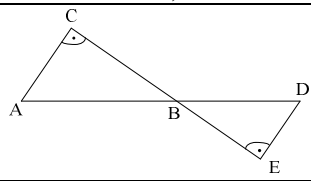


Univerzitet u Tuzli  
Fakultet elektrotehnike

**ZBIRKA**  
**zadataka sa prijemnih ispita iz Matematike na**  
**Fakultetu elektrotehnike u periodu od 2000-2017. godine**

Tuzla, maj 2018

UNIVERZITET U TUZLI Fakultet elektrotehnike Tuzla, 03.07.2017. godine	KVALIFIKACIONI ISPIT IZ MATEMATIKE	GRUPA A
1.	Broj cjelobrojnih realnih rješenja nejednačine $\frac{1}{x^2+2x+1} \geq 1$ je: a) 6                                      b) 4                                      c) 3                                      d) 2	
2.	Proizvod realnih rješenja sistema jednačina $\frac{3}{4x+y+4} - \frac{1}{2x-8y+4} = \frac{13}{2}$ i $\frac{1}{8x+2y+8} - \frac{5}{x-4y+2} = 6$ je: a) $-\frac{1}{2}$ b) $-2$ c) $-\frac{3}{2}$ d) 2	
3.	Zbir svih realnih vrijednosti parametra $k$ za koje su rješenja jednačine $7x^2 - 2(3k-1)x + k^2 - 2k = 0$ realna i jednaka je: a) $-\frac{1}{8}$ b) $\frac{1}{2}$ c) $-4$ d) $\frac{1}{8}$	
4.	Zbir realnih rješenja sistema jednačina $2^x \cdot 25^y = 2$ i $\frac{4^x}{5^y} = 4$ je: a) 1                                      b) $\log \frac{2}{5}$ c) $\log \frac{5}{2}$ d) $1 + 2 \log 2$	
5.	Broj realnih rješenja jednačine $x^2 + 5 x^2 - 1  + 2 = 0$ je: a) 6                                      b) 4                                      c) 2                                      d) 0	
6.	Vrijednost izraza $2 \log_{\frac{1}{81}} 27 - 3 \log_{\frac{1}{27}} 9 + \log_{\frac{1}{9}} \frac{1}{3} + \log_3 \frac{1}{9} - \log_9 \frac{1}{27} + 2 \log_{81} 27$ je: a) 2                                      b) $-\frac{1}{2}$ c) $\frac{1}{2}$ d) $\frac{3}{2}$	
7.	S koliko nula se završava proizvod svih prirodnih brojeva od 1 do 91? a) 91                                      b) 36                                      c) 18                                      d) 9	
8.	Ako je dat kompleksan broj $Z_1 = 1 - 2i$ , koliko iznosi modul kompleksnog broja $Z = x + iy$ tako da vrijedi $\operatorname{Re} \left\{ \frac{Z}{Z_1} \right\} = \frac{7}{5}$ i $\operatorname{Im} \{ Z \cdot Z_1 \} = 1$ ? a) $\sqrt{2}$ b) $\sqrt{5}$ c) 1                                      d) $\sqrt{10}$	
9.	Broj svih realnih rješenja jednačine $\sin 2x - \frac{\sqrt{3}}{3} \cos 2x = 1$ na segmentu $[0, 2\pi]$ je: a) 4                                      b) 3                                      c) 2                                      d) 1	
10.	Ako za trouglove $\triangle ABC$ i $\triangle BDE$ vrijedi $AB : BD = 3 : 2$ i $BC = 5$ , koliko iznosi $BE$ ? a) $\frac{1}{3}$ b) $\frac{10}{3}$ c) $\frac{4}{3}$ d) $\frac{5}{3}$	



**NAPOMENA**

Poslije svakog zadatka ponuđena su četiri odgovora. Zaokružite slovo ispred tačnog odgovora. Svaki zadatak nosi 4 boda. Samo zaokruženo tačno rješenje zadatka koje je potkrijepljeno izradom na pomoćnim papirima nosi 4 boda. U ostalim slučajevima zadatak ne nosi bodove.

1.  $\frac{1}{x^2+2x+1} \geq 1$ ; Dp:  $x^2+2x+1 \neq 0 \Rightarrow$   
 $(x+1)^2 \neq 0 \Rightarrow x \neq -1$ .  
 $\frac{1}{x^2+2x+1} - 1 \geq 0$ ;  $\frac{1-x^2-2x-1}{x^2+2x+1} \geq 0$ ;  
 $\frac{-x^2-2x}{x^2+2x+1} \geq 0$ ;  $-\frac{x^2+2x}{x^2+2x+1} \geq 0 \ /(-1)$   
 $\frac{x^2+2x}{x^2+2x+1} \leq 0$ ;  $\frac{x(x+2)}{(x+1)^2} \leq 0$

	$-\infty$	$-2$	$-1$	$0$	$+\infty$
$x$	-	-	-	-	+
$x+2$	-	+	+	+	+
$(x+1)^2$	+	+	+	+	+
	+	-	-	-	+

$x \in [-2, -1) \cup (-1, 0]$ .

Cjelobrojna rješenja:  $x \{-2, 0\}$

Broj cjelobrojnih rješenja 2.

a) 6

b) 4

c) 3

d) 2

2.  $\frac{3}{4x+y+4} - \frac{1}{2x-8y+4} = \frac{13}{2}$   
 $\frac{1}{8x+2y+8} - \frac{5}{x-4y+2} = 6$   
 $3 \cdot \frac{1}{4x+y+4} - \frac{1}{2} \cdot \frac{1}{x-4y+2} = \frac{13}{2}$   
 $\frac{1}{2} \cdot \frac{1}{4x+y+4} - 5 \cdot \frac{1}{x-4y+2} = 6$   
 Smjena:  $\frac{1}{4x+y+4} = a \wedge \frac{1}{x-4y+2} = b$   
 $3a - \frac{1}{2}b = \frac{13}{2} \ / \cdot 2$   
 $\frac{1}{2}a - 5b = 6 \ / \cdot 2$   
 $6a - b = 13 \ / \cdot (-10)$   
 $a - 10b = 12$   
 $-60a + 10b = -130$   
 $a - 10b = 12$

$-59a = -118 \Rightarrow a = 2$

$\frac{1}{2} \cdot 2 - 5b = 6 \Rightarrow -5b = 6 - 1 \Rightarrow b = -1$

$\frac{1}{4x+y+4} = 2 \ /^{-1}$

$\frac{1}{x-4y+2} = -1 \ /^{-1}$

$4x+y+4 = \frac{1}{2}$

$x-4y+2 = -1$

$4x+y = -\frac{7}{2} \ / \cdot 4$

$x-4y = 1$

$16x+4y = -14$

$x-4y = -3$

$17x = -17 \Rightarrow x = -1$

$-4+y = -\frac{7}{2} \Rightarrow y = \frac{1}{2}$

$x \cdot y = -1 \cdot \frac{1}{2} = -\frac{1}{2}$

a)  $-\frac{1}{2}$

b) -2

c)  $-\frac{3}{2}$

d) 2



6.	$2 \log_{\frac{1}{81}} 27 - 3 \log_{\frac{1}{27}} 9 + \log_{\frac{1}{9}} \frac{1}{3} + \log_3 \frac{1}{9} - \log_9 \frac{1}{27} + 2 \log_{81} 27 =$ $2 \cdot \frac{\log 27}{\log \frac{1}{81}} - 3 \cdot \frac{\log 9}{\log \frac{1}{27}} + \frac{\log \frac{1}{3}}{\log \frac{1}{9}} + \frac{\log \frac{1}{9}}{\log 3} - \frac{\log \frac{1}{27}}{\log 9} + 2 \cdot \frac{\log 27}{\log 81} =$ $2 \cdot \frac{\log 3^3}{\log 3^{-4}} - 3 \cdot \frac{\log 3^2}{\log 3^{-3}} + \frac{\log 3^{-1}}{\log 3^{-2}} + \frac{\log 3^{-2}}{\log 3} - \frac{\log 3^{-3}}{\log 3^2} + 2 \cdot \frac{\log 3^3}{\log 3^4} =$ $2 \cdot \frac{3 \log 3}{-4 \log 3} - 3 \cdot \frac{2 \log 3}{-3 \log 3} + \frac{-\log 3}{-2 \log 3} + \frac{-2 \log 3}{\log 3} - \frac{-3 \log 3}{2 \log 3} + 2 \cdot \frac{3 \log 3}{4 \log 3} = -\frac{3}{2} + 2 + \frac{1}{2} - 2 + \frac{3}{2} + \frac{3}{2} = 2$
	<p>a) 2                                      b) <math>-\frac{1}{2}</math>                                      c) <math>\frac{1}{2}</math>                                      d) <math>\frac{3}{2}</math></p>
7.	<p>Nula na kraju proizvoda prirodnih brojeva nastaje na dva načina: od broja 10 ili množenjem brojeva 2 i 5. Kako je i broj 10 djeljiv brojem 5, to znači da je broj nula kojima se proizvod završava jednak broju faktora djeljivih sa 5. Od 1 do 91 je 18 brojeva djeljivih sa 5 (prvi manji broj od 91 djeljiv sa 5 je 90, tj. <math>90:5=18</math>) što znači da se proizvod prirodnih brojeva od 1 do 91 završava sa 18 nula.</p>
	<p>a) 91                                      b) 36                                      c) 18                                      d) 9</p>
8.	$\operatorname{Re} \left\{ \frac{Z}{Z_1} \right\} = \operatorname{Re} \left\{ \frac{x+iy}{1+2i} \right\} = \operatorname{Re} \left\{ \frac{x+iy}{1+2i} \cdot \frac{1-2i}{1-2i} \right\} = \operatorname{Re} \left\{ \frac{x-2ix+iy+2y}{5} \right\} = \frac{x+2y}{5} = \frac{7}{5} \Rightarrow x+2y=7$ $\operatorname{Im} \{ Z \cdot Z_1 \} = \operatorname{Im} \{ (x+iy) \cdot (1-2i) \} = \operatorname{Im} \{ x-2ix+iy+2y \} = 1 \Rightarrow -2x+y=1$ <hr/> $x+2y=7 \quad / \cdot 2$ $-2x+y=1$ $2x+4y=14$ $-2x+y=1$ $5y=15 \Rightarrow y=3$ $-2x+3=1 \Rightarrow x=1$ $ Z  =  1+3i  = \sqrt{1^2+3^2} = \sqrt{10}$
	<p>a) <math>\sqrt{2}</math>                                      b) <math>\sqrt{5}</math>                                      c) 1                                      d) <math>\sqrt{10}</math></p>

$$\sin 2x - \frac{\sqrt{3}}{3} \cos 2x = 1$$

$$\sin 2x - \operatorname{tg} \frac{\pi}{6} \cdot \cos 2x = 1$$

$$\sin 2x - \frac{\sin \frac{\pi}{6}}{\cos \frac{\pi}{6}} \cdot \cos 2x = 1 \quad / \cdot \cos \frac{\pi}{6}$$

$$\sin 2x \cdot \cos \frac{\pi}{6} - \sin \frac{\pi}{6} \cdot \cos 2x = \cos \frac{\pi}{6}$$

9.  $\sin\left(2x - \frac{\pi}{6}\right) = \frac{\sqrt{3}}{2}$

$$1^\circ : 2x - \frac{\pi}{6} = \frac{\pi}{3} + 2k\pi \Rightarrow 2x = \frac{\pi}{2} + 2k\pi \Rightarrow x = \frac{\pi}{4} + k\pi \Rightarrow$$

$$x_1 = \frac{\pi}{4} \in [0, 2\pi] \wedge x_2 = \frac{5\pi}{4} \in [0, 2\pi], k \in Z$$

$$2^\circ : 2x - \frac{\pi}{6} = \frac{2\pi}{3} + 2k\pi \Rightarrow 2x = \frac{5\pi}{6} + 2k\pi \Rightarrow x = \frac{5\pi}{12} + k\pi \Rightarrow$$

$$x_3 = \frac{5\pi}{12} \in [0, 2\pi] \wedge x_4 = \frac{17\pi}{12} \in [0, 2\pi], k \in Z$$

Broj realnih rješenja: 2.

a) 4

b) 3

c) 2

d) 1

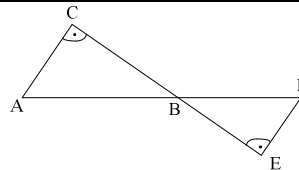
Uglovi  $\sphericalangle ABC$  i  $\sphericalangle DBE$  su unakrsni, pa vrijedi:  $\sphericalangle ABC = \sphericalangle DBE$

Kako su  $\sphericalangle ACB = \sphericalangle BED = \frac{\pi}{2}$ , slijedi  $\sphericalangle BAC = \sphericalangle BDE$ .

Trouglovi  $ABC$  i  $BDE$  su slični:  $\triangle ABC \cong \triangle BDE$ :

10  $AB : BD = BC : BE = 3 : 2$

$$2BC = 3BE \Rightarrow BE = \frac{2BC}{3} = \frac{10}{3}$$

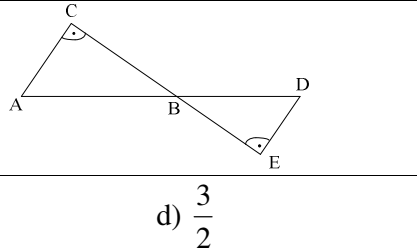


a)  $\frac{1}{3}$

b)  $\frac{10}{3}$

c)  $\frac{4}{3}$

d)  $\frac{5}{3}$

UNIVERZITET U TUZLI Fakultet elektrotehnike Tuzla, 03.07.2017. godine	KVALIFIKACIONI ISPIT IZ MATEMATIKE	GRUPA B
1.	Broj cjelobrojnih rješenja realnih nejednačine $\frac{4}{x^2 - 8x + 16} \geq 1$ je: a) 2                                      b) 3                                      c) 4                                      d) 5	
2.	Proizvod realnih rješenja sistema jednačina $\frac{6}{2x-3y-2} + \frac{1}{6x+4y-6} = \frac{7}{4}$ i $\frac{3}{4x-6y-4} - \frac{1}{3x+2y-3} = 1$ je: a) $-\frac{1}{6}$ b) $-\frac{1}{3}$ c) $-\frac{1}{2}$ d) $-1$	
3.	Zbir svih realnih vrijednosti parametra $k$ za koje su rješenja jednačine $3x^2 - 2(2k+1)x + k^2 + 4k = 0$ realna i jednaka je: a) 8                                      b) $-\frac{1}{8}$ c) $\frac{1}{8}$ d) $-1$	
4.	Zbir realnih rješenja sistema jednačina $4^x \cdot 25^y = \frac{1}{25}$ i $\frac{2^x}{5^y} = 5$ je: a) $\log \frac{2}{5}$ b) $\log \frac{5}{2}$ c) $-1$ d) $1 + \log 5$	
5.	Broj realnih rješenja jednačine $x^2 + 5 x^2 - 4  + 2 = 0$ je: a) 0                                      b) 2                                      c) 4                                      d) 6	
6.	Vrijednost izraza $4 \log_{\frac{1}{9}} 27 - \frac{1}{2} \log_{\frac{1}{3}} 81 + \log_{\frac{1}{81}} \frac{1}{3} + \log_3 \frac{1}{27} - 2 \log_9 \frac{1}{81} - \log_{81} 3$ je: a) $\frac{1}{4}$ b) $-3$ c) $-\frac{1}{4}$ d) 4	
7.	S koliko nula se završava proizvod svih prirodnih brojeva od 1 do 81? a) 16                                      b) 32                                      c) 8                                      d) 81	
8.	Ako je dat kompleksan broj $Z_1 = 1 - 3i$ , koliko iznosi modul kompleksnog broja $Z = x + iy$ tako da vrijedi $\operatorname{Re}\left\{\frac{Z}{Z_1}\right\} = \frac{1}{2}$ i $\operatorname{Im}\{Z \cdot Z_1\} = -5$ ? a) $\sqrt{2}$ b) 1                                      c) $\sqrt{10}$ d) $\sqrt{5}$	
9.	Broj realnih rješenja jednačine $\sin x - \frac{\sqrt{3}}{3} \cos x = 1$ na segmentu $[0, 2\pi]$ je: a) 4                                      b) 3                                      c) 2                                      d) 1	
10.	Ako za trouglove $\triangle ABC$ i $\triangle BDE$ vrijedi $BC : BE = 3 : 1$ i $AB = 2$ , koliko iznosi $BD$ ?	
	a) $\frac{1}{3}$	b) $\frac{2}{3}$
	c) 1	d) $\frac{3}{2}$

**NAPOMENA**

Poslije svakog zadatka ponuđena su četiri odgovora. Zaokružite slovo ispred tačnog odgovora. Svaki zadatak nosi 4 boda. Samo zaokruženo tačno rješenje zadatka koje je potkrijepljeno izradom na pomoćnim papirima nosi 4 boda. U ostalim slučajevima zadatak ne nosi bodove.

1.  $\frac{4}{x^2-8x+16} \geq 1$ ;  $Dp: x^2-8x+16 \neq 0 \Rightarrow$   
 $(x-4)^2 \neq 0 \Rightarrow x \neq 4.$

	$-\infty$	2	4	6	$+\infty$
$x-2$	-	+	+	+	+
$x-6$	-	-	-	+	+
$(x-4)^2$	+	+	+	+	+
	+	-	-	+	+

$\frac{4}{x^2-8x+16} - 1 \geq 0$ ;  $\frac{4-x^2+8x-16}{x^2-8x+16} \geq 0$ ;  
 $\frac{-x^2+8x-12}{x^2-8x+16} \geq 0$ ;  $-\frac{x^2-8x+12}{x^2-8x+16} \geq 0 \quad /(-1)$   
 $\frac{x^2-8x+12}{x^2-8x+16} \leq 0$ ;  $\frac{(x-2)(x-6)}{(x-4)^2} \leq 0$   
 $x \in [2,4) \cup (4,6].$   
 Cjelobrojna rješenja:  $x\{2,3,5,6\}$   
 Broj cjelobrojnih rješenja 4.

a) 2                      b) 3                      c) 4                      d) 5

2.

$\frac{6}{2x-3y-2} + \frac{1}{6x+4y-6} = \frac{7}{4}$ $\frac{3}{4x-6y-4} - \frac{1}{3x+2y-3} = 1$ $6 \cdot \frac{1}{2x-3y-2} + \frac{1}{2} \cdot \frac{1}{3x+2y-3} = \frac{7}{4}$ $\frac{3}{2} \cdot \frac{1}{2x-3y-2} - \frac{1}{3x+2y-3} = 1$ <p><i>Smjena:</i> <math>\frac{1}{2x-3y-2} = a \quad \wedge \quad \frac{1}{3x+2y-3} = b</math></p> $6a + \frac{1}{2}b = \frac{7}{4} \quad / \cdot 4$ $\frac{3}{2}a - b = 1 \quad / \cdot 2$ $24a + 2b = 7$ $3a - 2b = 2$	$27a = 9 \Rightarrow a = \frac{1}{3}$ $24 \cdot \frac{1}{3} + 2b = 7 \Rightarrow 2b = 7 - 8 \Rightarrow b = -\frac{1}{2}$ $\frac{1}{2x-3y-2} = \frac{1}{3} \quad /^{-1}$ $\frac{1}{3x+2y-3} = -\frac{1}{2} \quad /^{-1}$ $2x-3y-2 = 3$ $3x+2y-3 = -2$ $2x-3y = 5 \quad / \cdot 2$ $3x+2y = 1 \quad / \cdot 3$ $4x-6y = 10$ $9x+6y = 3$ $13x = 13 \Rightarrow x = 1$ $2-3y = 1 \Rightarrow y = -1$ $x \cdot y = 1 \cdot (-1) = -1$
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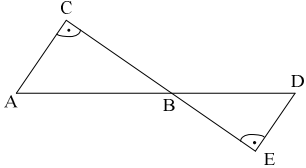
a)  $-\frac{1}{6}$                       b)  $-\frac{1}{3}$                       c)  $-\frac{1}{2}$                       d) -1





6.	$4 \log_{\frac{1}{9}} 27 - \frac{1}{2} \log_{\frac{1}{3}} 81 + \log_{\frac{1}{81}} \frac{1}{3} + \log_3 \frac{1}{27} - 2 \log_9 \frac{1}{81} - \log_{81} 3 =$ $4 \cdot \frac{\log 27}{\log \frac{1}{9}} - \frac{1}{2} \cdot \frac{\log 81}{\log \frac{1}{3}} + \frac{\log \frac{1}{3}}{\log \frac{1}{81}} + \frac{\log \frac{1}{27}}{\log 3} - 2 \cdot \frac{\log \frac{1}{81}}{\log 9} - \frac{\log 3}{\log 81} =$ $4 \cdot \frac{\log 3^3}{\log 3^{-2}} - \frac{1}{2} \cdot \frac{\log 3^4}{\log 3^{-1}} + \frac{\log 3^{-1}}{\log 3^{-4}} + \frac{\log 3^{-3}}{\log 3} - 2 \cdot \frac{\log 3^{-4}}{\log 3^2} - \frac{\log 3}{\log 3^4} =$ $4 \cdot \frac{3 \log 3}{-2 \log 3} - \frac{1}{2} \cdot \frac{4 \log 3}{-\log 3} + \frac{-\log 3}{-4 \log 3} + \frac{-3 \log 3}{\log 3} - 2 \cdot \frac{-4 \log 3}{2 \log 3} - \frac{\log 3}{4 \log 3} = -6 + 2 + \frac{1}{4} - 3 + 4 - \frac{1}{4} = -3$ <p>a) <math>\frac{1}{4}</math>                      b) <math>-3</math>                      c) <math>-\frac{1}{4}</math>                      d) 4</p>
7.	<p>Nula na kraju proizvoda prirodnih brojeva nastaje na dva načina: od broja 10 ili množenjem brojeva 2 i 5. Kako je i broj 10 djeljiv brojem 5, to znači da je broj nula kojima se proizvod završava jednak broju faktora djeljivih sa 5. Od 1 do 81 je 18 brojeva djeljivih sa 5 (prvi manji broj od 81 djeljiv sa 5 je 80, tj. <math>80:5=16</math>) što znači da se proizvod prirodnih brojeva od 1 do 81 završava sa 16 nula.</p> <p>a) 16                      b) 32                      c) 8                      d) 81</p>
8.	$\operatorname{Re} \left\{ \frac{Z}{Z_1} \right\} = \operatorname{Re} \left\{ \frac{x+iy}{1+3i} \right\} = \operatorname{Re} \left\{ \frac{x+iy}{1+3i} \cdot \frac{1-3i}{1-3i} \right\} = \operatorname{Re} \left\{ \frac{x-3ix+iy+3y}{10} \right\} = \frac{x+3y}{10} = \frac{1}{2} \Rightarrow x+3y=5$ $\operatorname{Im} \{ Z \cdot Z_1 \} = \operatorname{Im} \{ (x+iy) \cdot (1-3i) \} = \operatorname{Im} \{ x-3ix+iy+3y \} = -5 \Rightarrow -3x+y=-5$ <hr/> $x+3y=5 \quad / \cdot 3$ $\underline{-3x+y=-5}$ $3x+9y=15$ $\underline{-3x+y=-5}$ $10y=10 \Rightarrow y=1$ $x+3=5 \Rightarrow x=2$ $ Z  =  2+i  = \sqrt{2^2+1^2} = \sqrt{5}$ <p>a) <math>\sqrt{2}</math>                      b) 1                      c) <math>\sqrt{10}</math>                      d) <math>\sqrt{5}</math></p>



UNIVERZITET U TUZLI Fakultet elektrotehnike Tuzla, 03.07.2017. godine	KVALIFIKACIONI ISPIT IZ MATEMATIKE	GRUPA C
1.	Broj cjelobrojnih realnih rješenja nejednačine $\frac{1}{x^2 - 2x + 1} \geq 1$ je: a) 5                                      b) 4                                      c) 3                                      d) 2	
2.	Proizvod realnih rješenja sistema jednačina $\frac{2}{4x - y - 4} - \frac{1}{2x + 8y + 4} = \frac{7}{2}$ i $\frac{1}{8x - 2y - 8} - \frac{3}{x + 4y + 2} = -2$ je: a) 2                                      b) $-\frac{1}{2}$ c) -1                                      d) -2	
3.	Zbir svih realnih vrijednosti parametra $k$ za koje su rješenja jednačine $7x^2 + 2(3k + 1)x + k^2 + 2k = 0$ realna i jednaka je: a) 4                                      b) $-\frac{1}{4}$ c) $\frac{1}{2}$ d) $\frac{1}{4}$	
4.	Zbir realnih rješenja sistema jednačina $4^x \cdot 5^y = 5$ i $\frac{2^x}{25^y} = \frac{2}{50}$ je: a) $\log \frac{2}{5}$ b) $2 \log 5$ c) 1                                      d) $\log \frac{5}{2}$	
5.	Broj realnih rješenja jednačine $x^2 + 2 x^2 - 1  + 3 = 0$ je: a) 0                                      b) 2                                      c) 4                                      d) 6	
6.	Vrijednost izraza $2 \log_{\frac{1}{16}} 8 - 3 \log_{\frac{1}{8}} 4 + \log_{\frac{1}{4}} \frac{1}{2} + \log_2 \frac{1}{4} - \log_4 \frac{1}{8} + 2 \log_{16} 8$ je: a) $\frac{3}{2}$ b) $-\frac{3}{2}$ c) $\frac{1}{2}$ d) 2	
7.	S koliko nula se završava proizvod svih prirodnih brojeva od 1 do 71? a) 7                                      b) 14                                      c) 28                                      d) 71	
8.	Ako je dat kompleksan broj $Z_1 = 1 + 2i$ , koliko iznosi modul kompleksnog broja $Z = x + iy$ tako da vrijedi $\operatorname{Re}\{Z \cdot Z_1\} = 3$ i $\operatorname{Im}\left\{\frac{Z}{Z_1}\right\} = \frac{1}{5}$ ? a) $\sqrt{5}$ b) $\sqrt{10}$ c) $\sqrt{2}$ d) 1	
9.	Broj realnih rješenja jednačine $\sin 2x - \cos 2x = 1$ na segmentu $[0, 2\pi]$ je: a) 4                                      b) 3                                      c) 2                                      d) 5	
10.	Ako za trouglove $\triangle ABC$ i $\triangle BDE$ vrijedi $BC : BE = 3 : 2$ i $AB = 3$ , koliko iznosi $BD$ ?	
	a) $\frac{1}{3}$ b) $\frac{3}{2}$ c) 3                                      d) 2	

**NAPOMENA**

Poslije svakog zadatka ponuđena su četiri odgovora. Zaokružite slovo ispred tačnog odgovora. Svaki zadatak nosi 4 boda. Samo zaokruženo tačno rješenje zadatka koje je potkrijepljeno izradom na pomoćnim papirima nosi 4 boda. U ostalim slučajevima zadatak ne nosi bodove.

1.  $\frac{1}{x^2+2x+1} \geq 1$ ; Dp:  $x^2+2x+1 \neq 0 \Rightarrow$   
 $(x+1)^2 \neq 0 \Rightarrow x \neq -1$ .

$\frac{1}{x^2+2x+1} - 1 \geq 0$ ;  $\frac{1-x^2-2x-1}{x^2+2x+1} \geq 0$ ;  
 $\frac{-x^2-2x}{x^2+2x+1} \geq 0$ ;  $-\frac{x^2+2x}{x^2+2x+1} \geq 0 \quad /(-1)$   
 $\frac{x^2+2x}{x^2+2x+1} \leq 0$ ;  $\frac{x(x+2)}{(x+1)^2} \leq 0$

	$-\infty$	$-2$	$-1$	$0$	$+\infty$
$x$	-	-	-	+	
$x+2$	-	+	+	+	
$(x+1)^2$	+	+	+	+	
	+	-	-	+	

$x \in [-2, -1) \cup (-1, 0]$ .

Cjelobrojna rješenja:  $x \{-2, 0\}$

Broj cjelobrojnih rješenja 2.

a) 5

b) 4

c) 3

d) 2

2.

$\frac{2}{4x-y-4} - \frac{1}{2x+8y+4} = \frac{7}{2}$

$\frac{1}{8x-2y-8} - \frac{3}{x+4y+2} = -2$

$2 \cdot \frac{1}{4x-y-4} - \frac{1}{2} \cdot \frac{1}{x+4y+2} = \frac{7}{2}$

$\frac{1}{2} \cdot \frac{1}{4x-y-4} - 3 \cdot \frac{1}{x+4y+2} = -2$

Smjena:  $\frac{1}{4x-y-4} = a \wedge \frac{1}{x+4y+2} = b$

$2a - \frac{1}{2}b = \frac{7}{2} \quad / \cdot 2$

$\frac{1}{2}a - 3b = -2 \quad / \cdot 2$

$4a - b = 7 \quad / \cdot (-6)$

$a - 6b = -10$

$-24a + 6b = -42$

$a - 6b = -4$

$-23a = -46 \Rightarrow a = 2$

$\frac{1}{2} \cdot 2 - 3b = -2 \Rightarrow 3b = -2 - 1 \Rightarrow b = 1$

$\frac{1}{4x-y-4} = 2 \quad /^{-1}$

$\frac{1}{x+4y+2} = -2 \quad /^{-1}$

$4x - y - 4 = \frac{1}{2}$

$x + 4y + 2 = 1$

$4x - y = \frac{9}{2} \quad / \cdot 4$

$x + 4y = -1$

$16x - 4y = 18$

$x + 4y = -1$

$17x = 17 \Rightarrow x = 1$

$4 - y = \frac{9}{2} \Rightarrow y = -\frac{1}{2}$

$x \cdot y = 1 \cdot \left(-\frac{1}{2}\right) = -\frac{1}{2}$

a) 2

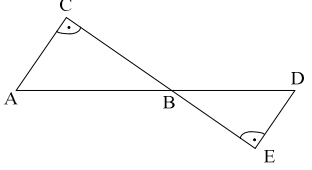
b)  $-\frac{1}{2}$

c) -1

d) -2



6.	$2 \log_{\frac{1}{16}} 8 - 3 \log_{\frac{1}{8}} 4 + \log_{\frac{1}{4}} \frac{1}{2} + \log_2 \frac{1}{4} - \log_4 \frac{1}{8} + 2 \log_{16} 8 =$ $2 \cdot \frac{\log 8}{\log \frac{1}{16}} - 3 \cdot \frac{\log 4}{\log \frac{1}{8}} + \frac{\log \frac{1}{2}}{\log \frac{1}{4}} + \frac{\log \frac{1}{4}}{\log 2} - \frac{\log \frac{1}{8}}{\log 4} + 2 \cdot \frac{\log 8}{\log 16} =$ $2 \cdot \frac{\log 2^3}{\log 2^{-4}} - 3 \cdot \frac{\log 2^2}{\log 2^{-3}} + \frac{\log 2^{-1}}{\log 2^{-2}} + \frac{\log 2^{-2}}{\log 2} - \frac{\log 2^{-3}}{\log 2^2} + 2 \cdot \frac{\log 2^3}{\log 2^4} =$ $2 \cdot \frac{3 \log 2}{-4 \log 2} - 3 \cdot \frac{2 \log 2}{-3 \log 2} + \frac{-\log 2}{-2 \log 2} + \frac{-2 \log 2}{\log 2} - \frac{-3 \log 2}{2 \log 2} + 2 \cdot \frac{3 \log 2}{4 \log 2} = -\frac{3}{2} + 2 + \frac{1}{2} - 2 + \frac{3}{2} + \frac{3}{2} = 2$
	<p>a) <math>\frac{3}{2}</math>                      b) <math>-\frac{3}{2}</math>                      c) <math>\frac{1}{2}</math>                      <b>d) 2</b></p>
7.	<p>Nula na kraju proizvoda prirodnih brojeva nastaje na dva načina: od broja 10 ili množenjem brojeva 2 i 5. Kako je i broj 10 djeljiv brojem 5, to znači da je broj nula kojima se proizvod završava jednak broju faktora djeljivih sa 5. Od 1 do 71 je 14 brojeva djeljivih sa 5 (prvi manji broj od 71 djeljiv sa 5 je 70, tj. <math>70:5=14</math>) što znači da se proizvod prirodnih brojeva od 1 do 71 završava sa 14 nula.</p>
	<p>a) 7                      <b>b) 14</b>                      c) 28                      d) 71</p>
8.	$\operatorname{Re}\{Z \cdot Z_1\} = \operatorname{Re}\{(x+iy) \cdot (1+2i)\} = \operatorname{Re}\{x+2ix+iy-2y\} = 3 \Rightarrow x-2y=3$ $\operatorname{Im}\left\{\frac{Z}{Z_1}\right\} = \operatorname{Im}\left\{\frac{x+iy}{1-2i}\right\} = \operatorname{Im}\left\{\frac{x+iy}{1-2i} \cdot \frac{1+2i}{1+2i}\right\} = \operatorname{Im}\left\{\frac{x+2ix+iy-2y}{5}\right\} = \frac{2x+y}{5} = \frac{1}{5} \Rightarrow 2x+y=1$ <hr/> $x-2y=3$ $2x+y=1 \quad / \cdot 2$ $x-2y=3$ $4x+2y=2$ $5x=5 \Rightarrow x=1$ $2+y=1 \Rightarrow y=-1$ $ Z  =  1-i  = \sqrt{1^2 + (-1)^2} = \sqrt{2}$
	<p>a) <math>\sqrt{5}</math>                      b) <math>\sqrt{10}</math>                      c) <math>\sqrt{2}</math>                      d) 1</p>

9.	$\sin 2x - \cos 2x = 1 \quad   \cdot \frac{\sqrt{2}}{2}$ $\frac{\sqrt{2}}{2} \sin 2x - \frac{\sqrt{2}}{2} \cos 2x = \frac{\sqrt{2}}{2}$ $\sin 2x \cdot \cos \frac{\pi}{4} - \cos 2x \cdot \sin \frac{\pi}{4} = \frac{\sqrt{2}}{2}$ $\sin \left( 2x - \frac{\pi}{4} \right) = \frac{\sqrt{2}}{2}$ $1^\circ : 2x - \frac{\pi}{4} = \frac{\pi}{4} + 2k\pi \Rightarrow 2x = \frac{\pi}{2} + 2k\pi \Rightarrow x = \frac{\pi}{4} + k\pi \Rightarrow$ $x_1 = \frac{\pi}{4} \in [0, 2\pi] \wedge x_2 = \frac{5\pi}{4} \in [0, 2\pi], k \in \mathbb{Z}$ $2^\circ : 2x - \frac{\pi}{4} = \frac{3\pi}{4} + 2k\pi \Rightarrow 2x = \pi + 2k\pi \Rightarrow x = \frac{\pi}{2} + k\pi \Rightarrow$ $x_3 = \frac{\pi}{2} \in [0, 2\pi] \wedge x_4 = \frac{3\pi}{2} \in [0, 2\pi], k \in \mathbb{Z}$ <p>Broj realnih rješenja : 4.</p>	
	<p>a) 4    b) 3    c) 2    d) 5</p>	
10	<p>Uglovi <math>\sphericalangle ABC</math> i <math>\sphericalangle DBE</math> su unakrsni, pa vrijedi : <math>\sphericalangle ABC = \sphericalangle DE</math></p> <p>Kako su <math>\sphericalangle ACB = \sphericalangle BED = \frac{\pi}{2}</math>, slijedi <math>\sphericalangle BAC = \sphericalangle BDE</math>.</p> <p>Troouglovi <math>ABC</math> i <math>BDE</math> su slični : <math>\triangle ABC \cong \triangle BDE</math> :</p> <p><math>BC : BE = AB : BD = 3 : 2</math></p> <p><math>2AB = 3BD \Rightarrow BD = \frac{2AB}{3} = 2</math></p>	
	<p>a) <math>\frac{1}{3}</math>    b) <math>\frac{3}{2}</math>    c) 3    d) 2</p>	

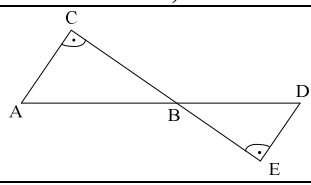
**NAPOMENA**

Poslije svakog zadatka ponuđena su četiri odgovora.  
 Zaokružite slovo ispred tačnog odgovora.  
 Svaki zadatak nosi 4 boda.  
 Samo zaokruženo tačno rješenje zadatka koje je  
 potkrijepljeno izradom na pomoćnim papirima nosi 4 boda.  
 U ostalim slučajevima zadatak ne nosi bodove.



UNIVERZITET U TUZLI Fakultet elektrotehnike Tuzla, 03.07.2017. godine	KVALIFIKACIONI ISPIT IZ MATEMATIKE	GRUPA D
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1.	Broj cjelobrojnih realnih rješenja nejednačine $\frac{4}{x^2+8x+16} \geq 1$ je: a) 2                                      b) 4                                      c) 6                                      d) 3
2.	Proizvod realnih rješenja sistema jednačina $\frac{3}{2x+3y+2} - \frac{1}{6x-4y+6} = \frac{5}{4}$ i $\frac{3}{4x+6y+4} - \frac{1}{3x-2y+3} = 1$ je: a) $-\frac{1}{6}$ b) $-2$ c) $-1$ d) $-\frac{1}{2}$
3.	Zbir svih realnih vrijednosti parametra $k$ za koje su rješenja jednačine $3x^2+2(2k-1)x+k^2-3k=0$ realna i jednaka je: a) $-5$ b) $-\frac{1}{5}$ c) $\frac{1}{5}$ d) 1
4.	Zbir realnih rješenja sistema jednačina $2^x \cdot 5^y = \frac{1}{2}$ i $\frac{4^x}{25^y} = \frac{1}{4}$ je: a) $\log \frac{2}{5}$ b) $\log \frac{5}{2}$ c) $1 + \log 2$ d) $-1$
5.	Broj realnih rješenja jednačine $x^2+2 x^2-4 +3=0$ je: a) 4                                      b) 6                                      c) 0                                      d) 2
6.	Vrijednost izraza $4 \log_{\frac{1}{4}} 8 - \frac{1}{2} \log_{\frac{1}{2}} 16 + \log_{\frac{1}{16}} \frac{1}{2} + \log_2 \frac{1}{8} - 2 \log_4 \frac{1}{16} - \log_{16} 2$ je: a) $\frac{1}{4}$ b) $-3$ c) $-\frac{1}{4}$ d) 4
7.	S koliko nula se završava proizvod svih prirodnih brojeva od 1 do 61? a) 24                                      b) 6                                      c) 61                                      d) 12
8.	Ako je dat kompleksan broj $Z_1 = 1+3i$ , koliko iznosi modul kompleksnog broja $Z = x+iy$ tako da vrijedi $\operatorname{Re}\{Z \cdot Z_1\} = -5$ i $\operatorname{Im}\left\{\frac{Z}{Z_1}\right\} = \frac{1}{2}$ ? a) $\sqrt{5}$ b) 1                                      c) $\sqrt{10}$ d) $\sqrt{2}$
9.	Broj realnih rješenja jednačine $\sin x - \cos x = 1$ na segmentu $[0, 2\pi]$ je: a) 1                                      b) 2                                      c) 3                                      d) 4
10.	Ako za trouglove $\triangle ABC$ i $\triangle BDE$ vrijedi $AB:BD = 3:1$ i $BC = 2$ , koliko iznosi $BE$ ? a) $\frac{1}{3}$ b) $\frac{4}{3}$ c) $\frac{2}{3}$ d) 1



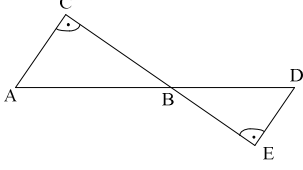
**NAPOMENA**

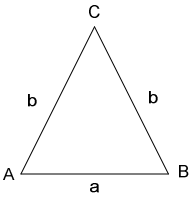
Poslije svakog zadatka ponuđena su četiri odgovora. Zaokružite slovo ispred tačnog odgovora. Svaki zadatak nosi 4 boda. Samo zaokruženo tačno rješenje zadatka koje je potkrijepljeno izradom na pomoćnim papirima nosi 4 boda. U ostalim slučajevima zadatak ne nosi bodove.



3.	$3x^2 + 2(2k - 1)x + k^2 - 3k = 0$ <p>Rješenja kvadratne jednačine <math>ax^2 + bx + c = 0</math> su realna i jednaka ako vrijedi :</p> $D = b^2 - 4ac = 0$ $4(2k - 1)^2 - 4 \cdot 3(k^2 - 3k) = 0 \quad / : 4$ $(2k - 1)^2 - 3(k^2 - 3k) = 0$ $4k^2 - 4k + 1 - 3k^2 + 9k = 0$ $k^2 + 5k + 1 = 0$ <p>Viettova pravila : <math>ak^2 + bk + c = 0, \quad k_1 + k_2 = -\frac{b}{a} = -5.</math></p>
	<p>a) <math>-5</math>                                      b) <math>-\frac{1}{5}</math>                                      c) <math>\frac{1}{5}</math>                                      d) <math>1</math></p>
4.	$2^x \cdot 5^y = \frac{1}{2} \quad / \log$ $\frac{4^x}{25^y} = \frac{1}{4} \quad / \log$ $\log(2^x \cdot 5^y) = \log 2^{-1}$ $\log \frac{2^{2x}}{5^{2y}} = \log 2^{-2}$ $\log 2^x + \log 5^y = -\log 2$ $\log 2^{2x} - \log 5^{2y} = -2 \log 2$ $x \log 2 + y \log 5 = -\log 2 \quad / \cdot 2$ $2x \log 2 - 2y \log 5 = -2 \log 2$ $2x \log 2 + 2y \log 5 = -2 \log 2$ $2x \log 2 - 2y \log 5 = -2 \log 2$ $4x \log 2 = -4 \log 2 \Rightarrow x = -1$ $-\log 2 + y \log 5 = -\log 2 \Rightarrow y \log 5 = 0 \Rightarrow y = 0$ $x + y = -1 + 0 = -1$
	<p>a) <math>\log \frac{2}{5}</math>                                      b) <math>\log \frac{5}{2}</math>                                      c) <math>1 + \log 2</math>                                      d) <math>-1</math></p>
5.	$x^2 + 2 x^2 - 4  + 3 = 0$ <p>Kako je :</p> $x^2 \geq 0, \text{ za } \forall x \in R$ $ x^2 - 4  \geq 0, \text{ za } \forall x \in R$ $3 > 0$ <p>slijedi : <math>x^2 + 2 x^2 - 4  + 3 &gt; 0, \text{ za } \forall x \in R.</math></p> <p>Jednačina nema realnih rješenja.</p>
	<p>a) <math>4</math>                                      b) <math>6</math>                                      c) <math>0</math>                                      d) <math>2</math></p>

6.	$4 \log_{\frac{1}{4}} 8 - \frac{1}{2} \log_{\frac{1}{2}} 16 + \log_{\frac{1}{16}} \frac{1}{2} + \log_2 \frac{1}{8} - 2 \log_4 \frac{1}{16} - \log_{16} 2 =$ $4 \cdot \frac{\log 8}{\log \frac{1}{4}} - \frac{1}{2} \cdot \frac{\log 16}{\log \frac{1}{2}} + \frac{\log \frac{1}{2}}{\log \frac{1}{16}} + \frac{\log \frac{1}{8}}{\log 2} - 2 \cdot \frac{\log \frac{1}{16}}{\log 4} - \frac{\log 2}{\log 16} =$ $4 \cdot \frac{\log 2^3}{\log 2^{-2}} - \frac{1}{2} \cdot \frac{\log 2^4}{\log 2^{-1}} + \frac{\log 2^{-1}}{\log 2^{-4}} + \frac{\log 2^{-3}}{\log 2} - 2 \cdot \frac{\log 2^{-4}}{\log 2^2} - \frac{\log 2}{\log 2^4} =$ $4 \cdot \frac{3 \log 2}{-2 \log 2} - \frac{1}{2} \cdot \frac{4 \log 2}{-\log 2} + \frac{-\log 2}{-4 \log 2} + \frac{-3 \log 2}{\log 2} - 2 \cdot \frac{-4 \log 2}{2 \log 2} - \frac{\log 2}{4 \log 2} = -6 + 2 + \frac{1}{4} - 3 + 4 - \frac{1}{4} = -3$
	<p>a) <math>\frac{1}{4}</math>                      b) <math>-3</math>                      c) <math>-\frac{1}{4}</math>                      d) 4</p>
7.	<p>Nula na kraju proizvoda prirodnih brojeva nastaje na dva načina: od broja 10 ili množenjem brojeva 2 i 5. Kako je i broj 10 djeljiv brojem 5, to znači da je broj nula kojima se proizvod završava jednak broju faktora djeljivih sa 5. Od 1 do 61 je 12 brojeva djeljivih sa 5 (prvi manji broj od 61 djeljiv sa 5 je 60, tj. <math>60:5=12</math>) što znači da se proizvod prirodnih brojeva od 1 do 91 završava sa 12 nula.</p>
	<p>a) 24                      b) 6                      c) 61                      d) 12</p>
8.	$\operatorname{Re}\{Z \cdot Z_1\} = \operatorname{Re}\{(x+iy) \cdot (1+3i)\} = \operatorname{Re}\{x+3ix+iy-3y\} = -5 \Rightarrow x-3y = -5$ $\operatorname{Im}\left\{\frac{Z}{Z_1}\right\} = \operatorname{Im}\left\{\frac{x+iy}{1-3i}\right\} = \operatorname{Im}\left\{\frac{x+iy}{1-3i} \cdot \frac{1+3i}{1+3i}\right\} = \operatorname{Im}\left\{\frac{x+3ix+iy-3y}{10}\right\} = \frac{3x+y}{10} = \frac{1}{2} \Rightarrow 3x+y=5$ <hr/> $x-3y = -5$ $\underline{3x+y=5} \quad / \cdot 3$ $x-3y = -5$ $\underline{9x+3y=15}$ $10x=10 \Rightarrow x=1$ $3+y=5 \Rightarrow y=2$ $ Z  =  1-2i  = \sqrt{1^2 + (-2)^2} = \sqrt{5}$
	<p>a) <math>\sqrt{5}</math>                      b) 1                      c) <math>\sqrt{10}</math>                      d) <math>\sqrt{2}</math></p>

9.	$\sin x - \cos x = 1 \quad   \cdot \frac{\sqrt{2}}{2}$ $\frac{\sqrt{2}}{2} \sin x - \frac{\sqrt{2}}{2} \cos x = \frac{\sqrt{2}}{2}$ $\sin x \cdot \cos \frac{\pi}{4} - \cos x \cdot \sin \frac{\pi}{4} = \frac{\sqrt{2}}{2}$ $\sin \left( x - \frac{\pi}{4} \right) = \frac{\sqrt{2}}{2}$ $1^\circ : x - \frac{\pi}{4} = \frac{\pi}{4} + 2k\pi \Rightarrow x = \frac{\pi}{2} + 2k\pi \Rightarrow x_1 = \frac{\pi}{2} \in [0, 2\pi], k \in \mathbb{Z}$ $2^\circ : x - \frac{\pi}{4} = \frac{3\pi}{4} + 2k\pi \Rightarrow x = \pi + 2k\pi \Rightarrow x_2 = \pi \in [0, 2\pi], k \in \mathbb{Z}$ <p>Broj realnih rješenja : 2.</p>	
	a) 1                                      b) 2                                      c) 3                                      d) 4	
10	<p>Uglovi <math>\sphericalangle ABC</math> i <math>\sphericalangle DBE</math> su unakrsni, pa vrijedi : <math>\sphericalangle ABC = \sphericalangle DE</math></p> <p>Kako su <math>\sphericalangle ACB = \sphericalangle BED = \frac{\pi}{2}</math>, slijedi <math>\sphericalangle BAC = \sphericalangle BDE</math>.</p> <p>Trouglovi <math>ABC</math> i <math>BDE</math> su slični : <math>\triangle ABC \cong \triangle BDE</math> :</p> $AB : BD = BC : BE = 3 : 1$ $BC = 3BE \Rightarrow BE = \frac{BC}{3} = \frac{2}{3}$	
	a) $\frac{1}{3}$ b) $\frac{4}{3}$ c) $\frac{2}{3}$ d) 1	

1.	Zbir svih realnih rješenja jednačine $(x^2 + 2x - 4)^2 - 3(x^2 + 2x - 4) - 4 = 0$ je: a) 4                                      b) -10                                      c) -4                                      d) 2
2.	Za koje vrijednosti parametra $k$ su zbir i proizvod realnih rješenja jednačine $(k+3)x^2 + (3k-1)x + (4k-1) = 0$ uvijek pozitivni? a) $\left(-3, \frac{1}{4}\right)$ b) $\left(\frac{1}{4}, \frac{1}{3}\right)$ c) $(-\infty, -3)$ d) $\left(\frac{1}{3}, +\infty\right)$
3.	Broj realnih rješenja jednačine $x^2 + 5 x-2  + 4 = 0$ je: a) 0                                      b) 2                                      c) 3                                      d) 5
4.	Proizvod realnih rješenja sistema jednačina $3^{x-y} = 2$ i $3^{x+y} = 4$ je: a) $\frac{1}{4} \log_3^2 2$ b) 1                                      c) $\frac{1}{2} \log_3^2 2$ d) $\frac{3}{4} \log_3^2 2$
5.	Broj cjelobrojnih rješenja nejednačine $\log_{\frac{1}{3}} \log_2 (3x-5) \geq -1$ je: a) 4                                      b) 3                                      c) 2                                      d) 1
6.	Koliko iznosi zbir realnog i imaginarnog dijela kompleksnog broja $Z$ ako vrijedi $\frac{ Z +3i}{Z-2} = 1$ ? a) $\frac{7}{4}$ b) $-\frac{7}{4}$ c) $\frac{17}{4}$ d) $-\frac{17}{4}$
7.	Broj rješenja jednačine $3\sin 2x - 3\sin x + 2\cos x - 1 = 0$ na intervalu $(0, \pi)$ je: a) 0                                      b) 1                                      c) 3                                      d) 4
8.	Proizvod realnih rješenja sistema jednačina $\frac{1}{3x-y-3} - \frac{7}{2x+6y+4} = -\frac{1}{3}$ i $\frac{1}{6x-2y-6} + \frac{3}{x+3y+2} = 3$ je: a) $-\frac{1}{2}$ b) $-\frac{4}{3}$ c) 2                                      d) $\frac{4}{3}$
9.	Zbir realnih rješenja jednačine $2 \cdot 4^x + 5 \cdot 25^x = 7 \cdot 10^x$ je: a) 0                                      b) 1                                      c) 2                                      d) -1
10.	Obim jednakokrakog $ABC$ trougla je 20, a odnos stranica je $a : b = 1 : 2$ . Koliko iznosi površina trougla?  a) $2\sqrt{17}$ b) $4\sqrt{17}$ c) $4\sqrt{15}$ d) $2\sqrt{15}$
<b>NAPOMENA</b>	<b>Poslije svakog zadatka ponuđena su četiri odgovora. Zaokružite slovo ispred tačnog odgovora. Svaki zadatak nosi 4 boda. Samo zaokruženo tačno rješenje zadatka koje je potkrijepljeno izradom na pomoćnim papirima nosi 4 boda. U ostalim slučajevima zadatak ne nosi bodove.</b>

1.	$(x^2 + 2x - 4)^2 - 3(x^2 + 2x - 4) - 4 = 0$ <p>Smjena: <math>x^2 + 2x - 4 = t</math></p> $t^2 - 3t - 4 = 0$ $t_1 = 4 \wedge t_2 = -1$ $x^2 + 2x - 4 = 4$ $x^2 + 2x - 8 = 0$ $x_1 = 2 \wedge x_2 = -4$ $x^2 + 2x - 4 = -1$ $x^2 + 2x - 3 = 0$ $x_3 = 1 \wedge x_4 = -3$ $x_1 + x_2 + x_3 + x_4 = 2 - 4 + 1 - 3 = -4.$
	<p>a) 4                      b) -10                      c) -4                      d) 2</p>
2.	$(k+3)x^2 + (3k-1)x + (4k-1) = 0$ <p>Za rješenja kvadratne jednačine <math>ax^2 + bx + c = 0</math> vrijedi: <math>x_1 + x_2 = -\frac{b}{a} \wedge x_1 \cdot x_2 = \frac{c}{a}</math>.</p> $x_1 + x_2 = -\frac{3k-1}{k+3} \wedge x_1 \cdot x_2 = \frac{4k-1}{k+3}$ $-\frac{3k-1}{k+3} > 0 \Rightarrow \frac{3k-1}{k+3} < 0 \Rightarrow k_1 \in \left(-3, \frac{1}{3}\right)$ $\frac{4k-1}{k+3} > 0 \Rightarrow \frac{4k-1}{k+3} > 0 \Rightarrow k_2 \in (-\infty, -3) \cup \left(\frac{1}{4}, +\infty\right)$ $k = k_1 \cap k_2 \Rightarrow k_1 \in \left(\frac{1}{4}, \frac{1}{3}\right).$
	<p>a) <math>\left(-3, \frac{1}{4}\right)</math>                      b) <math>\left(\frac{1}{4}, \frac{1}{3}\right)</math>                      c) <math>(-\infty, -3)</math>                      d) <math>\left(\frac{1}{3}, +\infty\right)</math></p>
3.	$x^2 + 5 x-2  + 4 = 0$ <p>Kako je <math>x^2 \geq 0 \wedge  x-2  \geq 0 \wedge 4 &gt; 0</math> za <math>\forall x \in \mathbb{R}</math>, onda slijedi:</p> $x^2 + 5 x-2  + 4 > 0$ za $\forall x \in \mathbb{R}$ , tj. data jednačina nema realnih rješenja.
	<p>a) 0                      b) 2                      c) 3                      d) 5</p>

4.	$3^{x-y} = 2 / \log_3$ $3^{x+y} = 4 / \log_3$ $\log_3 3^{x-y} = \log_3 2$ $\log_3 3^{x+y} = \log_3 2^2$ $(x-y)\log_3 3 = \log_3 2$ $(x+y)\log_3 3 = 2\log_3 2$ $x-y = \log_3 2$ $x+y = 2\log_3 2 \quad +$ $2x = 3\log_3 2$ $x = \frac{3\log_3 2}{2}$ $\frac{3\log_3 2}{2} + y = 2\log_3 2$ $y = \frac{\log_3 2}{2}$ $x \cdot y = \frac{3\log_3 2}{2} \cdot \frac{\log_3 2}{2} = \frac{3\log_3^2 2}{4}.$
	<p>a) <math>\frac{1}{4}\log_3^2 2</math>                      b) 1                      c) <math>\frac{1}{2}\log_3^2 2</math>                      d) <math>\frac{3}{4}\log_3^2 2</math></p>
5.	$\log_{\frac{1}{3}} \log_2 (3x-5) \geq -1$ <p><i>DP:</i></p> $3x-5 > 0 \Rightarrow x_1 > \frac{5}{3}$ $\log_2 (3x-5) > 0 = \log_2 1 \Rightarrow 3x-5 > 1 \Rightarrow x_2 > 2$ $x_{DP} = x_1 \cap x_2 \Rightarrow x > 2.$ $\log_{\frac{1}{3}} \log_2 (3x-5) \geq -1 \cdot \log_{\frac{1}{3}} \frac{1}{3} = \log_{\frac{1}{3}} 3$ $\log_2 (3x-5) \leq 3 \cdot \log_2 2 = \log_2 2^3$ $3x-5 \leq 8 \Rightarrow x \leq \frac{13}{3}.$ <p><i>Rješenje nejednačine: <math>x \in \left(2, \frac{13}{3}\right]</math>.</i></p> <p><i>Broj cjelobrojnih rješenja je 2 (cjelobrojna rješenja su: 3 i 4).</i></p>
	<p>a) 4                      b) 3                      c) 2                      d) 1</p>





$$\frac{1}{3x-y-3} - \frac{7}{2x+6y+4} = -\frac{1}{3}$$

$$\frac{1}{6x-2y-6} + \frac{3}{x+3y+2} = 3$$

$$\frac{1}{3x-y-3} - \frac{7}{2} \cdot \frac{1}{x+3y+2} = -\frac{1}{3}$$

$$\frac{1}{2} \cdot \frac{1}{3x-y-3} + 3 \cdot \frac{1}{x+3y+2} = 3$$

$$\text{Smjena: } \frac{1}{3x-y-3} = a \wedge \frac{1}{x+3y+2} = b$$

$$a - \frac{7}{2}b = -\frac{1}{3} \quad / \cdot 6$$

$$\frac{1}{2}a + 3b = 3 \quad / \cdot 7$$

$$6a - 21b = -2$$

$$\frac{7}{2}a + 21b = 21$$

$$\frac{19}{2}a = 19 \Rightarrow a = 2$$

8.  $1 + 3b = 3 \Rightarrow b = \frac{2}{3}$

$$\frac{1}{3x-y-3} = 2 \quad /^{-1}$$

$$\frac{1}{x+3y+2} = \frac{2}{3} \quad /^{-1}$$

$$3x-y-3 = \frac{1}{2} \quad / \cdot 3$$

$$x+3y+2 = \frac{3}{2}$$

$$9x-3y-9 = \frac{3}{2} \quad / \cdot 3$$

$$x+3y+2 = \frac{3}{2}$$

$$10x-7 = 3 \Rightarrow x = 1$$

$$1+3y+2 = \frac{3}{2} \Rightarrow 3y = -\frac{3}{2} \Rightarrow y = -\frac{1}{2}$$

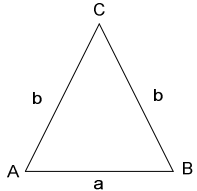
$$x \cdot y = -\frac{1}{2}$$

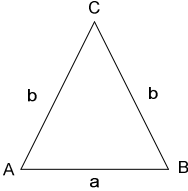
a)  $-\frac{1}{2}$

b)  $-\frac{4}{3}$

c) 2

d)  $\frac{4}{3}$

9.	$2 \cdot 4^x + 5 \cdot 25^x = 7 \cdot 10^x$ $2 \cdot (2^x)^2 - 7 \cdot 2^x \cdot 5^x + 5 \cdot (5^x)^2 = 0 \quad / : (5^x)^2$ $2 \cdot \left(\frac{2^x}{5^x}\right)^2 - 7 \cdot \frac{2^x}{5^x} + 5 = 0$ $2 \cdot \left[\left(\frac{2}{5}\right)^x\right]^2 - 7 \cdot \left(\frac{2}{5}\right)^x + 5 = 0$ <p>Smjena: <math>\left(\frac{2}{5}\right)^x = t</math></p> $2t^2 - 7t + 5 = 0$ $t_1 = 1 \wedge t_2 = \frac{5}{2}$ $\left(\frac{2}{5}\right)^x = 1 = \left(\frac{2}{5}\right)^0 \Rightarrow x_1 = 0$ $\left(\frac{2}{5}\right)^x = \frac{5}{2} = \left(\frac{2}{5}\right)^{-1} \Rightarrow x_2 = -1$ $x_1 + x_2 = -1.$	
<p>a) 0                                      b) 1                                      c) 2                                      d) -1</p>		
10.	$a + b + b = 20 \Rightarrow a + 2b = 20$ $a : b = 1 : 2 \Rightarrow 2a = b$ $a + 4a = 20 \Rightarrow a = 4 \Rightarrow b = 8.$ $h_a = \sqrt{b^2 - \left(\frac{a}{2}\right)^2} = \sqrt{64 - 4} = \sqrt{60} = 2\sqrt{15}$ $P = \frac{a \cdot h_a}{2} = \frac{4 \cdot 2\sqrt{15}}{2} = 4\sqrt{15}.$	
<p>a) <math>2\sqrt{17}</math>                                      b) <math>4\sqrt{17}</math>                                      c) <math>4\sqrt{15}</math>                                      d) <math>2\sqrt{15}</math></p>		
<b>NAPOMENA</b>	<p><b>Poslije svakog zadatka ponuđena su četiri odgovora.</b>  <b>Zaokružite slovo ispred tačnog odgovora.</b>  <b>Svaki zadatak nosi 4 boda.</b>  <b>Samo zaokruženo tačno rješenje zadatka koje je potkrijepljeno izradom na pomoćnim papirima nosi 4 boda.</b>  <b>U ostalim slučajevima zadatak ne nosi bodove.</b></p>	

1.	Zbir svih realnih rješenja jednačine $(x^2 - 3x - 6)^2 - 2(x^2 - 3x - 6) - 8 = 0$ je: a) 6                                      b) 12                                      c) -6                                      d) 2
2.	Za koje vrijednosti parametra $k$ su zbir i proizvod realnih rješenja jednačine $(k-3)x^2 + (4k+1)x + (3k+1) = 0$ uvijek negativni: a) $\left(-3, -\frac{1}{3}\right)$ b) $\left(-\frac{1}{4}, 1\right)$ c) $\left(-\frac{1}{3}, -\frac{1}{4}\right)$ d) $(1, +\infty)$
3.	Broj realnih rješenja jednačine $x^2 + 3 x-2  + 2 = 0$ je: a) 2                                      b) 0                                      c) 5                                      d) 3
4.	Zbir kvadrata realnih rješenja sistema jednačina $2^{x+y} = 3$ i $2^{x-y} = 9$ je: a) 1                                      b) $\frac{3}{2} \log_2^2 3$ c) $\frac{9}{4} \log_2^2 3$ d) $\frac{5}{2} \log_2^2 3$
5.	Broj cjelobrojnih rješenja nejednačine $\log_{\frac{1}{2}} \log_3(3x-5) \geq -1$ je: a) 4                                      b) 3                                      c) 2                                      d) 1
6.	Koliko iznosi zbir realnog i imaginarnog dijela kompleksnog broja $Z$ ako vrijedi $\frac{ Z +2i}{Z-1} = 1$ ? a) $-\frac{1}{2}$ b) $\frac{1}{2}$ c) $\frac{3}{2}$ d) $\frac{7}{2}$
7.	Broj rješenja jednačine $3\sin 2x + 3\sin x + 2\cos x + 1 = 0$ na intervalu $(0, \pi)$ je: a) 1                                      b) 0                                      c) 2                                      d) 3
8.	Proizvod realnih rješenja sistema jednačina $\frac{2}{2x+y-3} - \frac{3}{2x-4y-4} = \frac{3}{4}$ i $\frac{1}{4x+2y-6} + \frac{2}{x-2y-2} = \frac{15}{4}$ je: a) $-\frac{9}{4}$ b) $\frac{9}{4}$ c) $-\frac{2}{3}$ d) 1
9.	Zbir realnih rješenja jednačine $3 \cdot 9^x + 5 \cdot 25^x = 8 \cdot 15^x$ je: a) 1                                      b) 0                                      c) 2                                      d) -1
10.	Obim jednakokrakog $ABC$ trougla je 16, a odnos stranica je $a : b = 2 : 3$ . Koliko iznosi površina trougla?  a) $4\sqrt{2}$ b) $8\sqrt{2}$ c) 8                                      d) 16
<b>NAPOMENA</b>	<b>Poslije svakog zadatka ponuđena su četiri odgovora. Zaokružite slovo ispred tačnog odgovora. Svaki zadatak nosi 4 boda. Samo zaokruženo tačno rješenje zadatka koje je potkrijepljeno izradom na pomoćnim papirima nosi 4 boda. U ostalim slučajevima zadatak ne nosi bodove.</b>

1.	$(x^2 - 3x - 6)^2 - 2(x^2 - 3x - 6) - 8 = 0$ <p>Smjena: <math>x^2 - 3x - 6 = t</math></p> $t^2 - 2t - 8 = 0$ $t_1 = 4 \wedge t_2 = -2$ $x^2 - 3x - 6 = 4$ $x^2 - 3x - 10 = 0$ $x_1 = 5 \wedge x_2 = -2$ $x^2 - 3x - 6 = -2$ $x^2 - 3x - 4 = 0$ $x_3 = 4 \wedge x_4 = -1$ $x_1 + x_2 + x_3 + x_4 = 5 - 2 + 4 - 1 = 6.$
	<p>a) 6                      b) 12                      c) -6                      d) 2</p>
2.	$(k-3)x^2 + (4k+1)x + (3k+1) = 0$ <p>Za rješenja kvadratne jednačine <math>ax^2 + bx + c = 0</math> vrijedi: <math>x_1 + x_2 = -\frac{b}{a} \wedge x_1 \cdot x_2 = \frac{c}{a}</math>.</p> $x_1 + x_2 = -\frac{4k+1}{k-3} \wedge x_1 \cdot x_2 = \frac{3k+1}{k-3}$ $-\frac{4k+1}{k-3} < 0 \Rightarrow \frac{4k+1}{k-3} > 0 \Rightarrow k_1 \in \left(-\infty, -\frac{1}{4}\right) \cup (3, +\infty)$ $\frac{3k+1}{k-3} < 0 \Rightarrow k_2 \in \left(-\frac{1}{3}, +3\right)$ $k = k_1 \cap k_2 \Rightarrow k_1 \in \left(-\frac{1}{3}, -\frac{1}{4}\right).$
	<p>a) <math>\left(-3, -\frac{1}{3}\right)</math>                      b) <math>\left(-\frac{1}{4}, 1\right)</math>                      c) <math>\left(-\frac{1}{3}, -\frac{1}{4}\right)</math>                      d) <math>(1, +\infty)</math></p>
3.	$x^2 + 3 x-2  + 2 = 0$ <p>Kako je <math>x^2 \geq 0 \wedge  x-2  \geq 0 \wedge 2 &gt; 0</math> za <math>\forall x \in R</math>, onda slijedi:</p> $x^2 + 3 x-2  + 2 = 0$ za $\forall x \in R$ , tj. data jednačina nema realnih rješenja.
	<p>a) 2                      b) 0                      c) 5                      d) 3</p>

4.	$2^{x+y} = 3 / \log_2$ $2^{x-y} = 9 / \log_2$ $\log_2 2^{x+y} = \log_2 3$ $\log_2 2^{x-y} = \log_2 3^2$ $(x+y)\log_2 2 = \log_2 3$ $(x-y)\log_2 3 = 2\log_2 3$ $x+y = \log_2 3$ $x-y = 2\log_2 3 \quad +$ $2x = 3\log_2 3$ $x = \frac{3\log_2 3}{2}$ $\frac{3\log_2 3}{2} + y = \log_2 3$ $y = -\frac{\log_2 3}{2}$ $x^2 + y^2 = \left(\frac{3\log_2 3}{2}\right)^2 + \left(-\frac{\log_2 3}{2}\right)^2 = \frac{9\log_2^2 3}{4} + \frac{\log_2^2 3}{4} = \frac{10\log_2^2 3}{4} = \frac{5\log_2^2 3}{2}.$
	<p>a) 1                      b) <math>\frac{3}{2}\log_2^2 3</math>                      c) <math>\frac{9}{4}\log_2^2 3</math>                      d) <math>\frac{5}{2}\log_2^2 3</math></p>
5.	$\log_{\frac{1}{2}} \log_3 (3x-5) \geq -1$ <p><i>DP:</i></p> $3x-5 > 0 \Rightarrow x_1 > \frac{5}{3}$ $\log_3 (3x-5) > 0 = \log_3 1 \Rightarrow 3x-5 > 1 \Rightarrow x_2 > 2$ $x_{DP} = x_1 \cap x_2 \Rightarrow x > 2.$ $\log_{\frac{1}{2}} \log_3 (3x-5) \geq -1 \cdot \log_{\frac{1}{2}} \frac{1}{2} = \log_{\frac{1}{2}} 2$ $\log_3 (3x-5) \leq 2 \cdot \log_3 3 = \log_3 3^2$ $3x-5 \leq 9 \Rightarrow x \leq \frac{14}{3}.$ <p><i>Rješenje nejednačine:</i> <math>x \in \left(2, \frac{14}{3}\right]</math>.</p> <p><i>Broj cjelobrojnih rješenja je 2 (cjelobrojna rješenja su: 3 i 4).</i></p>
	<p>a) 4                      b) 3                      c) 2                      d) 1</p>



$$\frac{2}{2x+y-3} - \frac{3}{2x-4y-4} = \frac{3}{4}$$

$$\frac{1}{4x+2y-6} + \frac{2}{x-2y-2} = \frac{15}{4}$$

$$2 \cdot \frac{1}{2x+y-3} - \frac{3}{2} \cdot \frac{1}{x-2y-2} = \frac{3}{4}$$

$$\frac{1}{2} \cdot \frac{1}{2x+y-3} + 2 \cdot \frac{1}{x-2y-2} = \frac{15}{4}$$

$$\text{Smjena: } \frac{1}{2x+y-3} = a \wedge \frac{1}{x-2y-2} = b$$

$$2a - \frac{3}{2}b = \frac{3}{4} \quad / \cdot 16$$

$$\frac{1}{2}a + 2b = \frac{15}{4} \quad / \cdot 12$$

$$32a - 24b = 12$$

$$6a + 24b = 45$$

$$38a = 57 \Rightarrow a = \frac{3}{2}$$

$$8. \quad 3 - \frac{3}{2}b = \frac{3}{4} \Rightarrow b = \frac{3}{2}$$

$$\frac{1}{2x+y-3} = \frac{3}{2} \quad /^{-1}$$

$$\frac{1}{x-2y-2} = \frac{3}{2} \quad /^{-1}$$

$$2x+y-3 = \frac{2}{3} \quad / \cdot 2$$

$$x-2y-2 = \frac{2}{3}$$

$$4x+2y-6 = \frac{4}{3}$$

$$x-2y-2 = \frac{2}{3}$$

$$5x-8=2 \Rightarrow x=2$$

$$4+y-3 = \frac{2}{3} \Rightarrow y = -\frac{1}{3}$$

$$x \cdot y = -\frac{2}{3}$$

$$\text{a) } -\frac{9}{4}$$

$$\text{b) } \frac{9}{4}$$

$$\text{c) } -\frac{2}{3}$$

$$\text{d) } 1$$



$$3 \cdot 9^x + 5 \cdot 25^x = 8 \cdot 15^x$$

$$3 \cdot (3^x)^2 - 8 \cdot 3^x \cdot 5^x + 5 \cdot (5^x)^2 = 0 \quad / : (5^x)^2$$

$$3 \cdot \left(\frac{3^x}{5^x}\right)^2 - 8 \cdot \frac{3^x}{5^x} + 5 = 0$$

$$3 \cdot \left[\left(\frac{3}{5}\right)^x\right]^2 - 8 \cdot \left(\frac{3}{5}\right)^x + 5 = 0$$

Smjena:  $\left(\frac{3}{5}\right)^x = t$

$$3t^2 - 8t + 5 = 0$$

$$t_1 = 1 \wedge t_2 = \frac{5}{3}$$

$$\left(\frac{3}{5}\right)^x = 1 = \left(\frac{3}{5}\right)^0 \Rightarrow x_1 = 0$$

$$\left(\frac{3}{5}\right)^x = \frac{5}{3} = \left(\frac{3}{5}\right)^{-1} \Rightarrow x_2 = -1$$

$$x_1 + x_2 = -1.$$

9.

a) 1

b) 0

c) 2

d) -1

$$a + b + b = 16 \Rightarrow a + 2b = 16$$

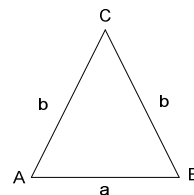
$$a : b = 2 : 3 \Rightarrow 3a = 2b \Rightarrow b = \frac{3}{2}a$$

$$a + 3a = 16 \Rightarrow a = 4 \Rightarrow b = 6.$$

10.

$$h_a = \sqrt{b^2 - \left(\frac{a}{2}\right)^2} = \sqrt{36 - 4} = \sqrt{32} = 4\sqrt{2}$$

$$P = \frac{a \cdot h_a}{2} = \frac{4 \cdot 4\sqrt{2}}{2} = 8\sqrt{2}.$$



a)  $4\sqrt{2}$

b)  $8\sqrt{2}$

c) 8

d) 16

**NAPOMENA**

**Poslije svakog zadatka ponuđena su četiri odgovora.**

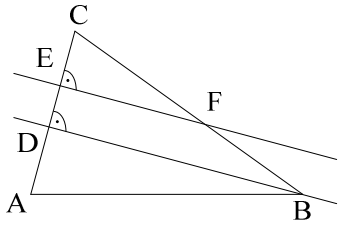
**Zaokružite slovo ispred tačnog odgovora.**

**Svaki zadatak nosi 4 boda.**

**Samo zaokruženo tačno rješenje zadatka koje je potkrijepljeno izradom na pomoćnim papirima nosi 4 boda.**

**U ostalim slučajevima zadatak ne nosi bodove.**

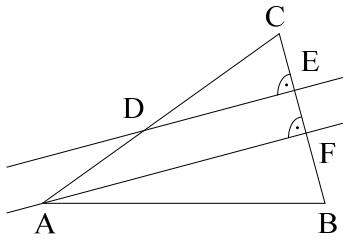
UNIVERZITET U TUZLI Fakultet elektrotehnike Tuzla, 01.07.2016. godine	KVALIFIKACIONI ISPIT IZ MATEMATIKE	GRUPA A
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1.	Realna vrijednost izraza $(\sqrt{3} + 2) \cdot \sqrt[3]{15\sqrt{3} - 26}$ je:	a) $-\sqrt{3}$	b) $-1$	c) $\sqrt{3}$	d) $1$
2.	Koliko iznosi zbir svih realnih vrijednosti parametra $k$ za koje razlika rješenja jednačine $(3k - 1)x^2 + (3k + 2)x + k = 0$ iznosi 1?	a) $\frac{11}{6}$	b) $\frac{1}{4}$	c) $-\frac{1}{4}$	d) $\frac{11}{3}$
3.	Broj realnih rješenja jednačine $x^2 + 3 x - 1  + 2 = 0$ je:	a) 1	b) 4	c) 2	d) 0
4.	Dat je niz brojeva 01234 01234 01234... Koji broj se nalazi na 2016. mjestu?	a) 4	b) 1	c) 0	d) 3
5.	Broj cjelobrojnih rješenja nejednačine $\log_{\frac{1}{2}} \log_3(2x - 3) \geq -1$ je:	a) 4	b) 3	c) 2	d) 0
6.	Koliko iznosi zbir realnog i imaginarnog dijela kompleksnog broja $Z$ ako vrijedi $\frac{ Z  + 2i}{\bar{Z} - 1} = -1$ ?	a) $\frac{7}{2}$	b) 2	c) $-\frac{7}{2}$	d) $\frac{1}{2}$
7.	Broj rješenja jednačine $\sin 2x + 2\sin x + \cos x + 1 = 0$ na intervalu $(0, \pi)$ je:	a) 0	b) 1	c) 2	d) 3
8.	Koliko iznosi $f(2)$ ako je $2f(x) + 3f(2 - x) = (x - 2)^2$ ?	a) 0	b) $\frac{12}{13}$	c) 2	d) $\frac{12}{5}$
9.	Zbir realnih rješenja jednačine $5 \cdot 9^x + 3 \cdot 25^x = 8 \cdot 15^x$ je:	a) $-\frac{1}{2}$	b) $\frac{1}{2}$	c) 1	d) $-1$
10.	<p>Trougao ABC je presiječen s dvije paralelne prave. Ako vrijedi <math>CB : CF = 2 : 1</math> i <math>CD = 8</math>, koliko iznosi <math>CE</math>?</p> 	a) 4	b) $\frac{1}{2}$	c) 8	d) 2

**NAPOMENA**

Poslije svakog zadatka ponuđena su četiri odgovora.  
 Zaokružite slovo ispred tačnog odgovora.  
 Svaki zadatak nosi 4 boda.  
 Samo zaokruženo tačno rješenje zadatka koje je potkrijepljeno izradom na pomoćnim papirima nosi 4 boda.  
 U ostalim slučajevima zadatak ne nosi bodove.

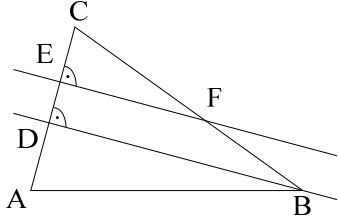
UNIVERZITET U TUZLI Fakultet elektrotehnike Tuzla, 01.07.2016. godine	KVALIFIKACIONI ISPIT IZ MATEMATIKE	GRUPA B
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1.	Realna vrijednost izraza $\sqrt{\sqrt{2}-1} \cdot \sqrt[6]{5\sqrt{2}+7}$ je: a) 1                      b) $\sqrt{3}$ c) $\sqrt{2}$ d) $2\sqrt{2}$
2.	Koliko iznosi zbir svih realnih vrijednosti parametra $k$ za koje razlika rješenja jednačine $(k+1)x^2 - (2k-1)x - 2k = 0$ iznosi 2? a) $\frac{3}{8}$ b) $\frac{3}{4}$ c) $-\frac{3}{4}$ d) $\frac{1}{2}$
3.	Broj realnih rješenja jednačine $x^2 + 4 x+1  + 3 = 0$ je: a) 1                      b) 0                      c) 4                      d) 2
4.	Dat je niz brojeva 1234 1234 1234... Koji broj se nalazi na 2016. mjestu? a) 1                      b) 2                      c) 3                      d) 4
5.	Broj cjelobrojnih rješenja nejednačine $\log_{\frac{1}{4}} \log_2 (2x+3) \geq -1$ je: a) 6                      b) 4                      c) 7                      d) 0
6.	Koliko iznosi zbir realnog i imaginarnog dijela kompleksnog broja $Z$ ako vrijedi $\frac{ Z -2i}{Z+1} = 1$ ? a) $-\frac{1}{2}$ b) $-\frac{7}{2}$ c) $\frac{7}{2}$ d) 1
7.	Broj rješenja jednačine $\sin 2x - 2\sin x + \cos x - 1 = 0$ na intervalu $(0, \pi)$ je: a) 3                      b) 2                      c) 1                      d) 0
8.	Koliko iznosi $f(3)$ ako je $2f(x) + f(3-x) = (x-3)^2$ ? a) 3                      b) -3                      c) 0                      d) $\frac{1}{3}$
9.	Zbir realnih rješenja jednačine $9 \cdot 16^x + 4 \cdot 81^x = 13 \cdot 36^x$ je: a) -1                      b) $\frac{1}{2}$ c) 1                      d) $-\frac{1}{2}$
10.	Trougao ABC je presiječen s dvije paralelne prave. Ako vrijedi $AC : DC = 3 : 2$ i $CF = 6$ , koliko iznosi $CE$ ? 
	a) $\frac{3}{2}$ b) 4                      c) 3                      d) $\frac{2}{3}$

**NAPOMENA**

Poslije svakog zadatka ponuđena su četiri odgovora.  
 Zaokružite slovo ispred tačnog odgovora.  
 Svaki zadatak nosi 4 boda.  
 Samo zaokruženo tačno rješenje zadatka koje je potkrijepljeno izradom na pomoćnim papirima nosi 4 boda.  
 U ostalim slučajevima zadatak ne nosi bodove.

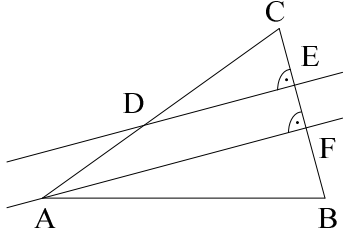
UNIVERZITET U TUZLI Fakultet elektrotehnike Tuzla, 01.07.2016. godine	KVALIFIKACIONI ISPIT IZ MATEMATIKE	GRUPA C
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1.	Realna vrijednost izraza $(\sqrt{3}-2) \cdot \sqrt[3]{15\sqrt{3}+26}$ je:	a) 1	b) $\sqrt{3}$	c) $-\sqrt{3}$	d) -1
2.	Koliko iznosi zbir svih realnih vrijednosti parametra $k$ za koje razlika rješenja jednačine $2(3k+1)x^2 - 2(3k-2)x - k = 0$ iznosi 1?	a) $\frac{8}{3}$	b) $-\frac{11}{6}$	c) $\frac{3}{16}$	d) $\frac{1}{2}$
3.	Broj realnih rješenja jednačine $x^2 + 5 x-1  + 4 = 0$ je:	a) 4	b) 2	c) 0	d) 1
4.	Dat je niz brojeva 123456 123456 123456... Koji broj se nalazi na 2016. mjestu?	a) 4	b) 6	c) 2	d) 1
5.	Broj cjelobrojnih rješenja nejednačine $\log_1 \log_2 (2x-3) \geq -1$ je:	a) 4	b) 2	c) 0	d) 3
6.	Koliko iznosi zbir realnog i imaginarnog dijela kompleksnog broja $Z$ ako vrijedi $\frac{ Z +3i}{Z-2} = -1$ ?	a) $\frac{7}{4}$	b) $\frac{17}{4}$	c) $-\frac{17}{4}$	d) 2
7.	Broj rješenja jednačine $\sin 2x + 2\sin x + \sqrt{2}\cos x + \sqrt{2} = 0$ na intervalu $(0, \pi)$ je:	a) 2	b) 1	c) 3	d) 0
8.	Koliko iznosi $f(2)$ ako je $3f(x) + 2f(2-x) = (x-2)^2$ ?	a) 2	b) $-\frac{8}{5}$	c) 0	d) $-\frac{8}{13}$
9.	Zbir realnih rješenja jednačine $3 \cdot 9^x + 5 \cdot 25^x = 8 \cdot 15^x$ je:	a) -1	b) $-\frac{1}{2}$	c) 1	d) -2
10.	<p>Trougao ABC je presječen s dvije paralelne prave. Ako vrijedi <math>CB : CF = 2 : 1</math> i <math>CE = 3</math>, koliko iznosi <math>CD</math>?</p> 	a) $\frac{3}{2}$	b) $\frac{1}{2}$	c) 6	d) 2

**NAPOMENA**

Poslije svakog zadatka ponuđena su četiri odgovora.  
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 Svaki zadatak nosi 4 boda.  
 Samo zaokruženo tačno rješenje zadatka koje je potkrijepljeno izradom na pomoćnim papirima nosi 4 boda.  
 U ostalim slučajevima zadatak ne nosi bodove.

UNIVERZITET U TUZLI Fakultet elektrotehnike Tuzla, 01.07.2016. godine	KVALIFIKACIONI ISPIT IZ MATEMATIKE	GRUPA D
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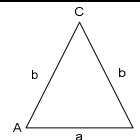
1.	Realna vrijednost izraza $\sqrt{\sqrt{2}+1} \cdot \sqrt[6]{5\sqrt{2}-7}$ je: a) $\sqrt{2}$ b) 1                      c) $2\sqrt{2}$ d) $\sqrt{3}$
2.	Koliko iznosi zbir svih realnih vrijednosti parametra $k$ za koje razlika rješenja jednačine $(k-1)x^2 + (2k+1)x + 2k = 0$ iznosi 2? a) $\frac{3}{8}$ b) $-\frac{8}{3}$ c) $\frac{3}{20}$ d) $\frac{5}{2}$
3.	Broj realnih rješenja jednačine $x^2 + 6 x+1  + 5 = 0$ je: a) 0                      b) 1                      c) 2                      d) 4
4.	Dat je niz brojeva 12345 12345 12345... Koji broj se nalazi na 2016. mjestu? a) 4                      b) 5                      c) 3                      d) 1
5.	Broj cjelobrojnih rješenja nejednačine $\log_{\frac{1}{2}} \log_4 (2x+3) \geq -1$ je: a) 4                      b) 7                      c) 0                      d) 6
6.	Koliko iznosi zbir realnog i imaginarnog dijela kompleksnog broja $Z$ ako vrijedi $\frac{ Z -3i}{Z+2} = 1$ ? a) $\frac{17}{4}$ b) $-\frac{17}{4}$ c) $-\frac{7}{4}$ d) $-2$
7.	Broj rješenja jednačine $\sin 2x - 2\sin x + \sqrt{2}\cos x - \sqrt{2} = 0$ na intervalu $(0, \pi)$ je: a) 3                      b) 1                      c) 2                      d) 0
8.	Koliko iznosi $f(3)$ ako je $f(x) + 2f(3-x) = (x-3)^2$ ? a) 6                      b) $\frac{18}{5}$ c) 3                      d) 0
9.	Zbir realnih rješenja jednačine $4 \cdot 16^x + 9 \cdot 81^x = 13 \cdot 36^x$ je: a) $\frac{1}{2}$ b) $-1$ c) 1                      d) 2
10.	<p>Trougao ABC je presiječen s dvije paralelne prave. Ako vrijedi <math>AC : DC = 3 : 2</math> i <math>CE = 6</math>, koliko iznosi <math>CF</math>?</p> 
	a) $\frac{3}{2}$ b) $\frac{2}{3}$ c) 4                      d) 9

**NAPOMENA**

Poslije svakog zadatka ponuđena su četiri odgovora.  
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 Samo zaokruženo tačno rješenje zadatka koje je potkrijepljeno izradom na pomoćnim papirima nosi 4 boda.  
 U ostalim slučajevima zadatak ne nosi bodove.

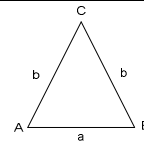
UNIVERZITET U TUZLI Fakultet elektrotehnike Tuzla, 31.08.2016. godine	KVALIFIKACIONI ISPIT IZ MATEMATIKE	GRUPA A
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1.	Zbir svih realnih rješenja jednačine $(x^2 + 3x - 6)^2 - 2(x^2 + 3x - 6) - 8 = 0$ je: a) 6                                      b) 0                                      c) -10                                      d) -6
2.	Za koje vrijednosti parametra $k$ su zbir i proizvod realnih rješenja jednačine $(k+2)x^2 + (2k-1)x + (3k-1) = 0$ uvijek pozitivni? a) $\left(\frac{1}{3}, \frac{1}{2}\right)$ b) $\left(-\frac{1}{2}, -\frac{1}{3}\right)$ c) $\left(-2, -\frac{1}{2}\right)$ d) $(-\infty, -2)$
3.	Proizvod realnih rješenja sistema jednačina $2^{x+y} = 3$ i $2^{x-y} = 9$ je: a) $-\frac{3}{2} \log_2^2 3$ b) 1                                      c) $-\frac{3}{4} \log_2^2 3$ d) $\frac{3}{2} \log_2^2 3$
4.	Broj cjelobrojnih rješenja nejednačine $\log_{\frac{1}{2}} \frac{1}{6 \cdot 2^x - 12} \geq \log_2 (4^x - 4 \cdot 2^x + 4)$ je: a) 4                                      b) 2                                      c) 1                                      d) 0
5.	Broj cjelobrojnih rješenja nejednačine $\left  \frac{1-6x+5x^2}{1+2x-3x^2} \right  \leq 1$ je: a) 0                                      b) 3                                      c) 1                                      d) 2
6.	Koliko iznosi vrijednost izraza $(\cos 75^\circ + i \sin 75^\circ) \cdot (\sin 15^\circ - i \cos 15^\circ)$ ? a) 1                                      b) $-i$ c) 0                                      d) $\frac{\sqrt{6}-\sqrt{2}}{4}$
7.	Za koje realne vrijednosti ugla $x$ na segmentu $[0, 2\pi]$ vrijedi $\frac{3\sqrt{3} + 6 \sin x - 2\sqrt{3} \cos x - 2 \sin 2x}{5 + 5 \sin x - 4 \cos x - 2 \sin 2x} \leq 0$ ? a) $\left[\pi, \frac{4\pi}{3}\right]$ b) $\left[\frac{4\pi}{3}, \frac{3\pi}{2}\right) \cup \left(\frac{3\pi}{2}, \frac{5\pi}{3}\right]$ c) $[0, \pi]$ d) $\left[\frac{5\pi}{3}, 2\pi\right]$
8.	135 studenata krenulo je s 3 autobusa na ekskurziju. Na prvom stajalištu iz prvog autobusa pređe u drugi 3 studenta, a u treći autobus 9 studenata. Kad su nastavili vožnju u svakom autobusu je bio jednak broj studenata. Koliko je studenata bilo u prvom autobusu na početku putovanja? a) 54                                      b) 33                                      c) 48                                      d) 57
9.	Vrijednost parametra $p$ , za koju prava $px + (p-1)y - 4 = 0$ ima dva puta veći odsječak na ordinati nego na apscisi, pripada intervalu: a) $(-1, 1]$ b) $(1, 3]$ c) $(-3, -1]$ d) $(3, 5]$
10.	Obim jednakokrakog $ABC$ trougla je 5, a odnos stranica je $a : b = 1 : 2$ . Koliko iznosi površina trougla? a) $\frac{\sqrt{15}}{2}$ b) $\sqrt{15}$ c) $\frac{\sqrt{15}}{4}$ d) $\frac{\sqrt{5}}{4}$



UNIVERZITET U TUZLI Fakultet elektrotehnike Tuzla, 31.08.2016. godine	KVALIFIKACIONI ISPIT IZ MATEMATIKE	GRUPA B
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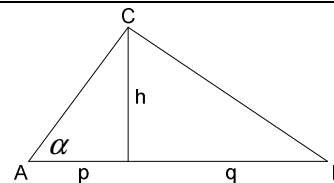
1.	Zbir svih realnih rješenja jednačine $(x^2 + 2x - 4)^2 - 3(x^2 + 2x - 4) - 4 = 0$ je: a) -8                      b) -4                      c) 0                      d) 4
2.	Za koje vrijednosti parametra $k$ su zbir i proizvod realnih rješenja jednačine $(k-2)x^2 + (2k+1)x + (3k+1) = 0$ uvijek pozitivni? a) $(\frac{1}{3}, \frac{1}{2})$ b) $(\frac{1}{2}, 2)$ c) $(-\frac{1}{2}, -\frac{1}{3})$ d) $(2, +\infty)$
3.	Proizvod realnih rješenja sistema jednačina $3^{x+y} = 2$ i $3^{x-y} = 4$ je: a) 1                      b) $-\frac{3}{2} \log_3^2 2$ c) $\frac{3}{2} \log_3^2 2$ d) $-\frac{3}{4} \log_3^2 2$
4.	Broj cjelobrojnih rješenja nejednačine $\log_{\frac{1}{2}} \frac{1}{6 \cdot 3^x - 18} \geq \log_2 (9^x - 6 \cdot 3^x + 9)$ je: a) 1                      b) 0                      c) 2                      d) 4
5.	Broj cjelobrojnih rješenja nejednačine $\left  \frac{2-7x+6x^2}{2+3x-2x^2} \right  \leq 1$ je: a) 0                      b) 1                      c) 2                      d) 3
6.	Koliko iznosi vrijednost izraza $(\cos 15^\circ + i \sin 15^\circ) \cdot (\sin 75^\circ - i \cos 75^\circ)$ ? a) $\frac{\sqrt{6} + \sqrt{2}}{4}$ b) $-i$ c) 0                      d) 1
7.	Za koje realne vrijednosti ugla $x$ na segmentu $[0, 2\pi]$ vrijedi $\frac{3\sqrt{3} - 2\sqrt{3} \sin x + 6 \cos x - 2 \sin 2x}{5 - 4 \sin x + 5 \cos x - 2 \sin 2x} \leq 0$ ? a) $[\frac{\pi}{2}, \frac{5\pi}{6}]$ b) $[\frac{5\pi}{6}, \pi) \cup (\pi, \frac{7\pi}{6}]$ c) $[\frac{7\pi}{6}, \frac{4\pi}{3}]$ d) $[\frac{4\pi}{3}, \frac{3\pi}{2}]$
8.	126 studenata krenulo je s 3 autobusa na ekskurziju. Na prvom stajalištu iz prvog autobusa pređe u drugi 4 studenta, a u treći autobus 7 studenata. Kad su nastavili vožnju u svakom autobusu je bio jednak broj studenata. Koliko je studenata bilo u trećem autobusu na početku putovanja? a) 31                      b) 46                      c) 35                      d) 38
9.	Vrijednost parametra $p$ , za koju prava $(p-1)x + py - 4 = 0$ ima dva puta veći odsječak na apscisi nego na ordinati, pripada intervalu: a) $(1, 3]$ b) $(3, 5]$ c) $(-1, 1]$ d) $(-3, -1]$
10.	Obim jednakokrakog $ABC$ trougla je 8, a odnos stranica je $a : b = 2 : 3$ . Koliko iznosi površina trougla? a) $\sqrt{2}$ b) $4\sqrt{2}$ c) 4                      d) $2\sqrt{2}$



**NAPOMENA** Poslije svakog zadatka ponuđena su četiri odgovora. Zaokružite slovo ispred tačnog odgovora. Svaki zadatak nosi 4 boda. Samo zaokruženo tačno rješenje zadatka koje je potkrijepljeno izradom na pomoćnim papirima nosi 4 boda. U ostalim slučajevima zadatak ne nosi bodove.

<b>UNIVERZITET U TUZLI</b> Fakultet elektrotehnike Tuzla, 09.07.2015.godine	<b>KVALIFIKACIONI ISPIT IZ</b> <b>MATEMATIKE</b>	<b>GRUPA A</b>
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1.	Broj realnih rješenja jednačine $ 4x^2 - 15x - 4  -  x - 4  = -4x$ je: a) 2                                      b) 1                                      c) 3                                      d) 4
2.	Proizvod svih realnih rješenja jednačine $2(x^2 - 2)^2 - 5(x^2 - 2) - 3 = 0$ je: a) $\sqrt{\frac{15}{2}}$ b) 15                                      c) $\frac{15}{2}$ d) $-\frac{3}{2}$
3.	Za koje vrijednosti parametra k je zbir realnih rješenja jednačine $(5k - 3)x^2 + (5k - 2)x - 127 = 0$ uvijek pozitivan: a) $(-\infty, -\frac{3}{5})$ b) $(\frac{2}{5}, \frac{3}{5})$ c) $(-\frac{3}{5}, -\frac{2}{5})$ d) $(\frac{3}{5}, +\infty)$
4.	Zbir realnih rješenja jednačine $36^x + 20 = 9 \cdot 6^x$ je: a) 9                                      b) $\log_6 9$ c) 20                                      d) $\log_6 20$
5.	Skup realnih rješenja nejednačine $\log_4(14 \cdot 4^x - 45) > 2x$ je: a) $(0, \log_4 5)$ b) $(5, 9)$ c) $(\log_4 5, \log_4 9)$ d) $(9, +\infty)$
6.	Koliko iznosi $\operatorname{Re}\{Z_1\} + \operatorname{Im}\{Z_1\}$ ako za izraz $Z_1 = \frac{5 - 3i - 2Z}{4 + 5i - \bar{Z}}$ vrijedi da je $Z = 4 + i$ ? a) $-\frac{1}{3}$ b) $-\frac{4}{3}$ c) $-\frac{5}{3}$ d) -1
7.	Koliko je $f(-2)$ ako je $f(x) - 3f\left(\frac{1}{x}\right) = 2x$ ? a) $\frac{8}{7}$ b) $-\frac{8}{7}$ c) -1                                      d) $\frac{7}{8}$
8.	Za koje realne vrijednosti ugla x iz I kvadranta vrijedi $\frac{\sin 2x + 4 \sin x - \sqrt{3} \cos x - 2\sqrt{3}}{2 \sin 2x + 2 \sin x + 6 \cos x + 3} > 0$ : a) $(0, \frac{\pi}{6})$ b) $(\frac{\pi}{3}, \frac{\pi}{2})$ c) $(\frac{\pi}{6}, \frac{\pi}{4})$ d) $(\frac{\pi}{4}, \frac{\pi}{3})$
9.	Dva pravca $3x - y - 6 = 0$ i $3x + 4y - 21 = 0$ sa x-osom čine trougao. Koliko iznosi površina tog trougla? a) $\frac{25}{2}$ b) $\frac{5}{2}$ c) $\frac{15}{2}$ d) 5
10.	Za pravougli trougao poznate su vrijednosti ugla $\alpha = 75^\circ$ i odsječka $q = 6$ . Koliko iznosi površina trougla? a) $36(2 + \sqrt{3})^2$ b) $36(2 - \sqrt{3})^2$ c) $72(2 + \sqrt{3})^2$ d) $72(2 - \sqrt{3})^2$

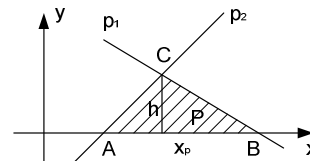




UNIVERZITET U TUZLI Fakultet elektrotehnike Tuzla, 09.07.2015.godine	KVALIFIKACIONI ISPIT IZ MATEMATIKE	GRUPA A
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1.	$ 4x^2 - 15x - 4  -  x - 4  = -4x \Rightarrow  (x-4)(4x+1)  -  x-4  = -4x \Rightarrow$ $ (x-4)  \cdot  (4x+1)  -  x-4  = -4x \Rightarrow  (x-4) ( (4x+1)  - 1) = -4x$ $ x-4  = \begin{cases} x-4, & x \geq 4 \\ -(x-4), & x < 4 \end{cases}, \quad  4x+1  = \begin{cases} (4x+1), & x \geq -\frac{1}{4} \\ -(4x+1), & x < -\frac{1}{4} \end{cases}$ $I: x \in \left(-\infty, -\frac{1}{4}\right) \Rightarrow -(x-4)[-(4x+1)-1] = -4x \Rightarrow 2x^2 - 5x - 4 = 0 \Rightarrow$ $x_1 = \frac{5 - \sqrt{57}}{4} < -\frac{1}{4} \in I, \quad x_2 = \frac{5 + \sqrt{57}}{4} \notin I.$ $II: x \in \left[-\frac{1}{4}, 4\right) \Rightarrow -(x-4)[(4x+1)-1] = -4x \Rightarrow 4x(x-5) = 0 \Rightarrow x_3 = 0 \in II, \quad x_4 = 5 \notin II.$ $III: x \in [4, +\infty) \Rightarrow (x-4)[(4x+1)-1] = -4x \Rightarrow 4x(x-3) = 0 \Rightarrow x_5 = 0 \notin III, \quad x_6 = 3 \notin I$ <p>Rješenja jednačine: <math>x_1 = \frac{5 - \sqrt{57}}{4} \wedge x_3 = 0</math>. Broj rješenja 2.</p>
	<p>a) 2                                      b) 1                                      c) 3                                      d) 4</p>
2.	$2(x^2 - 2)^2 - 5(x^2 - 2) - 3 = 0$ <p>Smjena: <math>(x^2 - 2) = t \Rightarrow 2t^2 - 5t - 3 = 0 \Rightarrow t_1 = 3 \wedge t_2 = -\frac{1}{2}</math>.</p> $1^o: x^2 - 2 = 3 \Rightarrow x^2 = 5 \Rightarrow x_{1/2} = \pm\sqrt{5}. \quad 2^o: x^2 - 2 = -\frac{1}{2} \Rightarrow x^2 = \frac{3}{2} \Rightarrow x_{3/4} = \pm\sqrt{\frac{3}{2}}.$ $x_1 \cdot x_2 \cdot x_3 \cdot x_4 = \sqrt{5} \cdot (-\sqrt{5}) \cdot \sqrt{\frac{3}{2}} \cdot \left(-\sqrt{\frac{3}{2}}\right) = \frac{15}{2}.$
	<p>a) <math>\sqrt{\frac{15}{2}}</math>                                      b) 15                                      c) <math>\frac{15}{2}</math>                                      d) <math>-\frac{3}{2}</math></p>
3.	$(5k-3)x^2 + (5k-2)x - 127 = 0$ <p>Po Viete – ovim pravila zbir rješenja kvadratne jednačine <math>ax^2 + bx + c = 0</math> je:</p> $x_1 + x_2 = -\frac{b}{a} \Rightarrow -\frac{(5k-2)}{(5k-3)} > 0 \Rightarrow \frac{(5k-2)}{(5k-3)} < 0 \Rightarrow x \in \left(\frac{2}{5}, \frac{3}{5}\right).$
	<p>a) <math>\left(-\infty, -\frac{3}{5}\right)</math>                                      b) <math>\left(\frac{2}{5}, \frac{3}{5}\right)</math>                                      c) <math>\left(-\frac{3}{5}, -\frac{2}{5}\right)</math>                                      d) <math>\left(\frac{3}{5}, +\infty\right)</math></p>
4.	$36^x + 20 = 9 \cdot 6^x; \quad (6^x)^2 - 9 \cdot 6^x + 20 = 0;$ $6^x = 5 \Rightarrow x_1 = \log_6 5.$ $6^x = 4 \Rightarrow x_2 = \log_6 4.$ $x_1 + x_2 = \log_6 5 + \log_6 4 = \log_6 20.$
	<p>a) 9                                      b) <math>\log_6 9</math>                                      c) 20                                      d) <math>\log_6 20</math></p>

5.	$\log_4(14 \cdot 4^x - 45) > 2x$ ; $D.P.: 14 \cdot 4^x - 45 > 0$ ; $4^x > \frac{45}{14}$ ; $x > \log_4 \frac{45}{14}$ . $\log_4(14 \cdot 4^x - 45) > \log_4 4^{2x}$ ; $14 \cdot 4^x - 45 > 4^{2x}$ ; $(4^x)^2 - 14 \cdot 4^x + 45 < 0$ ; $(4^x - 5)(4^x - 9) < 0 \Rightarrow x \in (\log_4 5, \log_4 9) \cap D.P. \Rightarrow x \in (\log_4 5, \log_4 9)$ .
	a) $(0, \log_4 5)$ b) $(5, 9)$ c) $(\log_4 5, \log_4 9)$ d) $(9, +\infty)$
6.	$Z_1 = \frac{5-3i-2Z}{4+5i-\bar{Z}}$ ; $Z = 4+i$ ; $\bar{Z} = 4-i$ $Z_1 = \frac{5-3i-8-2i}{4+5i-4+i} = \frac{-3-5i-i}{6i} = \frac{-3i+5}{-6} = \frac{-5+3i}{6} = -\frac{5}{6} + \frac{3}{6}i$ $\operatorname{Re}\{Z_1\} = -\frac{5}{6} \wedge \operatorname{Im}\{Z_1\} = \frac{3}{6}$ . $\operatorname{Re}\{Z_1\} + \operatorname{Im}\{Z_1\} = -\frac{2}{6} = -\frac{1}{3}$ .
	a) $-\frac{1}{3}$ b) $-\frac{4}{3}$ c) $-\frac{5}{3}$ d) $-1$
7.	$f(x) - 3f\left(\frac{1}{x}\right) = 2x$ . Iz zadate funkcionalne relacije se dobiva sistem: $Za x = -2 \Rightarrow f(-2) - 3f\left(-\frac{1}{2}\right) = -4$ . $Za x = -\frac{1}{2} \Rightarrow f\left(-\frac{1}{2}\right) - 3f(-2) = -1$ <i>Rješenje sistema</i> $f(-2) = \frac{7}{8}$ .
	a) $\frac{8}{7}$ b) $-\frac{8}{7}$ c) $-1$ d) $\frac{7}{8}$
8.	$\frac{\sin 2x + 4 \sin x - \sqrt{3} \cos x - 2\sqrt{3}}{2 \sin 2x + 2 \sin x + 6 \cos x + 3} > 0$ ; $\frac{2 \sin x \cos x + 4 \sin x - \sqrt{3} \cos x - 2\sqrt{3}}{4 \sin x \cos x + 2 \sin x + 6 \cos x + 3} > 0$ ; $\frac{2 \sin x (\cos x + 2) - \sqrt{3} (\cos x + 2)}{2 \sin x (2 \cos x + 1) + 3 (2 \cos x + 1)} > 0$ ; $\frac{(2 \sin x - \sqrt{3})(\cos x + 2)}{(2 \sin x + 3)(2 \cos x + 1)} > 0$ . <i>U prvom kvadrantu:</i> $2 \sin x - \sqrt{3} > 0 \Rightarrow \sin x > \frac{\sqrt{3}}{2} \Rightarrow x \in \left(\frac{\pi}{3}, \frac{\pi}{2}\right)$ . $\cos x + 2 > 0 \quad za \forall x \in R$ . $2 \sin x + 3 > 0 \quad za \forall x \in R$ . $2 \cos x + 1 > 0 \quad za \forall x \in \left(0, \frac{\pi}{2}\right)$ . <i>Rješenje nejednačine u I kvadrantu:</i> $x \in \left(\frac{\pi}{3}, \frac{\pi}{2}\right)$ .
	a) $\left(0, \frac{\pi}{6}\right)$ b) $\left(\frac{\pi}{3}, \frac{\pi}{2}\right)$ c) $\left(\frac{\pi}{6}, \frac{\pi}{4}\right)$ d) $\left(\frac{\pi}{4}, \frac{\pi}{3}\right)$
9.	<i>Tačke A i B se dobivaju iz jednačina pravaca <math>p_1</math> i <math>p_2</math> za <math>y_A = y_B = 0</math>.</i> $p_1: 3x - y - 6 = 0 \Rightarrow x_A = 2$ $p_2: 3x + 4y - 21 = 0 \Rightarrow x_B = 7 \Rightarrow x_p = x_B - x_A = 5$ . <i>Tačka C se dobiva kao presjek pravaca (rješenje sistema).</i> $h = y_C = 3$ . <i>Površina trougla je:</i> $P = \frac{x_p \cdot h}{2} = \frac{15}{2}$ .
	a) $\frac{25}{2}$ b) $\frac{5}{2}$ c) $\frac{15}{2}$ d) $5$



Ako je  $\alpha = 75^\circ$  u pravouglom trouglu, onda je  $\beta = 15^\circ$ .

$$\operatorname{tg} \beta = \frac{h}{q} \Rightarrow h = q \cdot \operatorname{tg} 15^\circ.$$

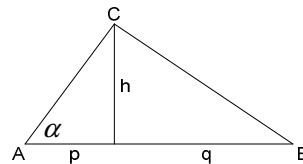
$$\operatorname{tg} 15^\circ = \operatorname{tg} (45^\circ - 30^\circ) = \frac{\operatorname{tg} 45^\circ - \operatorname{tg} 30^\circ}{1 + \operatorname{tg} 45^\circ \cdot \operatorname{tg} 30^\circ} = 2 - \sqrt{3} \Rightarrow h = 6 \cdot (2 - \sqrt{3}).$$

Iz sličnosti trouglova se dobiva

10. 
$$h^2 = p \cdot q \Rightarrow p = \frac{h^2}{q} = \frac{36(4 - 4\sqrt{3} + 3)}{6} = 6(7 - 4\sqrt{3}).$$

$$\text{Hipotenuza: } c = p + q = 6(8 - 4\sqrt{3}) = 24(2 - \sqrt{3}).$$

$$\text{Površina trougla: } P = \frac{c \cdot h}{2} = 72(2 - \sqrt{3})^2.$$



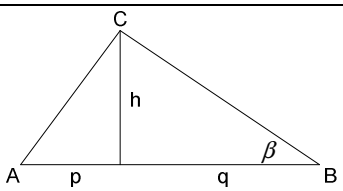
a)  $36(2 + \sqrt{3})^2$

b)  $36(2 - \sqrt{3})^2$

c)  $72(2 + \sqrt{3})^2$

**d)  $72(2 - \sqrt{3})^2$**

<b>UNIVERZITET U TUZLI</b> Fakultet elektrotehnike Tuzla, 09.07.2015.godine	<b>KVALIFIKACIONI ISPIT IZ</b> <b>MATEMATIKE</b>	<b>GRUPA B</b>
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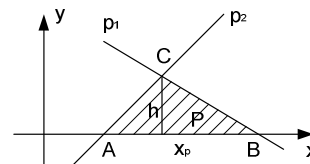
1.	Broj realnih rješenja jednačine $ 4x^2 + 15x - 4  -  x + 4  = 4x$ je: a) 4                      b) 1                      c) 3                      d) 2
2.	Proizvod svih realnih rješenja jednačine $2(x^2 - 1)^2 - 5(x^2 - 1) - 3 = 0$ je: a) 2                      b) $\sqrt{2}$ c) $\frac{3}{2}$ d) $-\frac{3}{2}$
3.	Za koje vrijednosti parametra k je zbir realnih rješenja jednačine $(5k + 2)x^2 - (3k + 4)x - 133 = 0$ uvijek negativan: a) $\left(\frac{2}{5}, \frac{4}{3}\right)$ b) $\left(-\infty, -\frac{4}{3}\right)$ c) $\left(-\frac{4}{3}, -\frac{2}{5}\right)$ d) $\left(\frac{4}{3}, +\infty\right)$
4.	Zbir realnih rješenja jednačine $36^x + 21 = 10 \cdot 6^x$ je: a) $\log_6 21$ b) $\log_6 10$ c) 21                      d) 10
5.	Skup realnih rješenja nejednačine $\log_5(13 \cdot 5^x - 42) > 2x$ je: a) $(7, +\infty)$ b) $(\log_5 6, \log_5 7)$ c) $(0, \log_5 6)$ d) $(6, 7)$
6.	Koliko iznosi $\operatorname{Re}\{Z_1\} + \operatorname{Im}\{Z_1\}$ ako za izraz $Z_1 = \frac{5 + 3i - 3Z}{3 - 4i - \bar{Z}}$ vrijedi da je $Z = 3 + 2i$ ? a) $-\frac{5}{2}$ b) -4                      c) $-\frac{1}{2}$ d) -1
7.	Koliko je $f(3)$ ako je $2f(x) + f(3-x) = x$ ? a) $-\frac{1}{2}$ b) $\frac{1}{2}$ c) 2                      d) -1
8.	Za koje realne vrijednosti ugla $x$ iz I kvadranta vrijedi $\frac{\sin 2x + 6 \sin x - \cos x - 3}{2 \sin 2x + 2\sqrt{3} \sin x + 6 \cos x + 3\sqrt{3}} < 0$ : a) $\left(0, \frac{\pi}{6}\right)$ b) $\left(\frac{\pi}{6}, \frac{\pi}{4}\right)$ c) $\left(\frac{\pi}{4}, \frac{\pi}{3}\right)$ d) $\left(\frac{\pi}{3}, \frac{\pi}{2}\right)$
9.	Dva pravca $5x - 2y - 5 = 0$ i $5x + 3y - 30 = 0$ sa x-osom čine trougao. Koliko iznosi površina tog trougla? a) 5                      b) $\frac{5}{2}$ c) $\frac{15}{2}$ d) $\frac{25}{2}$
10.	Za pravougli trougao poznate su vrijednosti ugla $\beta = 15^\circ$ i odsječka $p = 2$ . Koliko iznosi površina trougla?  a) $8(2 - \sqrt{3})^2$ b) $8(2 + \sqrt{3})^2$ c) $4(2 - \sqrt{3})^2$ d) $4(2 + \sqrt{3})^2$

**NAPOMENA**

Poslije svakog zadatka ponuđena su četiri odgovora.  
 Zaokružite slovo ispred tačnog odgovora. Svaki zadatak nosi 4 boda.  
 Samo zaokruženo tačno rješenje zadatka koje je potkrijepljeno izradom na pomoćnim papirima nosi 4 boda.  
 U ostalim slučajevima zadatak ne nosi bodove.

UNIVERZITET U TUZLI Fakultet elektrotehnike Tuzla, 09.07.2015.godine	KVALIFIKACIONI ISPIT IZ MATEMATIKE	GRUPA B			
1.	$ 4x^2 + 15x - 4  -  x + 4  = 4x \Rightarrow  (x + 4)(4x - 1)  -  x + 4  = 4x \Rightarrow$ $ (x + 4)  \cdot  (4x - 1)  -  x + 4  = 4x \Rightarrow  (x + 4)  ( (4x - 1)  - 1) = 4x$ $ x + 4  = \begin{cases} x + 4, & x \geq -4 \\ -(x + 4), & x < -4 \end{cases}, \quad  4x - 1  = \begin{cases} (4x - 1), & x \geq \frac{1}{4} \\ -(4x - 1), & x < \frac{1}{4} \end{cases}$ $I: x \in (-\infty, -4) \Rightarrow -(x + 4)[- (4x - 1) - 1] = 4x \Rightarrow 4x(x + 3) = 0 \Rightarrow x_1 = 0 \notin I, x_2 = -3 \notin I.$ $II: x \in \left[-4, \frac{1}{4}\right) \Rightarrow (x + 4)[- (4x - 1) - 1] = 4x \Rightarrow 4x(x + 5) = 0 \Rightarrow x_3 = 0 \in II, x_4 = -5 \notin II.$ $III: x \in \left[\frac{1}{4}, +\infty\right) \Rightarrow (x + 4)[(4x - 1) - 1] = 4x \Rightarrow 2x^2 + 5x - 4 = 0 \Rightarrow x_5 = \frac{-5 - \sqrt{57}}{4} \notin III,$ $x_6 = \frac{-5 + \sqrt{57}}{4} \in III.$ <p>Rješenja jednačine: <math>x_1 = \frac{-5 + \sqrt{57}}{4} \wedge x_2 = 0</math>. Broj rješenja 2.</p>	a) 4	b) 1	c) 3	d) 2
2.	$3(x^2 - 1)^2 - 5(x^2 - 1) - 2 = 0$ <p>Smjena: <math>(x^2 - 1) = t \Rightarrow 3t^2 - 5t - 2 = 0 \Rightarrow t_1 = 2 \wedge t_2 = -\frac{1}{3}</math>.</p> $1^\circ: x^2 - 1 = 2 \Rightarrow x^2 = 3 \Rightarrow x_{1/2} = \pm\sqrt{3}. \quad 2^\circ: x^2 - 1 = -\frac{1}{3} \Rightarrow x^2 = \frac{2}{3} \Rightarrow x_{3/4} = \pm\sqrt{\frac{2}{3}}.$ $x_1 \cdot x_2 \cdot x_3 \cdot x_4 = \sqrt{3} \cdot (-\sqrt{3}) \cdot \sqrt{\frac{2}{3}} \cdot \left(-\sqrt{\frac{2}{3}}\right) = 2.$	a) 2	b) $\sqrt{2}$	c) $\frac{3}{2}$	d) $-\frac{3}{2}$
3.	$(5k + 2)x^2 - (5k + 3)x - 133 = 0$ <p>Po Viete – ovim pravila zbir rješenja kvadratne jednačine <math>ax^2 + bx + c = 0</math> je:</p> $x_1 + x_2 = -\frac{b}{a} \Rightarrow \frac{(5k + 2)}{(5k + 3)} < 0 \Rightarrow x \in \left(-\frac{3}{5}, -\frac{2}{5}\right).$	a) $\left(\frac{2}{5}, \frac{4}{3}\right)$	b) $\left(-\infty, -\frac{4}{3}\right)$	c) $\left(-\frac{4}{3}, -\frac{2}{5}\right)$	d) $\left(\frac{4}{3}, +\infty\right)$
4.	$36^x + 21 = 10 \cdot 6^x; (6^x)^2 - 10 \cdot 6^x + 21 = 0;$ $6^x = 7 \Rightarrow x_1 = \log_6 7.$ $6^x = 3 \Rightarrow x_2 = \log_6 3.$ $x_1 + x_2 = \log_6 7 + \log_6 3 = \log_6 21.$	a) $\log_6 21$	b) $\log_6 10$	c) 21	d) 10

5.	$\log_5(13 \cdot 5^x - 42) > 2x$ ; $D.P.: 13 \cdot 5^x - 42 > 0$ ; $5^x > \frac{42}{13}$ ; $x > \log_5 \frac{42}{13}$ . $\log_5(13 \cdot 5^x - 42) > \log_5 5^{2x}$ ; $13 \cdot 5^x - 42 > 5^{2x}$ ; $(5^x)^2 - 13 \cdot 4^x + 42 < 0$ ; $(5^x - 6)(5^x - 7) < 0 \Rightarrow x \in (\log_5 6, \log_5 7) \cap D.P. \Rightarrow x \in (\log_5 6, \log_5 7)$ .
	a) $(7, +\infty)$ b) $(\log_5 6, \log_5 7)$ c) $(0, \log_5 6)$ d) $(6, 7)$
6.	$Z_1 = \frac{5+3i-3Z}{3-4i-\bar{Z}}$ ; $Z = 3+2i$ ; $\bar{Z} = 3-2i$ $Z_1 = \frac{5+3i-9-6i}{3-4i-3+2i} = \frac{-4-3i}{-2i} \cdot \frac{i}{i} = \frac{3-4i}{2} = \frac{3}{2} - \frac{4}{2}i$ $\operatorname{Re}\{Z_1\} = \frac{3}{2} \wedge \operatorname{Im}\{Z_1\} = -\frac{4}{2}$ . $\operatorname{Re}\{Z_1\} + \operatorname{Im}\{Z_1\} = -\frac{1}{2}$ .
	a) $-\frac{5}{2}$ b) $-4$ c) $-\frac{1}{2}$ d) $-1$
7.	$2f(x) + f(3-x) = x$ . Iz zadate funkcionalne relacije se dobiva sistem: $Za x=3 \Rightarrow 2f(3) + f(0) = 3$ . $Za x=0 \Rightarrow 2f(0) + f(3) = 0$ . <i>Rješenje sistema</i> $f(3) = 2$ .
	a) $-\frac{1}{2}$ b) $\frac{1}{2}$ c) $2$ d) $-1$
8.	$\frac{\sin 2x + 6 \sin x - \cos x - 3}{2 \sin 2x + 2\sqrt{3} \sin x + 6 \cos x + 3\sqrt{3}} < 0$ ; $\frac{2 \sin x \cos x + 6 \sin x - \cos x - 3}{4 \sin x \cos x + 2\sqrt{3} \sin x + 6 \cos x + 3\sqrt{3}} < 0$ ; $\frac{2 \sin x (\cos x + 3) - (\cos x + 3)}{2 \sin x (2 \cos x + \sqrt{3}) + 3(2 \cos x + \sqrt{3})} < 0$ ; $\frac{(2 \sin x - 1)(\cos x + 3)}{(2 \sin x + 3)(2 \cos x + \sqrt{3})} < 0$ . <i>U prvom kvadrantu:</i> $2 \sin x - 1 < 0 \Rightarrow \sin x < \frac{1}{2} \Rightarrow x \in \left(0, \frac{\pi}{6}\right)$ . $\cos x + 3 > 0 \quad za \forall x \in R$ . $2 \sin x + 3 > 0 \quad za \forall x \in R$ . $2 \cos x + \sqrt{3} > 0 \quad za \forall x \in \left(0, \frac{\pi}{2}\right)$ . <i>Rješenje nejednačine u I kvadrantu:</i> $x \in \left(0, \frac{\pi}{6}\right)$ .
	a) $\left(0, \frac{\pi}{6}\right)$ b) $\left(\frac{\pi}{6}, \frac{\pi}{4}\right)$ c) $\left(\frac{\pi}{4}, \frac{\pi}{3}\right)$ d) $\left(\frac{\pi}{3}, \frac{\pi}{2}\right)$
9.	<i>Tačke A i B se dobivaju iz jednačina pravaca <math>p_1</math> i <math>p_2</math> za <math>y_A = y_B = 0</math>.</i> $p_1: 5x - 2y - 5 = 0 \Rightarrow x_A = 1$ $p_2: 5x + 3y - 30 = 0 \Rightarrow x_B = 6 \Rightarrow x_p = x_B - x_A = 5$ . <i>Tačka C se dobiva kao presjek pravaca (rješenje sistema).</i> $h = y_C = 5$ . <i>Površina trougla je:</i> $P = \frac{x_p \cdot h}{2} = \frac{25}{2}$ .
	a) $5$ b) $\frac{5}{2}$ c) $\frac{15}{2}$ d) $\frac{25}{2}$



Ako je  $\beta = 15^\circ$  u pravouglom trouglu, onda je  $\alpha = 75^\circ$ .

$$\operatorname{tg} \alpha = \frac{h}{p} \Rightarrow h = p \cdot \operatorname{tg} 75^\circ.$$

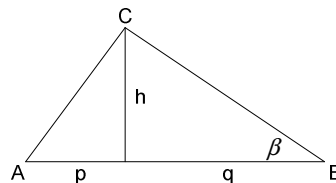
$$\operatorname{tg} 75^\circ = \operatorname{tg} (45^\circ + 30^\circ) = \frac{\operatorname{tg} 45^\circ + \operatorname{tg} 30^\circ}{1 - \operatorname{tg} 45^\circ \cdot \operatorname{tg} 30^\circ} = 2 + \sqrt{3} \Rightarrow h = 2 \cdot (2 + \sqrt{3}).$$

Iz sličnosti trouglova se dobiva

10. 
$$h^2 = p \cdot q \Rightarrow q = \frac{h^2}{p} = \frac{4(4 + 4\sqrt{3} + 3)}{2} = 2(7 + 4\sqrt{3}).$$

$$\text{Hipotenuza: } c = p + q = 2(8 - 4\sqrt{3}) = 8(2 - \sqrt{3}).$$

$$\text{Površina trougla: } P = \frac{c \cdot h}{2} = 8(2 + \sqrt{3})^2.$$



a)  $8(2 - \sqrt{3})^2$

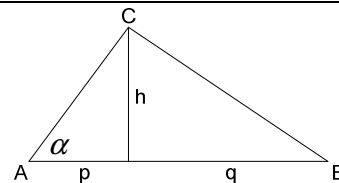
b)  $8(2 + \sqrt{3})^2$

c)  $4(2 - \sqrt{3})^2$

d)  $4(2 + \sqrt{3})^2$

<b>UNIVERZITET U TUZLI</b> <b>Fakultet elektrotehnike</b> <b>Tuzla, 09.07.2015.godine</b>	<b>KVALIFIKACIONI ISPIT IZ</b> <b>MATEMATIKE</b>	<b>GRUPA C</b>
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1.	Broj realnih rješenja jednačine $ x+4  -  4x^2 + 15x - 4  = -4x$ je: a) 4                      b) 3                      c) 2                      d) 1
2.	Proizvod svih realnih rješenja jednačine $3(x^2 - 2)^2 - 5(x^2 - 2) - 2 = 0$ je: a) $\frac{2}{3}$ b) $-\frac{2}{3}$ c) $\sqrt{\frac{20}{3}}$ d) $\frac{20}{3}$
3.	Za koje vrijednosti parametra k je zbir realnih rješenja jednačine $(5k - 2)x^2 + (5k - 3)x - 131 = 0$ uvijek pozitivan: a) $(-\infty, -\frac{3}{5})$ b) $(\frac{2}{5}, \frac{3}{5})$ c) $(\frac{3}{5}, +\infty)$ d) $(-\frac{3}{5}, -\frac{2}{5})$
4.	Zbir realnih rješenja jednačine $36^x + 24 = 11 \cdot 6^x$ je: a) $\log_6 24$ b) $\log_6 11$ c) 24                      d) 11
5.	Skup realnih rješenja nejednačine $\log_4(16 \cdot 4^x - 63) > 2x$ je: a) $(9, +\infty)$ b) $(\log_4 7, \log_4 9)$ c) $(7, 9)$ d) $(0, \log_4 7)$
6.	Koliko iznosi $\operatorname{Re}\{Z_1\} + \operatorname{Im}\{Z_1\}$ ako za izraz $Z_1 = \frac{3 - 5i + 2Z}{1 + 3i - \bar{Z}}$ vrijedi da je $Z = 1 + 4i$ ? a) $-\frac{12}{7}$ b) $\frac{2}{7}$ c) $-\frac{2}{7}$ d) $-\frac{8}{7}$
7.	Koliko je $f(-3)$ ako je $f(x) - 2f\left(\frac{1}{x}\right) = 3x$ ? a) $\frac{11}{3}$ b) $\frac{3}{11}$ c) $-\frac{3}{11}$ d) 1
8.	Za koje realne vrijednosti ugla $x$ iz I kvadranta vrijedi $\frac{\sin 2x + 6 \sin x + \sqrt{3} \cos x + 3\sqrt{3}}{3 \sin 2x - 3 \sin x + 8 \cos x - 4} < 0$ : a) $(\frac{\pi}{3}, \frac{\pi}{2})$ b) $(0, \frac{\pi}{6})$ c) $(\frac{\pi}{6}, \frac{\pi}{4})$ d) $(\frac{\pi}{4}, \frac{\pi}{3})$
9.	Dva pravca $3x - y - 3 = 0$ i $3x + 4y - 18 = 0$ sa x-osom čine trougao. Koliko iznosi površina tog trougla? a) $\frac{25}{2}$ b) $\frac{15}{2}$ c) $\frac{5}{2}$ d) 5
10.	Za pravougli trougao poznate su vrijednosti ugla $\alpha = 75^\circ$ i odsječka $q = 3$ . Koliko iznosi površina trougla? a) $18(2 + \sqrt{3})^2$ b) $9(2 - \sqrt{3})^2$ c) $9(2 + \sqrt{3})^2$ d) $18(2 - \sqrt{3})^2$

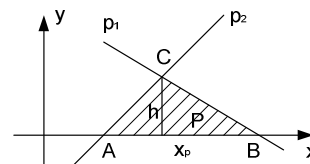




UNIVERZITET U TUZLI Fakultet elektrotehnike Tuzla, 09.07.2015.godine	KVALIFIKACIONI ISPIT IZ MATEMATIKE	GRUPA C
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1.	$ x+4  -  4x^2 + 15x - 4  = -4x$ $ x+4  -  (x+4)(4x-1)  = -4x \Rightarrow  x+4  -  (x+4)(4x-1)  = -4x \Rightarrow$ $ x+4  -  (x+4)  \cdot  (4x-1)  = -4x \Rightarrow  (x+4) (1 -  (4x-1) ) = -4x$ $ x+4  = \begin{cases} x+4, & x \geq 4 \\ -(x+4), & x < 4 \end{cases}, \quad  4x-1  = \begin{cases} (4x-1), & x \geq \frac{1}{4} \\ -(4x-1), & x < \frac{1}{4} \end{cases}$ $I: x \in (-\infty, -4) \Rightarrow -(x+4)[1+(4x-1)] = -4x \Rightarrow 4x(x+3) = 0 \Rightarrow x_1 = 0 \notin I, x_2 = -3 \notin I.$ $II: x \in \left[-4, \frac{1}{4}\right) \Rightarrow (x+4)[1+(4x-1)] = -4x \Rightarrow 4x(x+5) = 0 \Rightarrow x_3 = 0 \in II, x_4 = -5 \notin II.$ $III: x \in \left[\frac{1}{4}, +\infty\right) \Rightarrow (x+4)[(4x-1)-1] = -4x \Rightarrow 2x^2 + 5x - 4 = 0 \Rightarrow x_5 = \frac{-5 - \sqrt{57}}{4} \notin III, x_6 = \frac{-5 + \sqrt{57}}{4} \notin III.$ <i>Rješenja jednačine: <math>x_3 = 0 \wedge x_6 = \frac{-5 + \sqrt{57}}{4}</math>. Broj rješenja 2.</i>
	a) 4                      b) 3                      c) 2                      d) 1
2.	$3(x^2 - 2)^2 - 5(x^2 - 2) - 2 = 0$ <i>Smjena: <math>(x^2 - 2) = t \Rightarrow 3t^2 - 5t - 2 = 0 \Rightarrow t_1 = 2 \wedge t_2 = -\frac{1}{3}</math>.</i> $1^\circ: x^2 - 2 = 2 \Rightarrow x^2 = 4 \Rightarrow x_{1/2} = \pm 2. \quad 2^\circ: x^2 - 2 = -\frac{1}{3} \Rightarrow x^2 = \frac{5}{3} \Rightarrow x_{3/4} = \pm \sqrt{\frac{5}{3}}.$ $x_1 \cdot x_2 \cdot x_3 \cdot x_4 = 2 \cdot (-2) \cdot \sqrt{\frac{5}{3}} \cdot \left(-\sqrt{\frac{5}{3}}\right) = \frac{20}{3}.$
	a) $\frac{2}{3}$ b) $-\frac{2}{3}$ c) $\sqrt{\frac{20}{3}}$ d) $\frac{20}{3}$
3.	$(5k-2)x^2 + (5k-3)x - 131 = 0$ <i>Po Viète – ovim pravila zbir rješenja kvadratne jednačine <math>ax^2 + bx + c = 0</math> je:</i> $x_1 + x_2 = -\frac{b}{a} \Rightarrow -\frac{(5k-3)}{(5k-2)} > 0 \Rightarrow \frac{(5k-3)}{(5k-2)} < 0 \Rightarrow x \in \left(\frac{2}{5}, \frac{3}{5}\right).$
	a) $\left(-\infty, -\frac{3}{5}\right)$ b) $\left(\frac{2}{5}, \frac{3}{5}\right)$ c) $\left(\frac{3}{5}, +\infty\right)$ d) $\left(-\frac{3}{5}, -\frac{2}{5}\right)$
4.	$36^x + 24 = 11 \cdot 6^x; (6^x)^2 - 11 \cdot 6^x + 24 = 0;$ $6^x = 8 \Rightarrow x_1 = \log_6 8.$ $6^x = 3 \Rightarrow x_2 = \log_6 3.$ $x_1 + x_2 = \log_6 8 + \log_6 3 = \log_6 24.$
	a) $\log_6 24$ b) $\log_6 11$ c) 24                      d) 11

5.	$\log_4(16 \cdot 4^x - 63) > 2x$ ; <i>D.P.</i> : $16 \cdot 4^x - 63 > 0$ ; $4^x > \frac{63}{16}$ ; $x > \log_4 \frac{63}{16}$ . $\log_4(16 \cdot 4^x - 62) > \log_4 4^{2x}$ ; $16 \cdot 4^x - 63 > 4^{2x}$ ; $(4^x)^2 - 16 \cdot 4^x + 63 < 0$ ; $(4^x - 7)(4^x - 9) < 0 \Rightarrow x \in (\log_4 7, \log_4 9) \cap D.P. \Rightarrow x \in (\log_4 7, \log_4 9)$ .
	a) $(9, +\infty)$ b) $(\log_4 7, \log_4 9)$ c) $(7, 9)$ d) $(0, \log_4 7)$
6.	$Z_1 = \frac{3-5i+2Z}{1+3i-\bar{Z}}$ ; $Z = 1+4i$ ; $\bar{Z} = 1-4i$ $Z_1 = \frac{3-5i+2+8i}{1+3i-1+4i} = \frac{5+3i}{7i} \cdot \frac{i}{i} = \frac{5i-3}{-7} = \frac{3-5i}{7} = \frac{3}{7} - \frac{5}{7}i$ $\operatorname{Re}\{Z_1\} = \frac{3}{7} \wedge \operatorname{Im}\{Z_1\} = -\frac{5}{7}$ . $\operatorname{Re}\{Z_1\} + \operatorname{Im}\{Z_1\} = -\frac{2}{7}$ .
	a) $-\frac{12}{7}$ b) $\frac{2}{7}$ c) $-\frac{2}{7}$ d) $-\frac{8}{7}$
7.	$f(x) - 2f\left(\frac{1}{x}\right) = 3x$ . Iz zadate funkcionalne relacije se dobiva sistem: Za $x = -3 \Rightarrow f(-3) - 2f\left(-\frac{1}{3}\right) = -9$ . Za $x = -\frac{1}{3} \Rightarrow f\left(-\frac{1}{3}\right) - 2f(-3) = -1$ . Rješenje sistema $f(-3) = \frac{11}{3}$ .
	a) $\frac{11}{3}$ b) $\frac{3}{11}$ c) $-\frac{3}{11}$ d) 1
8.	$\frac{\sin 2x + 6 \sin x + \sqrt{3} \cos x + 3\sqrt{3}}{3 \sin 2x - 3 \sin x + 8 \cos x - 4} < 0$ ; $\frac{2 \sin x \cos x + 6 \sin x + \sqrt{3} \cos x + 3\sqrt{3}}{6 \sin x \cos x - 3 \sin x + 8 \cos x - 4} < 0$ ; $\frac{2 \sin x (\cos x + 3) + \sqrt{3} (\cos x + 3)}{3 \sin x (2 \cos x - 1) + 4 (2 \cos x - 1)} < 0$ ; $\frac{(2 \sin x + \sqrt{3})(\cos x + 3)}{(3 \sin x + 4)(2 \cos x - 1)} < 0$ . U prvom kvadrantu: $2 \cos x - 1 < 0 \Rightarrow \cos x < \frac{1}{2} \Rightarrow x \in \left(\frac{\pi}{3}, \frac{\pi}{2}\right)$ . $\cos x + 3 > 0 \quad \forall x \in \mathbb{R}$ . $2 \sin x + 4 > 0 \quad \forall x \in \mathbb{R}$ . $2 \sin x + \sqrt{3} > 0 \quad \forall x \in \left(0, \frac{\pi}{2}\right)$ . Rješenje nejednačine u I kvadrantu: $x \in \left(\frac{\pi}{3}, \frac{\pi}{2}\right)$ .
	a) $\left(\frac{\pi}{3}, \frac{\pi}{2}\right)$ b) $\left(0, \frac{\pi}{6}\right)$ c) $\left(\frac{\pi}{6}, \frac{\pi}{4}\right)$ d) $\left(\frac{\pi}{4}, \frac{\pi}{3}\right)$
9.	Tačke A i B se dobivaju iz jednačina pravaca $p_1$ i $p_2$ za $y_A = y_B = 0$ . $p_1: 3x - y - 3 = 0 \Rightarrow x_A = 1$ $p_2: 3x + 4y - 18 = 0 \Rightarrow x_B = 6 \Rightarrow x_p = x_B - x_A = 5$ . Tačka C se dobiva kao presjek pravaca (rješenje sistema). $h = y_C = 3$ . Površina trougla je: $P = \frac{x_p \cdot h}{2} = \frac{15}{2}$ .
	a) $\frac{25}{2}$ b) $\frac{15}{2}$ c) $\frac{5}{2}$ d) 5



Ako je  $\alpha = 75^\circ$  u pravouglom trouglu, onda je  $\beta = 15^\circ$ .

$$\operatorname{tg} \beta = \frac{h}{q} \Rightarrow h = q \cdot \operatorname{tg} 15^\circ.$$

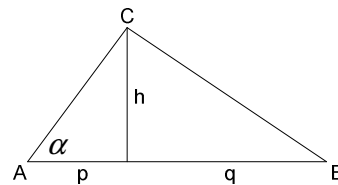
$$\operatorname{tg} 15^\circ = \operatorname{tg} (45^\circ - 30^\circ) = \frac{\operatorname{tg} 45^\circ - \operatorname{tg} 30^\circ}{1 + \operatorname{tg} 45^\circ \cdot \operatorname{tg} 30^\circ} = 2 - \sqrt{3} \Rightarrow h = 3 \cdot (2 - \sqrt{3}).$$

Iz sličnosti trouglova se dobiva

10. 
$$h^2 = p \cdot q \Rightarrow p = \frac{h^2}{q} = \frac{9(4 - 4\sqrt{3} + 3)}{3} = 3(7 - 4\sqrt{3}).$$

$$\text{Hipotenuza: } c = p + q = 3(8 - 4\sqrt{3}) = 12(2 - \sqrt{3}).$$

$$\text{Površina trougla: } P = \frac{c \cdot h}{2} = 18(2 - \sqrt{3})^2.$$



a)  $18(2 + \sqrt{3})^2$

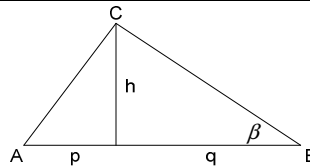
b)  $9(2 - \sqrt{3})^2$

c)  $9(2 + \sqrt{3})^2$

**d)  $18(2 - \sqrt{3})^2$**

<b>UNIVERZITET U TUZLI</b> <b>Fakultet elektrotehnike</b> <b>Tuzla, 09.07.2015.godine</b>	<b>KVALIFIKACIONI ISPIT IZ</b> <b>MATEMATIKE</b>	<b>GRUPA D</b>
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1.	Broj realnih rješenja jednačine $ x-4  -  4x^2 - 15x - 4  = 4x$ je: a) 2                      b) 1                      c) 3                      d) 4
2.	Proizvod svih realnih rješenja jednačine $3(x^2 - 1)^2 - 5(x^2 - 1) - 2 = 0$ je: a) $\frac{2}{3}$ b) $-\frac{2}{3}$ c) 2                      d) $\sqrt{2}$
3.	Za koje vrijednosti parametra k je zbir realnih rješenja jednačine $(5k+2)x^2 - (5k+3)x - 129 = 0$ uvijek negativan: a) $(-\infty, -\frac{3}{5})$ b) $(-\frac{3}{5}, -\frac{2}{5})$ c) $(\frac{2}{5}, \frac{3}{5})$ d) $(\frac{3}{5}, +\infty)$
4.	Zbir realnih rješenja jednačine $36^x + 18 = 11 \cdot 6^x$ je: a) 18                      b) 11                      c) $\log_6 11$ d) $\log_6 18$
5.	Skup realnih rješenja nejednačine $\log_5(14 \cdot 5^x - 48) > 2x$ je: a) $(8, +\infty)$ b) $(\log_5 6, \log_5 8)$ c) $(0, \log_5 6)$ d) $(6, 8)$
6.	Koliko iznosi $\operatorname{Re}\{Z_1\} + \operatorname{Im}\{Z_1\}$ ako za izraz $Z_1 = \frac{3+5i+3Z}{2+4i-\bar{Z}}$ vrijedi da je $Z = 2+3i$ ? a) $-\frac{12}{7}$ b) $\frac{23}{7}$ c) $\frac{5}{7}$ d) $-\frac{23}{7}$
7.	Koliko je $f(2)$ ako je $3f(x) - f(2-x) = 2x$ ? a) $\frac{3}{2}$ b) $\frac{2}{3}$ c) $-\frac{2}{3}$ d) 1
8.	Za koje realne vrijednosti ugla $x$ iz I kvadranta vrijedi $\frac{\sin 2x + 4 \sin x + \cos x + 2}{3 \sin 2x - 3\sqrt{3} \sin x + 8 \cos x - 4\sqrt{3}} > 0$ : a) $(0, \frac{\pi}{6})$ b) $(\frac{\pi}{6}, \frac{\pi}{4})$ c) $(\frac{\pi}{3}, \frac{\pi}{2})$ d) $(\frac{\pi}{4}, \frac{\pi}{3})$
9.	Dva pravca $5x - y - 10 = 0$ i $5x + 4y - 35 = 0$ sa x-osom čine trougao. Koliko iznosi površina tog trougla? a) $\frac{5}{2}$ b) $\frac{25}{2}$ c) $\frac{15}{2}$ d) 5
10.	Za pravougli trougao poznate su vrijednosti ugla $\beta = 15^\circ$ i odsječka $p = 4$ . Koliko iznosi površina trougla? a) $16(2+\sqrt{3})^2$ b) $16(2-\sqrt{3})^2$ c) $32(2-\sqrt{3})^2$ d) $32(2+\sqrt{3})^2$

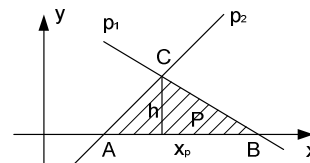


**NAPOMENA**

Poslije svakog zadatka ponuđena su četiri odgovora.  
 Zaokružite slovo ispred tačnog odgovora.  
 Svaki zadatak nosi 4 boda.  
 Samo zaokruženo tačno rješenje zadatka koje je potkrijepljeno izradom na pomoćnim papirima nosi 4 boda.  
 U ostalim slučajevima zadatak ne nosi bodove.

UNIVERZITET U TUZLI Fakultet elektrotehnike Tuzla, 09.07.2015.godine	KVALIFIKACIONI ISPIT IZ MATEMATIKE	GRUPA D			
1.	$ x-4  -  4x^2 - 15x - 4  = 4x \Rightarrow  x-4  -  (x-4)(4x+1)  = 4x \Rightarrow$ $ x-4  -  (x-4)  \cdot  (4x+1)  = 4x \Rightarrow  (x-4) (1 -  (4x+1) ) = 4x$ $ x+4  = \begin{cases} x-4, & x \geq 4 \\ -(x-4), & x < 4 \end{cases}, \quad  4x+1  = \begin{cases} (4x+1), & x \geq -\frac{1}{4} \\ -(4x+1), & x < -\frac{1}{4} \end{cases}$ $I: x \in \left(-\infty, -\frac{1}{4}\right) \Rightarrow -(x-4)[1 + (4x+1)] = 4x \Rightarrow 2x^2 - 5x - 4 = 0 \Rightarrow x_1 = \frac{5 + \sqrt{57}}{4} \notin I, x_2 = \frac{5 - \sqrt{57}}{4} \in I$ $II: x \in \left[-\frac{1}{4}, 4\right) \Rightarrow -(x-4)[1 - (4x+1)] = 4x \Rightarrow 4x(x-5) = 0 \Rightarrow x_3 = 0 \in II, x_4 = 5 \notin II.$ $III: x \in [4, +\infty) \Rightarrow (x+4)[1 - (4x+1)] = 4x \Rightarrow 4x(x-3) = 0 \Rightarrow x_1 = 0 \notin III, x_2 = -3 \notin III.$ <i>Rješenja jednačine: <math>x_1 = \frac{5 - \sqrt{57}}{4} \wedge x_3 = 0</math>. Broj rješenja 2.</i>	a) 2	b) 1	c) 3	d) 4
2.	$2(x^2 - 1)^2 - 5(x^2 - 1) - 3 = 0$ <i>Smjena: <math>(x^2 - 1) = t \Rightarrow 2t^2 - 5t - 3 = 0 \Rightarrow t_1 = 3 \wedge t_2 = -\frac{1}{2}</math>.</i> $1^\circ: x^2 - 1 = 3 \Rightarrow x^2 = 4 \Rightarrow x_{1/2} = \pm 2. 2^\circ: x^2 - 1 = -\frac{1}{2} \Rightarrow x^2 = \frac{1}{2} \Rightarrow x_{3/4} = \pm \sqrt{\frac{1}{2}}$ $x_1 \cdot x_2 \cdot x_3 \cdot x_4 = 2 \cdot (-2) \cdot \sqrt{\frac{1}{2}} \cdot \left(-\sqrt{\frac{1}{2}}\right) = 2.$	a) $\frac{2}{3}$	b) $-\frac{2}{3}$	c) 2	d) $\sqrt{2}$
3.	$(5k+2)x^2 - (5k+3)x - 129 = 0$ <i>Po Viète - ovim pravila zbir rješenja kvadratne jednačine <math>ax^2 + bx + c = 0</math> je:</i> $x_1 + x_2 = -\frac{b}{a} \Rightarrow \frac{(5k+2)}{(5k+3)} < 0 \Rightarrow x \in \left(-\frac{3}{5}, -\frac{2}{5}\right).$	a) $\left(-\infty, -\frac{3}{5}\right)$	b) $\left(-\frac{3}{5}, -\frac{2}{5}\right)$	c) $\left(\frac{2}{5}, \frac{3}{5}\right)$	d) $\left(\frac{3}{5}, +\infty\right)$
4.	$36^x + 18 = 11 \cdot 6^x; (6^x)^2 - 11 \cdot 6^x + 18 = 0;$ $6^x = 9 \Rightarrow x_1 = \log_6 9.$ $6^x = 2 \Rightarrow x_2 = \log_6 2.$ $x_1 + x_2 = \log_6 9 + \log_6 2 = \log_6 18.$	a) 18	b) 11	c) $\log_6 11$	d) $\log_6 18$
5.	$\log_5(14 \cdot 5^x - 48) > 2x; D.P.: 14 \cdot 5^x - 48 > 0; 5^x > \frac{48}{14}; x > \log_5 \frac{24}{7}.$ $\log_5(14 \cdot 5^x - 48) > \log_5 5^{2x}; 14 \cdot 5^x - 48 > 5^{2x}; (5^x)^2 - 14 \cdot 4^x + 48 < 0;$ $(5^x - 6)(5^x - 8) < 0 \Rightarrow x \in (\log_5 6, \log_5 8) \cap D.P. \Rightarrow x \in (\log_5 6, \log_5 8).$	a) $(8, +\infty)$	b) $(\log_5 6, \log_5 8)$	c) $(0, \log_5 6)$	d) $(6, 8)$

6.	$Z_1 = \frac{3+5i+3Z}{2+4i-\bar{Z}}; Z = 2+3i; \bar{Z} = 2-3i$ $Z_1 = \frac{3+5i+6+9i}{2+4i-2+3i} = \frac{9+14i}{7i} \cdot \frac{i}{i} = \frac{9i-14}{-7} = \frac{14-9i}{7} = \frac{14}{7} - \frac{9}{7}i$ $\operatorname{Re}\{Z_1\} = \frac{14}{7} \wedge \operatorname{Im}\{Z_1\} = -\frac{9}{7}. \operatorname{Re}\{Z_1\} + \operatorname{Im}\{Z_1\} = \frac{5}{7}.$
	a) $-\frac{12}{7}$ b) $\frac{23}{7}$ c) $\frac{5}{7}$ d) $-\frac{23}{7}$
7.	$3f(x) - f(2-x) = 2x$ . Iz zadate funkcionalne relacije se dobiva sistem: $Za x = 2 \Rightarrow 3f(2) - f(0) = 4$ . $Za x = 0 \Rightarrow 3f(0) - f(2) = 0$ . Rješenje sistema $f(2) = \frac{3}{2}$ .
	a) $\frac{3}{2}$ b) $\frac{2}{3}$ c) $-\frac{2}{3}$ d) 1
8.	$\frac{\sin 2x + 4 \sin x + \cos x + 2}{3 \sin 2x - 3\sqrt{3} \sin x + 8 \cos x - 4\sqrt{3}} > 0; \frac{2 \sin x \cos x + 4 \sin x + \cos x + 2}{6 \sin x \cos x - 3\sqrt{3} \sin x + 8 \cos x - 4\sqrt{3}} > 0;$ $\frac{2 \sin x (\cos x + 2) + (\cos x + 2)}{3 \sin x (2 \cos x - \sqrt{3}) + 4(2 \cos x - \sqrt{3})} > 0; \frac{(2 \sin x + 1)(\cos x + 2)}{(3 \sin x + 4)(2 \cos x - \sqrt{3})} > 0.$ <p>U prvom kvadrantu:</p> $2 \cos x - \sqrt{3} > 0 \Rightarrow \sin x > \frac{\sqrt{3}}{2} \Rightarrow x \in \left(0, \frac{\pi}{6}\right). \cos x + 2 > 0 \text{ za } \forall x \in R.$ $3 \sin x + 4 > 0 \text{ za } \forall x \in R. 2 \sin x + 1 > 0 \text{ za } \forall x \in \left(0, \frac{\pi}{2}\right).$ <p>Rješenje nejednačine u I kvadrantu: <math>x \in \left(0, \frac{\pi}{6}\right)</math>.</p>
	a) $\left(0, \frac{\pi}{6}\right)$ b) $\left(\frac{\pi}{6}, \frac{\pi}{4}\right)$ c) $\left(\frac{\pi}{3}, \frac{\pi}{2}\right)$ d) $\left(\frac{\pi}{4}, \frac{\pi}{3}\right)$
9.	<p>Tačke A i B se dobivaju iz jednačina pravaca <math>p_1</math> i <math>p_2</math> za <math>y_A = y_B = 0</math>.</p> $p_1: 5x - y - 10 = 0 \Rightarrow x_A = 2$ $p_2: 5x + 4y - 35 = 0 \Rightarrow x_B = 7 \Rightarrow x_p = x_B - x_A = 5.$ Tačka C se dobiva kao presjek pravaca (rješenje sistema). $h = y_C = 5$ . Površina trougla je: $P = \frac{x_p \cdot h}{2} = \frac{25}{2}$ .
	a) $\frac{5}{2}$ b) $\frac{25}{2}$ c) $\frac{15}{2}$ d) 5



Ako je  $\beta = 15^\circ$  u pravouglom trouglu, onda je  $\alpha = 75^\circ$ .

$$\operatorname{tg} \alpha = \frac{h}{p} \Rightarrow h = p \cdot \operatorname{tg} 75^\circ.$$

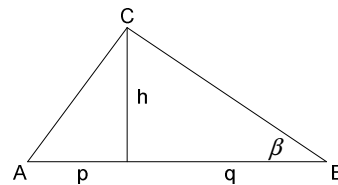
$$\operatorname{tg} 75^\circ = \operatorname{tg} (45^\circ + 30^\circ) = \frac{\operatorname{tg} 45^\circ + \operatorname{tg} 30^\circ}{1 - \operatorname{tg} 45^\circ \cdot \operatorname{tg} 30^\circ} = 2 + \sqrt{3} \Rightarrow h = 4 \cdot (2 + \sqrt{3}).$$

Iz sličnosti trouglova se dobiva

10. 
$$h^2 = p \cdot q \Rightarrow q = \frac{h^2}{p} = \frac{16(4 + 4\sqrt{3} + 3)}{4} = 4(7 + 4\sqrt{3}).$$

$$\text{Hipotenuza: } c = p + q = 4(8 - 4\sqrt{3}) = 16(2 - \sqrt{3}).$$

$$\text{Površina trougla: } P = \frac{c \cdot h}{2} = 32(2 + \sqrt{3})^2.$$



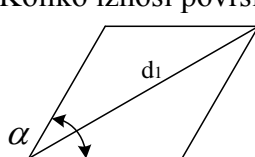
a)  $16(2 + \sqrt{3})^2$

b)  $16(2 - \sqrt{3})^2$

c)  $32(2 - \sqrt{3})^2$

**d)  $32(2 + \sqrt{3})^2$**

<b>UNIVERZITET U TUZLI</b> Fakultet elektrotehnike Tuzla, 09.07.2014. godine	<b>KVALIFIKACIONI ISPIT IZ</b> <b>MATEMATIKE</b>	<b>GRUPA A</b>
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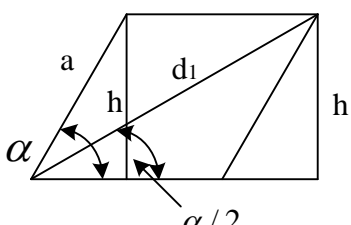
1.	Ako su $a = \frac{\sqrt{3}-1}{2}$ i $b = \frac{\sqrt{3}+1}{2}$ tada vrijednost izraza $a^3 - b^3$ pripada intervalu:
	a). $(-2, -1)$ b). $(1, 2)$ c). $(-3, -2)$ d). $(2, 3)$
2.	Skup rješenja nejednačina $\sqrt{1-2x} < 1+5x$ je:
	a). $\left(-\infty, -\frac{1}{5}\right]$ b). $\left(0, \frac{1}{2}\right]$ c). $\left(\frac{1}{2}, +\infty\right)$ d). $\left(-\frac{1}{5}, 0\right]$
3.	Zbir svih realnih vrijednosti parametra k za koje su rješenja jednačine $3kx^2 + (2k+1)x + (k-5) = 0$ realna i jednaka je:
	a). $-\frac{1}{8}$ b). $\frac{1}{8}$ c). $-8$ d). $8$
4.	Broj realnih rješenja jednačine $ 6-x-x^2  - 2 x+3  = -x$ je:
	a). 6      b). 4      c). 3      d). 2
5.	Skup rješenja nejednačine $3^{x-1} + 5 \cdot 3^{-x-1} < 2$ je:
	a). $(0, \log_3 5)$ b). $(\log_3 5, 3)$ c). $(-\log_5 3, 0)$ d). $(3, +\infty)$
6.	Proizvod svih realnih rješenja jednačine $\log_3(x+2) - 2\log_{(x+2)} 3 = 1$ je:
	a). $\frac{49}{3}$ b). $\frac{35}{3}$ c). $-\frac{35}{3}$ d). $-\frac{49}{3}$
7.	Modul kompleksnog broja $\frac{\sqrt{5}-i\sqrt{3}}{\cos 55^\circ - i \sin 55^\circ}$ je:
	a). $\sqrt{2}$ b). $\frac{\sqrt{2}}{\sin^2 55^\circ}$ c). $\frac{2\sqrt{2}}{\cos^2 55^\circ}$ d). $2\sqrt{2}$
8.	Skup rješenja nejednačine $\frac{3\sin x - \sqrt{3}}{2\sin x - \sqrt{3}} > 1$ u prvom kvadrantu je:
	a). $\left(\frac{\pi}{3}, \frac{\pi}{2}\right)$ b). $\left(\frac{\pi}{4}, \frac{\pi}{3}\right)$ c). $\left(\frac{\pi}{6}, \frac{\pi}{4}\right)$ d). $\left(0, \frac{\pi}{6}\right)$
9.	Otac i kćerka zajedno imaju 40 godina. Koliko su godina imali zajedno prije 5 godina ako je otac tada bio 5 puta stariji od kćerke?
	a). 32      b). 28      c). 35      d). 30
10.	Koliko iznosi površina romba kod kojeg su poznati ugao $\alpha = 60^\circ$ i duža dijagonala $d_1 = 20$ ?
	
	a). $\frac{100\sqrt{3}}{3}$ b). $\frac{200\sqrt{3}}{3}$ c). $\frac{150\sqrt{3}}{3}$ d). $100\sqrt{3}$
<b>NAPOMENA</b>	<b>Poslije svakog zadatka ponuđena su četiri odgovora.</b> <b>Zaokružite odgovor koji smatrate tačnim.</b> <b>Tačno zaokružen odgovor nosi 4 boda.</b> <b>Nezaokružen odgovor nosi 0 bodova.</b>

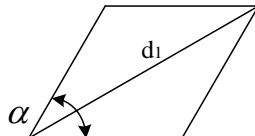


UNIVERZITET U TUZLI Fakultet elektrotehnike Tuzla, 09.07.2014.godine	KVALIFIKACIONI ISPIT IZ MATEMATIKE	GRUPA A
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**RJEŠENJA ZADATAKA**

1.	$a^3 - b^3 = \left(\frac{\sqrt{3}-1}{2}\right)^3 - \left(\frac{\sqrt{3}+1}{2}\right)^3 = \frac{3\sqrt{3}-9+3\sqrt{3}-1-3\sqrt{3}-9-3\sqrt{3}-1}{8} = -\frac{20}{8} = -\frac{5}{2} \in (-3, -2).$			
	a). (-2, -1)	b). (1, 2)	c). (-3, -2)	d). (2, 3)
2.	$\sqrt{1-2x} < 1+5x$ <p>1° <math>1-2x \geq 0 \Rightarrow R_1: x \leq \frac{1}{2}</math></p> <p>2° <math>1+5x &gt; 0 \Rightarrow R_2: x &gt; -\frac{1}{5}</math></p> <p>3° <math>1-2x &lt; (1+5x)^2 \Rightarrow 25x^2 + 12x &gt; 0 \Rightarrow R_3: x \in \left(-\infty, -\frac{12}{25}\right) \cup (0, +\infty)</math></p> <p><math>R = R_1 \cup R_2 \cup R_3 \Rightarrow x \in \left(0, \frac{1}{2}\right]</math></p>			
	a). $\left(-\infty, -\frac{1}{5}\right]$	b). $\left(0, \frac{1}{2}\right]$	c). $\left(\frac{1}{2}, +\infty\right)$	d). $\left(-\frac{1}{5}, 0\right]$
3.	<p>Potreban uslov da jednačina <math>ax^2 + bx + c = 0</math> ima realna i jednaka rješenja je:</p> <p><math>D = b^2 - 4ac = 0</math>. Za jednačinu <math>3kx^2 + (2k+1)x + (k-5) = 0</math> se dobiva:</p> <p><math>(2k+1)^2 - 4 \cdot 3k \cdot (k-5) = 0 \Rightarrow -8k^2 + 64k + 1 = 0</math>. Zbir rješenja kvadratne jednačine (Vieteova pravila)</p> <p><math>a_1x^2 + b_1x + c_1 = 0</math> je <math>-\frac{b_1}{a_1}</math>, odakle slijedi: <math>k_1 + k_2 = -\frac{64}{-8} = 8</math>.</p>			
	a). $-\frac{1}{8}$	b). $\frac{1}{8}$	c). -8	d). 8
4.	$ 6-x-x^2  - 2 x+3  = -x \Rightarrow  (x+3) \cdot (2-x)  - 2 x+3  = -x \Rightarrow  x+3 ( 2-x -2) = -x$ $ 2-x  = \begin{cases} +(2-x), & x \leq 2 \\ -(2-x), & x > 2 \end{cases}, \quad  x+3  = \begin{cases} +(x+3), & x > -3 \\ -(x+3), & x < -3 \end{cases}$ <p>I: <math>x \in (-\infty, -3) \Rightarrow -(x+3)[+(2-x)-2] = -x \Rightarrow x(x+3) = -x \Rightarrow x^2 + 4x = 0 \Rightarrow x_1 = 0 \notin I, x_2 = -4 \in I</math></p> <p>II: <math>x \in [-3, 2] \Rightarrow (x+3)[+(2-x)-2] = -x \Rightarrow -x(x+3) = -x \Rightarrow x^2 + 2x = 0 \Rightarrow x_3 = 0 \in II, x_4 = -2 \in II</math></p> <p>III: <math>x \in (2, \infty) \Rightarrow (x+3)[-(2-x)-2] = -x \Rightarrow (x+3)(x-4) = -x \Rightarrow x^2 = 12 \Rightarrow x_5 = -2\sqrt{3} \notin III, x_6 = 2\sqrt{3} \in III</math></p> <p>Broj realnih rješenja jednačine je: 4 (<math>x_2, x_3, x_4</math> i <math>x_6</math>).</p>			
	a). 6	b). 4	c). 3	d). 2
5.	$3^{x-1} + 5 \cdot 3^{-x-1} < 2 \Rightarrow \frac{3^x}{3} + 5 \cdot \frac{1}{3^x \cdot 3} - 2 < 0 \quad / \cdot (3^x \cdot 3) \quad \text{Smjena: } 3^x = t$ $t^2 - 6 \cdot t + 5 < 0 \Rightarrow (t-1) \cdot (t-5) < 0 \Rightarrow t \in (1, 5).$ <p><math>3^x = 1 = 3^0 \Rightarrow x = 0</math>. <math>3^x = 5 \Rightarrow x = \log_3 5</math>. Rješenje nejednačine: <math>x \in (0, \log_3 5)</math>.</p>			
	a). $(0, \log_3 5)$	b). $(\log_3 5, 3)$	c). $(-\log_5 3, 0)$	d). $(3, +\infty)$

6.	$\log_3(x+2) - 2\log_{(x+2)} 3 = 1 \Rightarrow \log_3(x+2) - \frac{2}{\log_3(x+2)} - 1 = 0. \text{ Smjena: } \log_3(x+2) = t$ $t - 1 - \frac{2}{t} = 0 / \cdot t \Rightarrow t^2 - t - 2 = 0 \Rightarrow t_1 = 2 \wedge t_2 = -1.$ $\log_3(x+2) = 2 \Rightarrow x_1 + 2 = 9 \Rightarrow x_1 = 7.$ $\log_3(x+2) = -1 \Rightarrow x_2 + 2 = \frac{1}{3} \Rightarrow x_2 = -\frac{5}{3}. \text{ Proizvod rješenja: } x_1 \cdot x_2 = -\frac{35}{3}.$																
	a). $\frac{49}{3}$ b). $\frac{35}{3}$ c). $-\frac{35}{3}$ d). $-\frac{49}{3}$																
7.	$\left  \frac{\sqrt{5} - i\sqrt{3}}{\cos 55^\circ - i \sin 55^\circ} \right  = \frac{\sqrt{(\sqrt{5})^2 + (-\sqrt{3})^2}}{\sqrt{\cos^2 55^\circ + (-\sin 55^\circ)^2}} = \frac{\sqrt{5+3}}{\sqrt{\cos^2 55^\circ + \sin^2 55^\circ}} = \frac{\sqrt{8}}{\sqrt{1}} = 2\sqrt{2}$																
	a). $\sqrt{2}$ b). $\frac{\sqrt{2}}{\sin^2 55^\circ}$ c). $\frac{2\sqrt{2}}{\cos^2 55^\circ}$ d). $2\sqrt{2}$																
8.	$\frac{3\sin x - \sqrt{3}}{2\sin x - \sqrt{3}} > 1 \Rightarrow \frac{3\sin x - \sqrt{3}}{2\sin x - \sqrt{3}} - 1 > 0 \Rightarrow \frac{\sin x}{2\sin x - \sqrt{3}} > 0.$ <p><i>U prvom kvadrantu: <math>\sin x &gt; 0 \Rightarrow x \in (0, \frac{\pi}{2}) \wedge \sin x &gt; \frac{\sqrt{3}}{2} \Rightarrow x \in (\frac{\pi}{3}, \frac{\pi}{2})</math>.</i></p> <p><i>Rješenje nejednačine: <math>x \in (\frac{\pi}{3}, \frac{\pi}{2})</math>.</i></p> <table border="1" style="float: right; margin-left: 20px;"> <thead> <tr> <th></th> <th>0</th> <th><math>\frac{\pi}{3}</math></th> <th><math>\frac{\pi}{2}</math></th> </tr> </thead> <tbody> <tr> <td><math>\sin x</math></td> <td></td> <td>+</td> <td>+</td> </tr> <tr> <td><math>\sin x - \frac{\sqrt{3}}{2}</math></td> <td></td> <td>-</td> <td>+</td> </tr> <tr> <td></td> <td></td> <td>-</td> <td>+</td> </tr> </tbody> </table>		0	$\frac{\pi}{3}$	$\frac{\pi}{2}$	$\sin x$		+	+	$\sin x - \frac{\sqrt{3}}{2}$		-	+			-	+
	0	$\frac{\pi}{3}$	$\frac{\pi}{2}$														
$\sin x$		+	+														
$\sin x - \frac{\sqrt{3}}{2}$		-	+														
		-	+														
	a). $(\frac{\pi}{3}, \frac{\pi}{2})$ b). $(\frac{\pi}{4}, \frac{\pi}{3})$ c). $(\frac{\pi}{6}, \frac{\pi}{4})$ d). $(0, \frac{\pi}{6})$																
9.	<p><i>x – broj godina oca, y – broj godina kćerke.</i></p> $x + y = 40 \Rightarrow x = 40 - y$ $x - 5 = 5(y - 5)$ $40 - y - 5 = 5y - 25 \Rightarrow 6y = 60 \Rightarrow y = 10 \wedge x = 30. (x - 5) + (y - 5) = 30.$																
	a). 32                      b). 28                      c). 35                      d). 30																
10.	 $\sin \frac{\alpha}{2} = \frac{h}{d_1} \Rightarrow h = d_1 \cdot \sin \frac{\alpha}{2} = 10$ $\sin \alpha = \frac{h}{a} \Rightarrow a = \frac{h}{\sin \alpha} = \frac{10}{\frac{\sqrt{3}}{2}} = \frac{20}{\sqrt{3}} = \frac{20\sqrt{3}}{3}.$ <p><i>Površina romba: <math>P = a \cdot h = \frac{200\sqrt{3}}{3}</math>.</i></p>																
	a). $\frac{100\sqrt{3}}{3}$ b). $\frac{200\sqrt{3}}{3}$ c). $\frac{150\sqrt{3}}{3}$ d). $100\sqrt{3}$																

UNIVERZITET U TUZLI Fakultet elektrotehnike Tuzla, 09.07.2014. godine	KVALIFIKACIONI ISPIT IZ MATEMATIKE	GRUPA B
1.	Ako su $a = \frac{\sqrt{2}-1}{2}$ i $b = \frac{\sqrt{2}+1}{2}$ tada vrijednost izraza $a^3 - b^3$ pripada intervalu: a). $(-1,0)$ b). $(-2,-1)$ c). $(0,1)$ d). $(1,2)$	
2.	Skup rješenja nejednačina $\sqrt{1+2x} < 1-5x$ je: a). $(-\infty, -\frac{1}{2})$ b). $[0, \frac{1}{5})$ c). $[\frac{1}{5}, +\infty)$ d). $[-\frac{1}{2}, 0)$	
3.	Zbir svih realnih vrijednosti parametra k za koje su rješenja jednačine $3kx^2 - (2k-3)x + (k+5) = 0$ realna i jednaka je: a). $-\frac{1}{9}$ b). $\frac{1}{9}$ c). $-9$ d). $9$	
4.	Broj realnih rješenja jednačine $ 21-4x-x^2  - 3 x+7  = x$ je: a). 2      b). 5      c). 3      d). 4	
5.	Skup rješenja nejednačine $3^{x-1} + 4 \cdot 3^{-x-1} < \frac{5}{3}$ je: a). $(3, +\infty)$ b). $(-\log_4 3, 0)$ c). $(0, \log_3 4)$ d). $(\log_3 4, 3)$	
6.	Proizvod svih realnih rješenja jednačine $\log_2(x-3) - 2\log_{(x-3)} 2 = -1$ je: a). $\frac{45}{4}$ b). $-\frac{65}{4}$ c). $-\frac{45}{4}$ d). $\frac{65}{4}$	
7.	Modul kompleksnog broja $\frac{\sqrt{6}-i\sqrt{3}}{\cos 25^\circ - i \sin 25^\circ}$ je: a). $\frac{\sqrt{3}}{\cos^2 25^\circ}$ b). $3\sqrt{3}$ c). $\frac{3\sqrt{3}}{\sin^2 25^\circ}$ d). 3	
8.	Skup rješenja nejednačine $\frac{3 \sin x - 1}{2 \sin x - 1} < 1$ u prvom kvadrantu je: a). $(\frac{\pi}{4}, \frac{\pi}{3})$ b). $(\frac{\pi}{3}, \frac{\pi}{2})$ c). $(0, \frac{\pi}{6})$ d). $(\frac{\pi}{6}, \frac{\pi}{4})$	
9.	Otac i kćerka zajedno imaju 30 godina. Koliko će godina imati zajedno za 5 godina ako će otac tada biti 3 puta stariji od kćerke? a). 36      b). 40      c). 50      d). 48	
10.	Koliko iznosi površina romba kod kojeg su poznati ugao $\alpha = 60^\circ$ i duža dijagonala $d_1 = 10$ ?  a). $\frac{50\sqrt{3}}{3}$ b). $\frac{100\sqrt{3}}{3}$ c). $50\sqrt{3}$ d). $100\sqrt{3}$	
<b>NAPOMENA</b> Poslije svakog zadatka ponuđena su četiri odgovora. Zaokružite odgovor koji smatrate tačnim. Tačno zaokružen odgovor nosi 4 boda. Nezaokružen odgovor nosi 0 bodova.		

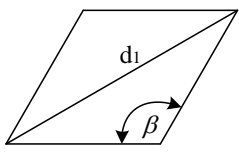
UNIVERZITET U TUZLI Fakultet elektrotehnike Tuzla, 09.07.2014.godine	KVALIFIKACIONI ISPIT IZ MATEMATIKE	GRUPA B
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**RJEŠENJA ZADATAKA**

1.	$a^3 - b^3 = \left(\frac{\sqrt{2}-1}{2}\right)^3 - \left(\frac{\sqrt{2}+1}{2}\right)^3 = \frac{2\sqrt{2}-6+3\sqrt{2}-1-2\sqrt{2}-6-3\sqrt{2}-1}{8} = -\frac{14}{8} = -\frac{7}{4} \in (-2, -1).$			
	a). $(-1, 0)$	b). $(-2, -1)$	c). $(0, 1)$	d). $(1, 2)$
2.	$\sqrt{1+2x} < 1-5x$ <p>1° <math>1+2x \geq 0 \Rightarrow R_1 : x \geq -\frac{1}{2}</math></p> <p>2° <math>1-5x &gt; 0 \Rightarrow R_2 : x &lt; \frac{1}{5}</math></p> <p>3° <math>1+2x &lt; (1-5x)^2 \Rightarrow 25x^2 - 12x &gt; 0 \Rightarrow R_3 : x \in (-\infty, 0) \cup \left(\frac{12}{25}, +\infty\right)</math></p> $R = R_1 \cup R_2 \cup R_3 \Rightarrow x \in \left[-\frac{1}{2}, 0\right).$			
	a). $\left(-\infty, -\frac{1}{2}\right)$	b). $\left[0, \frac{1}{5}\right)$	c). $\left[\frac{1}{5}, +\infty\right)$	d). $\left[-\frac{1}{2}, 0\right)$
3.	<p>Potreban uslov da jednačina <math>ax^2 + bx + c = 0</math> ima realna i jednaka rješenja je:</p> <p><math>D = b^2 - 4ac = 0</math>. Za jednačinu <math>3kx^2 - (2k-3)x + (k+5) = 0</math> se dobiva:</p> <p><math>(2k-3)^2 - 4 \cdot 3k \cdot (k+5) = 0 \Rightarrow -8k^2 - 72k + 9 = 0</math>. Zbir rješenja kvadratne jednačine (Vieteova pravila)</p> <p><math>a_1x^2 + b_1x + c_1 = 0</math> je <math>-\frac{b_1}{a_1}</math>, odakle slijedi: <math>k_1 + k_2 = -\frac{-72}{-8} = -9</math>.</p>			
	a). $-\frac{1}{9}$	b). $\frac{1}{9}$	c). $-9$	d). $9$
4.	$ 21-4x-x^2  - 3 x+7  = x \Rightarrow  (x+7) \cdot (3-x)  - 3 x+7  = x \Rightarrow  x+7 ( 3-x -3) = x$ $ 3-x  = \begin{cases} +(3-x), & x \leq 3 \\ -(3-x), & x > 3 \end{cases}, \quad  x+7  = \begin{cases} +(x+7), & x > -7 \\ -(x+7), & x < -7 \end{cases}$ <p>I : <math>x \in (-\infty, -7) \Rightarrow -(x+7)[+(3-x)-3] = x \Rightarrow x(x+7) = x \Rightarrow x^2 + 6x = 0 \Rightarrow x_1 = 0 \notin I, x_2 = -6 \notin I</math></p> <p>II : <math>x \in [-7, 3] \Rightarrow (x+7)[+(3-x)-2] = x \Rightarrow -x(x+7) = x \Rightarrow x^2 + 8x = 0 \Rightarrow x_3 = 0 \in II, x_4 = -8 \notin II</math></p> <p>III : <math>x \in (3, \infty) \Rightarrow (x+7)[-(3-x)-2] = x \Rightarrow (x+7)(x-6) = x \Rightarrow x^2 = 42 \Rightarrow x_5 = -\sqrt{42} \notin III, x_6 = \sqrt{42} \in III</math></p> <p>Broj real nih rješenja jednačine je: 2 (<math>x_3</math> i <math>x_6</math>).</p>			
	a). 2	b). 5	c). 3	d). 4
5.	$3^{x-1} + 4 \cdot 3^{-x-1} < \frac{5}{3} \Rightarrow \frac{3^x}{3} + 4 \cdot \frac{1}{3^x \cdot 3} - \frac{5}{3} < 0 \quad / \cdot (3^x \cdot 3) \quad \text{Smjena: } 3^x = t$ $t^2 - 5 \cdot t + 4 < 0 \Rightarrow (t-1) \cdot (t-4) < 0 \Rightarrow t \in (1, 4).$ $3^x = 1 = 3^0 \Rightarrow x = 0. \quad 3^x = 4 \Rightarrow x = \log_3 4. \quad \text{Rješenje nejednačine: } x \in (0, \log_3 4).$			
	a). $(3, +\infty)$	b). $(-\log_4 3, 0)$	c). $(0, \log_3 4)$	d). $(\log_3 4, 3)$



<b>UNIVERZITET U TUZLI</b> Fakultet elektrotehnike Tuzla, 09.07.2014. godine	<b>KVALIFIKACIONI ISPIT IZ</b> <b>MATEMATIKE</b>	<b>GRUPA C</b>
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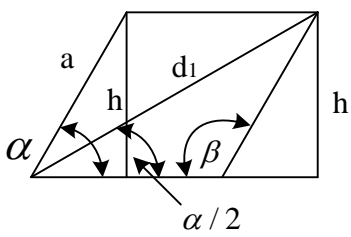
1.	Ako su $a = \frac{\sqrt{3}+1}{2}$ i $b = \frac{\sqrt{3}-1}{2}$ tada vrijednost izraza $a^3 - b^3$ pripada intervalu:
	a). $(-2, -1)$ b). $(1, 2)$ c). $(2, 3)$ d). $(-3, -2)$
2.	Skup rješenja nejednačina $\sqrt{1-3x} < 1+4x$ je:
	a). $\left(-\infty, -\frac{1}{4}\right]$ b). $\left(0, \frac{1}{3}\right]$ c). $\left(-\frac{1}{4}, 0\right]$ d). $\left(\frac{1}{3}, +\infty\right)$
3.	Zbir svih realnih vrijednosti parametra k za koje su rješenja jednačine $kx^2 - (3k-2)x + (k+7) = 0$ realna i jednaka je:
	a). 8      b). -8      c). $\frac{1}{8}$ d). $-\frac{1}{8}$
4.	Broj realnih rješenja jednačine $ 15-2x-x^2  - 3 x+5  = -x$ je:
	a). 6      b). 4      c). 3      d). 2
5.	Skup rješenja nejednačine $2^{x-1} + 3 \cdot 2^{-x-1} < 2$ je:
	a). $(2, +\infty)$ b). $(-\log_3 2, 0)$ c). $(\log_2 3, 2)$ d). $(0, \log_2 3)$
6.	Proizvod svih realnih rješenja jednačine $\log_3(x+2) - 2\log_{(x+2)} 3 = -1$ je:
	a). $-\frac{17}{9}$ b). $\frac{17}{9}$ c). $-\frac{8}{9}$ d). $\frac{8}{9}$
7.	Modul kompleksnog broja $\frac{\sqrt{5}+i\sqrt{3}}{\cos 65^\circ - i \sin 65^\circ}$ je:
	a). $\sqrt{2}$ b). $\frac{2\sqrt{2}}{\cos^2 65^\circ}$ c). $2\sqrt{2}$ d). $\frac{\sqrt{2}}{\sin^2 55^\circ}$
8.	Skup rješenja nejednačine $\frac{3\cos x - \sqrt{3}}{2\cos x - \sqrt{3}} > 1$ u prvom kvadrantu je:
	a). $\left(\frac{\pi}{4}, \frac{\pi}{3}\right)$ b). $\left(0, \frac{\pi}{6}\right)$ c). $\left(\frac{\pi}{6}, \frac{\pi}{4}\right)$ d). $\left(\frac{\pi}{3}, \frac{\pi}{2}\right)$
9.	Otac i kćerka zajedno imaju 60 godina. Koliko su godina imali zajedno prije 5 godina ako je otac tada bio 4 puta stariji od kćerke?
	a). 42      b). 45      c). 48      d). 50
10.	Koliko iznosi površina romba kod kojeg su poznati ugao $\beta = 120^\circ$ i duža dijagonala $d_1 = 20$ ?
	
	a). $\frac{100\sqrt{3}}{3}$ b). $\frac{150\sqrt{3}}{3}$ c). $\frac{200\sqrt{3}}{3}$ d). $100\sqrt{3}$

**NAPOMENA**      Poslije svakog zadatka ponuđena su četiri odgovora.  
      Zaokružite odgovor koji smatrate tačnim.  
      Tačno zaokružen odgovor nosi 4 boda.  
      Nezaokružen odgovor nosi 0 bodova.

UNIVERZITET U TUZLI Fakultet elektrotehnike Tuzla, 09.07.2014.godine	KVALIFIKACIONI ISPIT IZ MATEMATIKE	GRUPA C
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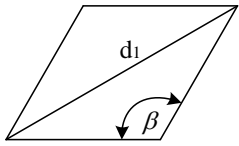
RJEŠENJA ZADATAKA

1.	$a^3 - b^3 = \left(\frac{\sqrt{3}+1}{2}\right)^3 - \left(\frac{\sqrt{3}-1}{2}\right)^3 = \frac{3\sqrt{3}+9+3\sqrt{3}+1-3\sqrt{3}+9-3\sqrt{3}+1}{8} = \frac{20}{8} = \frac{5}{2} \in (2,3).$			
	a). (-2,-1)	b). (1,2)	c). (2,3)	d). (-3,-2)
2.	$\sqrt{1-3x} < 1+4x$ <p>1° <math>1-3x \geq 0 \Rightarrow R_1: x \leq \frac{1}{3}</math></p> <p>2° <math>1+4x &gt; 0 \Rightarrow R_2: x &gt; -\frac{1}{4}</math></p> <p>3° <math>1-3x &lt; (1+4x)^2 \Rightarrow 16x^2 + 11x &gt; 0 \Rightarrow R_3: x \in \left(-\infty, -\frac{11}{16}\right) \cup (0, +\infty)</math></p> $R = R_1 \cup R_2 \cup R_3 \Rightarrow x \in \left(0, \frac{1}{3}\right].$			
	a). $\left(-\infty, -\frac{1}{4}\right]$	b). $\left(0, \frac{1}{3}\right]$	c). $\left(-\frac{1}{4}, 0\right]$	d). $\left(\frac{1}{3}, +\infty\right)$
3.	<p>Potreban uslov da jednačina <math>ax^2 + bx + c = 0</math> ima realna i jednaka rješenja je:</p> <p><math>D = b^2 - 4ac = 0</math>. Za jednačinu <math>kx^2 - (3k-2)x + (k+7) = 0</math> se dobiva:</p> <p><math>(3k-2)^2 - 4 \cdot k \cdot (k+7) = 0 \Rightarrow 5k^2 - 40k + 4 = 0</math>. Zbir rješenja kvadratne jednačine (Vieteova pravila)</p> <p><math>a_1x^2 + b_1x + c_1 = 0</math> je <math>-\frac{b_1}{a_1}</math>, odakle slijedi: <math>k_1 + k_2 = -\frac{-40}{5} = 8</math>.</p>			
	a). 8	b). -8	c). $\frac{1}{8}$	d). $-\frac{1}{8}$
4.	$ 15-2x-x^2  - 3 x+5  = -x \Rightarrow  (x+5) \cdot (3-x)  - 3 x+5  = -x \Rightarrow  x+5 ( 3-x -3) = -x$ $ 3-x  = \begin{cases} +(3-x), & x \leq 3 \\ -(3-x), & x > 3 \end{cases}, \quad  x+5  = \begin{cases} +(x+5), & x > -5 \\ -(x+5), & x < -5 \end{cases}$ <p>I: <math>x \in (-\infty, -5) \Rightarrow -(x+5)[+(3-x)-3] = -x \Rightarrow x(x+5) = -x \Rightarrow x^2 + 6x = 0 \Rightarrow x_1 = 0 \notin I, x_2 = -6 \in I</math></p> <p>II: <math>x \in [-5, 3] \Rightarrow (x+5)[+(3-x)-3] = -x \Rightarrow -x(x+5) = -x \Rightarrow x^2 + 4x = 0 \Rightarrow x_3 = 0 \in II, x_4 = -4 \in II</math></p> <p>III: <math>x \in (3, \infty) \Rightarrow (x+5)[-(3-x)-3] = -x \Rightarrow (x+5)(x-6) = -x \Rightarrow x^2 = 30 \Rightarrow x_5 = -\sqrt{30} \notin III, x_6 = \sqrt{30} \in III</math></p> <p>Broj realnih rješenja jednačine je: 4 (<math>x_2, x_3, x_4</math> i <math>x_6</math>).</p>			
	a). 6	b). 4	c). 3	d). 2
5.	$2^{x-1} + 3 \cdot 2^{-x-1} < 2 \Rightarrow \frac{2^x}{2} + 3 \cdot \frac{1}{2^x \cdot 2} - 2 < 0 \quad / \cdot (2^x \cdot 2) \quad \text{Smjena: } 2^x = t$ $t^2 - 4 \cdot t + 3 < 0 \Rightarrow (t-1) \cdot (t-3) < 0 \Rightarrow t \in (1, 3).$ $2^x = 1 = 2^0 \Rightarrow x = 0. \quad 2^x = 3 \Rightarrow x = \log_2 3. \quad \text{Rješenje nejednačine: } x \in (0, \log_2 3).$			
	a). (2, +∞)	b). (-log <sub>3</sub> 2, 0)	c). (log <sub>2</sub> 3, 2)	d). (0, log <sub>2</sub> 3)

6.	$\log_3(x+2) - 2\log_{(x+2)} 3 = -1 \Rightarrow \log_3(x+2) - \frac{2}{\log_3(x+2)} + 1 = 0. \text{ Smjena : } \log_3(x+2) = t$ $t + 1 - \frac{2}{t} = 0 / \cdot t \Rightarrow t^2 + t - 2 = 0 \Rightarrow t_1 = -2 \wedge t_2 = 1.$ $\log_3(x+2) = -2 \Rightarrow x_1 + 2 = \frac{1}{9} \Rightarrow x_1 = -\frac{17}{9}.$ $\log_3(x+2) = 1 \Rightarrow x_2 + 2 = 3 \Rightarrow x_2 = 1. \text{ Proizvod rješenja : } x_1 \cdot x_2 = -\frac{17}{9}.$																
	<p>a). <math>-\frac{17}{9}</math>                      b). <math>\frac{17}{9}</math>                      c). <math>-\frac{8}{9}</math>                      d). <math>\frac{8}{9}</math></p>																
7.	$\left  \frac{\sqrt{5} + i\sqrt{3}}{\cos 65^\circ - i \sin 65^\circ} \right  = \frac{\sqrt{(\sqrt{5})^2 + (\sqrt{3})^2}}{\sqrt{\cos^2 65^\circ + (-\sin 65^\circ)^2}} = \frac{\sqrt{5+3}}{\sqrt{\cos^2 65^\circ + \sin^2 65^\circ}} = \frac{\sqrt{8}}{\sqrt{1}} = 2\sqrt{2}$																
	<p>a). <math>\sqrt{2}</math>                      b). <math>\frac{2\sqrt{2}}{\cos^2 65^\circ}</math>                      c). <math>2\sqrt{2}</math>                      d). <math>\frac{\sqrt{2}}{\sin^2 55^\circ}</math></p>																
8.	$\frac{3\cos x - \sqrt{3}}{2\cos x - \sqrt{3}} > 1 \Rightarrow \frac{3\cos x - \sqrt{3}}{2\cos x - \sqrt{3}} - 1 > 0 \Rightarrow \frac{\cos x}{2\cos x - \sqrt{3}} > 0.$ <p>U prvom kvadrantu : <math>\cos x &gt; 0 \Rightarrow x \in \left(0, \frac{\pi}{2}\right) \wedge \cos x &gt; \frac{\sqrt{3}}{2} \Rightarrow x \in \left(0, \frac{\pi}{6}\right).</math></p> <p>Rješenje nejednačine : <math>x \in \left(0, \frac{\pi}{6}\right).</math></p> <table border="1" data-bbox="1165 784 1484 1030" style="float: right; margin-left: 20px;"> <thead> <tr> <th></th> <th>0</th> <th><math>\frac{\pi}{6}</math></th> <th><math>\frac{\pi}{2}</math></th> </tr> </thead> <tbody> <tr> <td>cos x</td> <td>+</td> <td>+</td> <td></td> </tr> <tr> <td><math>\cos x - \frac{\sqrt{3}}{2}</math></td> <td>+</td> <td>-</td> <td></td> </tr> <tr> <td></td> <td>+</td> <td>-</td> <td></td> </tr> </tbody> </table>		0	$\frac{\pi}{6}$	$\frac{\pi}{2}$	cos x	+	+		$\cos x - \frac{\sqrt{3}}{2}$	+	-			+	-	
	0	$\frac{\pi}{6}$	$\frac{\pi}{2}$														
cos x	+	+															
$\cos x - \frac{\sqrt{3}}{2}$	+	-															
	+	-															
	<p>a). <math>\left(\frac{\pi}{4}, \frac{\pi}{3}\right)</math>                      b). <math>\left(0, \frac{\pi}{6}\right)</math>                      c). <math>\left(\frac{\pi}{6}, \frac{\pi}{4}\right)</math>                      d). <math>\left(\frac{\pi}{3}, \frac{\pi}{2}\right)</math></p>																
9.	<p><math>x</math> – broj godina oca, <math>y</math> – broj godina kćerke.</p> $x + y = 60 \Rightarrow x = 60 - y$ $x - 5 = 4(y - 5)$ $60 - y - 5 = 4y - 20 \Rightarrow 5y = 75 \Rightarrow y = 15 \wedge x = 45. (x - 5) + (y - 5) = 50.$																
	<p>a). 42                      b). 45                      c). 48                      d). 50</p>																
10.	 $2\alpha + 2\beta = 360^\circ \Rightarrow \alpha = 60^\circ$ $\sin \frac{\alpha}{2} = \frac{h}{d_1} \Rightarrow h = d_1 \cdot \sin \frac{\alpha}{2} = 10$ $\sin \alpha = \frac{h}{a} \Rightarrow a = \frac{h}{\sin \alpha} = \frac{10}{\frac{\sqrt{3}}{2}} = \frac{20}{\sqrt{3}} = \frac{20\sqrt{3}}{3}.$ <p>Površina romba : <math>P = a \cdot h = \frac{200\sqrt{3}}{3}.</math></p>																
	<p>a). <math>\frac{100\sqrt{3}}{3}</math>                      b). <math>\frac{150\sqrt{3}}{3}</math>                      c). <math>\frac{200\sqrt{3}}{3}</math>                      d). <math>100\sqrt{3}</math></p>																



<b>UNIVERZITET U TUZLI</b> Fakultet elektrotehnike Tuzla, 09.07.2014. godine	<b>KVALIFIKACIONI ISPIT IZ</b> <b>MATEMATIKE</b>	<b>GRUPA D</b>
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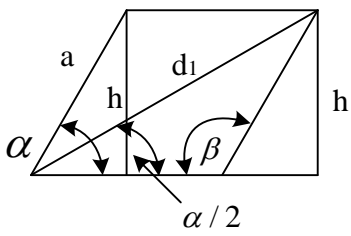
1.	Ako su $a = \frac{\sqrt{2}+1}{2}$ i $b = \frac{\sqrt{2}-1}{2}$ tada vrijednost izraza $a^3 - b^3$ pripada intervalu:
	a). (1,2)                      b). (0,1)                      c). (-2,-1)                      d). (-1,-0)
2.	Skup rješenja nejednačina $\sqrt{1+3x} < 1-4x$ je:
	a). $\left(-\infty, -\frac{1}{3}\right)$ b). $\left[0, \frac{1}{4}\right)$ c). $\left[-\frac{1}{3}, 0\right)$ d). $\left[\frac{1}{4}, +\infty\right)$
3.	Zbir svih realnih vrijednosti parametra k za koje su rješenja jednačine $kx^2 + (2k+3)x - (k+7) = 0$ realna i jednaka je:
	a). $\frac{1}{5}$ b). $-\frac{1}{5}$ c). 5                      d). -5
4.	Broj realnih rješenja jednačine $ 10-3x-x^2  - 2 x+5  = x$ je:
	a). 2                      b). 3                      c). 5                      d). 6
5.	Skup rješenja nejednačine $2^{x-1} + 5 \cdot 2^{-x-1} < 3$ je:
	a). (4, +∞)                      b). $(-\log_5 2, 0)$ c). $(0, \log_2 5)$ d). $(\log_2 5, 4)$
6.	Proizvod svih realnih rješenja jednačine $\log_2(x-3) - 2\log_{(x-3)} 2 = 1$ je:
	a). $\frac{35}{2}$ b). $-\frac{49}{2}$ c). $\frac{25}{2}$ d). $\frac{49}{2}$
7.	Modul kompleksnog broja $\frac{\sqrt{6}+i\sqrt{3}}{\cos 35^\circ - i \sin 35^\circ}$ je:
	a). $\frac{3\sqrt{3}}{\cos^2 35^\circ}$ b). 3                      c). $3\sqrt{3}$ d). $\frac{\sqrt{3}}{\sin^2 35^\circ}$
8.	Skup rješenja nejednačine $\frac{3\cos x - 1}{2\cos x - 1} < 1$ u prvom kvadrantu je:
	a). $\left(\frac{\pi}{3}, \frac{\pi}{2}\right)$ b). $\left(\frac{\pi}{4}, \frac{\pi}{3}\right)$ c). $\left(\frac{\pi}{6}, \frac{\pi}{4}\right)$ d). $\left(0, \frac{\pi}{6}\right)$
9.	Otac i kćerka zajedno imaju 50 godina. Koliko će godina imati zajedno za 5 godina ako će otac tada biti 3 puta stariji od kćerke?
	a). 48                      b). 52                      c). 60                      d). 50
10.	Koliko iznosi površina romba kod kojeg su poznati ugao $\beta = 120^\circ$ i duža dijagonala $d_1 = 10$ ?
	
	a). $\frac{100\sqrt{3}}{3}$ b). $\frac{50\sqrt{3}}{3}$ c). $100\sqrt{3}$ d). $50\sqrt{3}$

**NAPOMENA**                      **Poslije svakog zadatka ponuđena su četiri odgovora.**  
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UNIVERZITET U TUZLI Fakultet elektrotehnike Tuzla, 09.07.2014.godine	KVALIFIKACIONI ISPIT IZ MATEMATIKE	GRUPA D
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**RJEŠENJA ZADATAKA**

1.	$a^3 - b^3 = \left(\frac{\sqrt{2}+1}{2}\right)^3 - \left(\frac{\sqrt{2}-1}{2}\right)^3 = \frac{2\sqrt{2}+6+3\sqrt{2}+1-2\sqrt{2}+6-3\sqrt{2}+1}{8} = \frac{14}{8} = \frac{7}{4} \in (1,2).$			
	a). (1,2)	b). (0,1)	c). (-2,-1)	d). (-1,-0)
2.	$\sqrt{1+3x} < 1-4x$ <p>1° <math>1+3x \leq 0 \Rightarrow R_1 : x \geq -\frac{1}{2}</math></p> <p>2° <math>1-4x &gt; 0 \Rightarrow R_2 : x &lt; \frac{1}{4}</math></p> <p>3° <math>1+3x &lt; (1-4x)^2 \Rightarrow 16x^2 - 11x &gt; 0 \Rightarrow R_3 : x \in (-\infty, 0) \cup \left(\frac{11}{16}, +\infty\right)</math></p> $R = R_1 \cup R_2 \cup R_3 \Rightarrow x \in \left[-\frac{1}{3}, 0\right).$			
	a). $\left(-\infty, -\frac{1}{3}\right)$	b). $\left[0, \frac{1}{4}\right)$	c). $\left[-\frac{1}{3}, 0\right)$	d). $\left[\frac{1}{4}, +\infty\right)$
3.	<p>Potreban uslov da jednačina <math>ax^2 + bx + c = 0</math> ima realna i jednaka rješenja je:</p> <p><math>D = b^2 - 4ac = 0</math>. Za jednačinu <math>kx^2 + (2k+3)x - (k+7) = 0</math> se dobiva:</p> <p><math>(2k+3)^2 + 4 \cdot k \cdot (k+7) = 0 \Rightarrow 8k^2 + 40k + 9 = 0</math>. Zbir rješenja kvadratne jednačine (Vieteova pravila)</p> <p><math>a_1x^2 + b_1x + c_1 = 0</math> je <math>-\frac{b_1}{a_1}</math>, odakle slijedi: <math>k_1 + k_2 = -\frac{40}{8} = -5</math>.</p>			
	a). $\frac{1}{5}$	b). $-\frac{1}{5}$	c). 5	d). -5
4.	$ 10-3x-x^2  - 2 x+5  = x \Rightarrow  (x+5) \cdot (2-x)  - 2 x+5  = x \Rightarrow  x+5 ( 2-x -2) = x$ $ 2-x  = \begin{cases} +(2-x), & x \leq 2 \\ -(2-x), & x > 2 \end{cases}, \quad  x+3  = \begin{cases} +(x+5), & x > -5 \\ -(x+5), & x < -5 \end{cases}$ <p>I : <math>x \in (-\infty, -5) \Rightarrow -(x+5)[+(2-x)-2] = x \Rightarrow x(x+5) = x \Rightarrow x^2 + 4x = 0 \Rightarrow x_1 = 0 \notin I, x_2 = -4 \notin I</math></p> <p>II : <math>x \in [-5, 2] \Rightarrow (x+5)[+(2-x)-2] = x \Rightarrow -x(x+5) = x \Rightarrow x^2 + 6x = 0 \Rightarrow x_3 = 0 \in II, x_4 = -6 \notin II</math></p> <p>III : <math>x \in (2, \infty) \Rightarrow (x+5)[-(2-x)-2] = x \Rightarrow (x+5)(x-4) = x \Rightarrow x^2 = 20 \Rightarrow x_5 = -2\sqrt{5} \notin III, x_6 = 2\sqrt{5} \in III</math></p> <p>Broj real nih rješenja jednačine je: 2 (<math>x_3</math> i <math>x_6</math>).</p>			
	a). 2	b). 3	c). 5	d). 6
5.	$2^{x-1} + 5 \cdot 2^{-x-1} < 3 \Rightarrow \frac{2^x}{2} + 5 \cdot \frac{1}{2^x \cdot 2} - 3 < 0 \quad \cdot (2^x \cdot 2) \quad \text{Smjena: } 2^x = t$ $t^2 - 6 \cdot t + 5 < 0 \Rightarrow (t-1) \cdot (t-5) < 0 \Rightarrow t \in (1,5).$ $2^x = 1 = 2^0 \Rightarrow x = 0. \quad 2^x = 5 \Rightarrow x = \log_2 5. \quad \text{Rješenje nejednačine: } x \in (0, \log_2 5).$			
	a). (4, +∞)	b). (-log <sub>5</sub> 2, 0)	c). (0, log <sub>2</sub> 5)	d). (log <sub>2</sub> 5, 4)

6.	$\log_2(x-3) - 2\log_{(x-3)} 2 = 1 \Rightarrow \log_2(x-3) - \frac{2}{\log_2(x-3)} - 1 = 0. \text{ Smjena: } \log_2(x-3) = t$ $t - 1 - \frac{2}{t} = 0 / \cdot t \Rightarrow t^2 - t - 2 = 0 \Rightarrow t_1 = 2 \wedge t_2 = -1.$ $\log_2(x-3) = 2 \Rightarrow x_1 - 3 = 4 \Rightarrow x_1 = 7.$ $\log_2(x-3) = -1 \Rightarrow x_2 - 3 = \frac{1}{2} \Rightarrow x_2 = \frac{7}{2}. \text{ Proizvod rješenja: } x_1 \cdot x_2 = \frac{49}{2}.$																
	a). $\frac{35}{2}$ b). $-\frac{49}{2}$ c). $\frac{25}{2}$ d). $\frac{49}{2}$																
7.	$\left  \frac{\sqrt{6} + i\sqrt{3}}{\cos 35^\circ - i \sin 35^\circ} \right  = \frac{\sqrt{(\sqrt{6})^2 + (\sqrt{3})^2}}{\sqrt{\cos^2 35^\circ + (-\sin 35^\circ)^2}} = \frac{\sqrt{6+3}}{\sqrt{\cos^2 35^\circ + \sin^2 35^\circ}} = \frac{\sqrt{9}}{\sqrt{1}} = 3$																
8.	$\frac{3\cos x - 1}{2\cos x - 1} < 1 \Rightarrow \frac{3\cos x - 1}{2\cos x - 1} - 1 < 0 \Rightarrow \frac{\cos x}{2\cos x - 1} < 0.$ <p><i>U prvom kvadrantu: <math>\cos x &gt; 0 \Rightarrow x \in (0, \frac{\pi}{2}) \wedge \cos x &gt; \frac{1}{2} \Rightarrow x \in (0, \frac{\pi}{3})</math>.</i></p> <p><i>Rješenje nejednačine: <math>x \in (\frac{\pi}{3}, \frac{\pi}{2})</math>.</i></p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th></th> <th>0</th> <th><math>\frac{\pi}{3}</math></th> <th><math>\frac{\pi}{2}</math></th> </tr> </thead> <tbody> <tr> <td><math>\cos x</math></td> <td></td> <td>+</td> <td>+</td> </tr> <tr> <td><math>\cos x - \frac{1}{2}</math></td> <td></td> <td>+</td> <td>-</td> </tr> <tr> <td></td> <td></td> <td>+</td> <td>-</td> </tr> </tbody> </table>		0	$\frac{\pi}{3}$	$\frac{\pi}{2}$	$\cos x$		+	+	$\cos x - \frac{1}{2}$		+	-			+	-
	0	$\frac{\pi}{3}$	$\frac{\pi}{2}$														
$\cos x$		+	+														
$\cos x - \frac{1}{2}$		+	-														
		+	-														
9.	$x$ – broj godina oca, $y$ – broj godina kćerke. $x + y = 50 \Rightarrow x = 50 - y$ $x + 5 = 3(y + 5)$ $50 - y + 5 = 3y + 15 \Rightarrow 4y = 40 \Rightarrow y = 10 \wedge x = 40. (x + 5) + (y + 5) = 60.$																
	a). 48                                      b). 52                                      c). 60                                      d). 50																
10.	 $2\alpha + 2\beta = 360^\circ \Rightarrow \alpha = 60^\circ$ $\sin \frac{\alpha}{2} = \frac{h}{d_1} \Rightarrow h = d_1 \cdot \sin \frac{\alpha}{2} = 5$ $\sin \alpha = \frac{h}{a} \Rightarrow a = \frac{h}{\sin \alpha} = \frac{5}{\frac{\sqrt{3}}{2}} = \frac{10}{\sqrt{3}} = \frac{10\sqrt{3}}{3}.$ <p><i>Površina romba: <math>P = a \cdot h = \frac{50\sqrt{3}}{3}</math>.</i></p>																
	a). $\frac{100\sqrt{3}}{3}$ b). $\frac{50\sqrt{3}}{3}$ c). $100\sqrt{3}$ d). $50\sqrt{3}$																

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1.	Za koju vrijednost parametra $a$ će polinom $P(x) = x^4 + x^3 - 21x^2 - 23x + a + 12$ biti djeljiv polinomom $Q(x) = x^2 - 5x + 2$ bez ostatka?
	a). $a = 0$ b). $a = -1$ c). $a = 3$ d). $a = 2$
2.	Za koje vrijednosti parametra $p$ je proizvod rješenja jednačine $(p+2)x^2 + 13px + p - 3 = 0$ uvijek negativan?
	a). $p \in (-3, -2)$ b). $p \in (-2, 3)$ c). $p \in (3, 6)$ d). $p \in (6, +\infty)$
3.	Proizvod rješenja jednačine $15^x + 15 = 5 \cdot 5^x + 3 \cdot 3^x$ iznosi:
	a). 1                      b). 0                      c). $\frac{\log_3^2 5}{\log_5^2 3}$ d). $\frac{\log_5^2 3}{\log_3^2 5}$
4.	Broj cjelobrojnih, realnih rješenja nejednačine $\sqrt{1 - 25x^2} \geq 1 - 9x$ je:
	a). 3                      b). 2                      c). 1                      d). 0
5.	Broj cjelobrojnih, realnih rješenja nejednačine $\log_{(x+2)}(3-x) \geq 0$ je:
	a). 3                      b). 0                      c). 1                      d). 4
6.	Vrijednost kompleksnog izraza $(1+i)(\cos 60^\circ - i \sin 60^\circ)$ u algebarskom obliku je:
	a). $\frac{\sqrt{3}+1}{2} + i \frac{\sqrt{3}-1}{2}$ b). $\frac{\sqrt{3}+1}{2} - i \frac{\sqrt{3}-1}{2}$ c). $\frac{\sqrt{3}-1}{2} - i \frac{\sqrt{3}+1}{2}$ d). $\frac{\sqrt{3}-1}{2} + i \frac{\sqrt{3}+1}{2}$
7.	Skup rješenja nejednačine $\left  \frac{1-8x}{7x+1} \right  \leq 1$ je:
	a). $x \in \left[ 2, \frac{15}{7} \right)$ b). $x \in \left[ -2, -\frac{1}{7} \right)$ c). $x \in [0, 2]$ d). $x \in \left( -\frac{1}{7}, 0 \right]$
8.	Skup rješenja nejednačine $\frac{2 \sin x - \sqrt{2}}{2 \cos x - 1} > 0$ iz prvog kvadranta je:
	a). $\left( \frac{\pi}{6}, \frac{\pi}{4} \right)$ b). $\left( 0, \frac{\pi}{6} \right)$ c). $\left( \frac{\pi}{3}, \frac{\pi}{2} \right)$ d). $\left( \frac{\pi}{4}, \frac{\pi}{3} \right)$
9.	Sin, otac i djed zajedno imaju 124 godina. Prije tri godine djed je bio dva puta stariji od oca, a za dvije godine će biti pet puta stariji od sina. Koliko imaju godina pojedinačno?
	a). 12, 38, 74                      b). 15, 36, 73                      c). 13, 38, 73                      d). 13, 40, 71
10.	Prečnik opisane kružnice pravouglog trougla iznosi 20[cm], a odnos kateta je 3:4. Kolika je površina trougla?
	a). 96[cm <sup>2</sup> ]                      b). 48[cm <sup>2</sup> ]                      c). 72[cm <sup>2</sup> ]                      d). 60[cm <sup>2</sup> ]

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UNIVERZITET U TUZLI Fakultet elektrotehnike Tuzla, 01.07.2013.godine	KVALIFIKACIONI ISPIT IZ MATEMATIKE	GRUPA A
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**RJEŠENJA ZADATAKA**

1.	$(x^4 + x^3 - 21x^2 - 23x + a + 12) : (x^2 - 5x + 2) = x^2 + 6x + 7$ $\begin{array}{r} \pm x^4 \mp 5x^3 \pm 2x^2 \\ \hline 6x^3 - 23x^2 - 23x + a + 12 \\ \pm 6x^3 \mp 30x^2 \pm 12x \\ \hline 7x^2 - 35x + a + 12 \\ \pm 7x^2 \mp 35x \pm 14 \\ \hline a + 12 - 14 = 0 \Rightarrow a = 2. \end{array}$																				
	<p>a). <math>a = 0</math>                      b). <math>a = -1</math>                      c). <math>a = 3</math>                      d). <math>a = 2</math></p>																				
2.	$(p+2)x^2 + 13px + p - 3 = 0 \quad / : (p+2)$ $x^2 + \frac{13p}{p+2}x + \frac{p-3}{p+2} = 0$ <p>Iz Vietovih pravila se dobija da je <math>x_1 \cdot x_2 = \frac{p-3}{p+2} &lt; 0 \Rightarrow p \in (-2, 3)</math></p>																				
	<p>a). <math>p \in (-3, -2)</math>                      b). <math>p \in (-2, 3)</math>                      c). <math>p \in (3, 6)</math>                      d). <math>p \in (6, +\infty)</math></p>																				
3.	$15^x + 15 = 5 \cdot 5^x + 3 \cdot 3^x \Rightarrow 5^x \cdot 3^x - 5 \cdot 5^x - 3 \cdot 3^x + 15 = 0 \Rightarrow (5^x - 3)(3^x - 5) = 0$ $5^x - 3 = 0 \Rightarrow 5^x = 3 \Rightarrow x_1 = \log_5 3$ $3^x - 5 = 0 \Rightarrow 3^x = 5 \Rightarrow x_2 = \log_3 5$ $x_1 \cdot x_2 = \log_5 3 \cdot \log_3 5 = \frac{\log 3}{\log 5} \cdot \frac{\log 5}{\log 3} = 1$																				
	<p>a). 1                      b). 0                      c). <math>\frac{\log_3^2 5}{\log_5^2 3}</math>                      d). <math>\frac{\log_5^2 3}{\log_3^2 5}</math></p>																				
4.	$\sqrt{1-25x^2} \geq 1-9x \Leftrightarrow \left\{ \begin{array}{l} 1-25x^2 \geq 0 \\ 1-9x < 0 \end{array} \right\} \vee \left\{ \begin{array}{l} 1-25x^2 \geq (1-9x)^2 \\ 1-9x \geq 0 \end{array} \right\}$ $1^\circ 1-25x^2 \geq 0 \Rightarrow x \in \left[-\frac{1}{5}, \frac{1}{5}\right] \wedge 1-9x < 0 \Rightarrow x > \frac{1}{9}, \text{ tj. } x \in \left(\frac{1}{9}, \frac{1}{5}\right].$ $2^\circ 1-25x^2 \geq (1-9x)^2, 53x^2 - 9x \leq 0 \Rightarrow x \in \left[0, \frac{9}{53}\right] \wedge 1-9x \geq 0 \Rightarrow x \leq \frac{1}{9}, \text{ tj. } x \in \left[0, \frac{1}{9}\right].$ <p>Rješenje nejednačine: <math>1^\circ \cup 2^\circ; x \in \left[0, \frac{1}{9}\right] \cup \left(\frac{1}{9}, \frac{1}{5}\right] \Rightarrow x \in \left[0, \frac{1}{5}\right]</math>. Cijeli broj je <math>x = 0</math>.</p>																				
	<p>a). 3                      b). 2                      c). 1                      d). 0</p>																				
5.	$\log_{(x+2)}(3-x) \geq 0,$ <p>DP: <math>3-x &gt; 0, x+2 &gt; 0, x+2 \neq 1</math></p> <p>DP: <math>x \in (-2, -1) \cup (-1, 3)</math></p> $\frac{\log(3-x)}{\log(x+2)} \geq 0$ <table border="1" data-bbox="853 1675 1236 1892" style="margin-left: auto; margin-right: auto;"> <tr> <td></td> <td align="center">-2</td> <td align="center">-1</td> <td align="center">2</td> <td align="center">3</td> </tr> <tr> <td><math>\log(3-x)</math></td> <td align="center">+</td> <td align="center">+</td> <td align="center">-</td> <td align="center">-</td> </tr> <tr> <td><math>\log(x+2)</math></td> <td align="center">-</td> <td align="center">+</td> <td align="center">+</td> <td align="center">-</td> </tr> <tr> <td></td> <td align="center">-</td> <td align="center">+</td> <td align="center">-</td> <td align="center">-</td> </tr> </table> <p><math>x \in (-1, 2] \quad x = 0, 1, 2</math>. Broj cjelobrojnih rješenja = 3.</p>		-2	-1	2	3	$\log(3-x)$	+	+	-	-	$\log(x+2)$	-	+	+	-		-	+	-	-
	-2	-1	2	3																	
$\log(3-x)$	+	+	-	-																	
$\log(x+2)$	-	+	+	-																	
	-	+	-	-																	
	<p>a). 3                      b). 0                      c). 1                      d). 4</p>																				

6.	$(1+i)(\cos 60^\circ - i \sin 60^\circ) = (1+i) \left( \frac{1}{2} - i \frac{\sqrt{3}}{2} \right) = \frac{1}{2} - i \frac{\sqrt{3}}{2} + i \frac{1}{2} + \frac{\sqrt{3}}{2} = \frac{\sqrt{3}+1}{2} - i \frac{\sqrt{3}-1}{2}$																				
	a). $\frac{\sqrt{3}+1}{2} + i \frac{\sqrt{3}-1}{2}$ b). $\frac{\sqrt{3}+1}{2} - i \frac{\sqrt{3}-1}{2}$ c). $\frac{\sqrt{3}-1}{2} - i \frac{\sqrt{3}+1}{2}$ d). $\frac{\sqrt{3}-1}{2} + i \frac{\sqrt{3}+1}{2}$																				
7.	$\left  \frac{1-8x}{7x+1} \right  \leq 1 \Rightarrow \begin{cases} 1-8x, x \leq \frac{1}{8} \\ -(1-8x), x > \frac{1}{8} \end{cases},  7x+1  = \begin{cases} 7x+1, x > -\frac{1}{7} \\ -(7x+1), x < -\frac{1}{7} \end{cases}$ <p>Za <math>x \in \left(-\infty, -\frac{1}{7}\right) \Rightarrow \frac{1-8x}{-(7x+1)} \leq 1 \Rightarrow \frac{x-2}{7x+1} \leq 0 \Rightarrow x \in \left(-\frac{1}{7}, 2\right]</math> odnosno nema rješenja.</p> <p>Za <math>x \in \left(-\frac{1}{7}, \frac{1}{8}\right] \Rightarrow \frac{1-8x}{7x+1} \leq 1 \Rightarrow \frac{15x}{7x+1} \geq 0 \Rightarrow x \in \left(-\infty, -\frac{1}{7}\right) \cup [0, +\infty)</math> odnosno <math>x \in \left[0, \frac{1}{8}\right]</math></p> <p>Za <math>x \in \left(\frac{1}{8}, +\infty\right) \Rightarrow \frac{-(1-8x)}{7x+1} \leq 1 \Rightarrow \frac{x-2}{7x+1} \leq 0 \Rightarrow x \in \left(-\frac{1}{7}, 2\right]</math> odnosno <math>x \in \left(\frac{1}{8}, 2\right]</math></p> <p>Rješenje nejednačine: <math>x \in \left[0, \frac{1}{8}\right] \cup \left(\frac{1}{8}, 2\right]</math> odnosno <math>x \in [0, 2]</math></p>																				
	a). $x \in \left[2, \frac{15}{7}\right)$ b). $x \in \left[-2, -\frac{1}{7}\right)$ c). $x \in [0, 2]$ d). $x \in \left(-\frac{1}{7}, 0\right]$																				
8.	$\frac{2 \sin x - \sqrt{2}}{2 \cos x - 1} > 0,$ $2 \sin x - \sqrt{2} > 0 \Rightarrow x \in \left(\frac{\pi}{4}, \frac{\pi}{2}\right)$ $2 \cos x - 1 > 0 \Rightarrow \left(0, \frac{\pi}{3}\right)$ <table border="1" data-bbox="853 817 1260 1064" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th></th> <th>0</th> <th><math>\frac{\pi}{4}</math></th> <th><math>\frac{\pi}{3}</math></th> <th><math>\frac{\pi}{2}</math></th> </tr> </thead> <tbody> <tr> <td><math>2 \sin x - \sqrt{2}</math></td> <td></td> <td>-</td> <td>+</td> <td>+</td> </tr> <tr> <td><math>2 \cos x - 1</math></td> <td></td> <td>+</td> <td>+</td> <td>-</td> </tr> <tr> <td></td> <td></td> <td>-</td> <td>+</td> <td>-</td> </tr> </tbody> </table> <p>Rješenje nejednačine: <math>x \in \left(\frac{\pi}{4}, \frac{\pi}{3}\right)</math></p>		0	$\frac{\pi}{4}$	$\frac{\pi}{3}$	$\frac{\pi}{2}$	$2 \sin x - \sqrt{2}$		-	+	+	$2 \cos x - 1$		+	+	-			-	+	-
	0	$\frac{\pi}{4}$	$\frac{\pi}{3}$	$\frac{\pi}{2}$																	
$2 \sin x - \sqrt{2}$		-	+	+																	
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		-	+	-																	
	a). $\left(\frac{\pi}{6}, \frac{\pi}{4}\right)$ b). $\left(0, \frac{\pi}{6}\right)$ c). $\left(\frac{\pi}{3}, \frac{\pi}{2}\right)$ d). $\left(\frac{\pi}{4}, \frac{\pi}{3}\right)$																				
9.	<p><math>x</math> – broj godina djeda, <math>y</math> – broj godina oca, <math>z</math> – broj godina sina</p> $x + y + z = 124$ $z - 3 = 2(y - 3) \quad (13, 38, 73)$ $z + 2 = 5(x + 2)$																				
	a). 12, 38, 74      b). 15, 36, 73      c). 13, 38, 73      d). 13, 40, 71																				
10.	<p>Kod pravouglog trougla vrijedi da je hipotenuza jednaka prečniku opisane kružnice (<math>c=2R</math>).</p> $a:b=3:4=k, a=3k \text{ i } b=4k$ $a^2 + b^2 = c^2 \Rightarrow 25k^2 = 400 \Rightarrow k = 4, a = 12, b = 16$ $P = \frac{a \cdot b}{2} = 96 [cm^2]$																				
	a). $96 [cm^2]$ b). $48 [cm^2]$ c). $72 [cm^2]$ d). $60 [cm^2]$																				

<b>UNIVERZITET U TUZLI</b> Fakultet elektrotehnike Tuzla, 01.07.2013.godine	<b>KVALIFIKACIONI ISPIT IZ</b> <b>MATEMATIKE</b>	<b>GRUPA B</b>
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1.	Za koju vrijednost parametra $a$ će polinom $P(x) = x^4 - x^3 - 21x^2 + 23x + a + 11$ biti djeljiv polinomom $Q(x) = x^2 + 5x + 2$ bez ostatka? a). $a = 3$ b). $a = 2$ c). $a = 0$ d). $a = -1$
2.	Za koje vrijednosti parametra $p$ je proizvod rješenja jednačine $(p+3)x^2 - 11px + p - 2 = 0$ uvijek negativan? a). $p \in (-5, -3)$ b). $p \in (2, 5)$ c). $p \in (-3, 2)$ d). $p \in (5, +\infty)$
3.	Proizvod rješenja jednačine $20^x + 20 = 5 \cdot 5^x + 4 \cdot 4^x$ iznosi: a). 1                                  b). 0                                  c). $\frac{\log_5^2 4}{\log_4^2 5}$ d). $\frac{\log_4^2 5}{\log_5^2 4}$
4.	Broj cjelobrojnih, realnih rješenja nejednačine $\sqrt{1-16x^2} \geq 1-7x$ je: a). 0                                  b). 1                                  c). 2                                  d). 3
5.	Broj cjelobrojnih, realnih rješenja nejednačine $\log_{(x+3)}(4-x) \geq 0$ je: a). 0                                  b). 1                                  c). 3                                  d). 5
6.	Vrijednost kompleksnog izraza $(1+i)(\cos 30^\circ - i \sin 30^\circ)$ u algebarskom obliku je: a). $\frac{\sqrt{3}+1}{2} - i \frac{\sqrt{3}-1}{2}$ b). $\frac{\sqrt{3}-1}{2} + i \frac{\sqrt{3}-1}{2}$ c). $\frac{\sqrt{3}+1}{2} + i \frac{\sqrt{3}+1}{2}$ d). $\frac{\sqrt{3}+1}{2} + i \frac{\sqrt{3}-1}{2}$
7.	Skup rješenja nejednačine $\left  \frac{1-5x}{4x+1} \right  \leq 1$ je: a). $x \in [0, 2]$ b). $x \in \left[ -\frac{1}{4}, 0 \right]$ c). $x \in \left[ 2, \frac{9}{4} \right)$ d). $x \in \left[ -2, -\frac{1}{4} \right)$
8.	Skup rješenja nejednačine $\frac{2 \sin x - 1}{2 \cos x - \sqrt{2}} > 0$ iz prvog kvadranta je: a). $\left( \frac{\pi}{4}, \frac{\pi}{3} \right)$ b). $\left( \frac{\pi}{6}, \frac{\pi}{4} \right)$ c). $\left( 0, \frac{\pi}{6} \right)$ d). $\left( \frac{\pi}{3}, \frac{\pi}{2} \right)$
9.	Sin, otac i djed zajedno imaju 121 godina. Prije dvije godine djed je bio dva puta stariji od oca, a za tri godine će biti pet puta stariji od sina. Koliko imaju godina pojedinačno? a). 14, 37, 70                      b). 10, 39, 72                      c). 12, 39, 70                      d). 12, 37, 72
10.	Prečnik opisane kružnice pravouglog trougla iznosi 10[cm], a odnos kateta je 3:4. Kolika je površina trougla? a). 48[cm <sup>2</sup> ]                      b). 24[cm <sup>2</sup> ]                      c). 36[cm <sup>2</sup> ]                      d). 12[cm <sup>2</sup> ]
<b>NAPOMENA</b>	<b>Poslije svakog zadatka ponuđena su četiri odgovora.</b> <b>Zaokružite odgovor koji smatrate tačnim.</b> <b>Tačno zaokružen odgovor nosi 4 boda.</b> <b>Nezaokružen odgovor nosi 0 bodova.</b>

UNIVERZITET U TUZLI Fakultet elektrotehnike Tuzla, 01.07.2013.godine	KVALIFIKACIONI ISPIT IZ MATEMATIKE	GRUPA B
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**RJEŠENJA ZADATAKA**

1.	$(x^4 - x^3 - 21x^2 + 23x + a + 11) : (x^2 + 5x + 2) = x^2 - 6x + 7$ $\begin{array}{r} \underline{\pm x^4 \pm 5x^3 \pm 2x^2} \\ -6x^3 - 23x^2 + 23x + a + 11 \\ \underline{\mp 6x^3 \mp 30x^2 \mp 12x} \\ 7x^2 + 35x + a + 11 \\ \underline{\pm 7x^2 \pm 35x \pm 14} \\ a + 11 - 14 = 0 \Rightarrow a = 3. \end{array}$															
	<p>a). <math>a = 3</math>                      b). <math>a = 2</math>                      c). <math>a = 0</math>                      d). <math>a = -1</math></p>															
2.	$(p+3)x^2 - 11px + p - 2 = 0 \quad / : (p+3)$ $x^2 - \frac{11p}{p+3}x + \frac{p-2}{p+3} = 0$ <p>Iz Vietovih pravila se dobija da je <math>x_1 \cdot x_2 = \frac{p-2}{p+3} &lt; 0 \Rightarrow p \in (-3, 2)</math></p>															
	<p>a). <math>p \in (-5, -3)</math>                      b). <math>p \in (2, 5)</math>                      c). <math>p \in (-3, 2)</math>                      d). <math>p \in (5, +\infty)</math></p>															
3.	$20^x + 20 = 5 \cdot 5^x + 4 \cdot 4^x \Rightarrow 5^x \cdot 4^x - 5 \cdot 5^x - 4 \cdot 4^x + 20 = 0 \Rightarrow (5^x - 4)(4^x - 5) = 0$ $5^x - 4 = 0 \Rightarrow 5^x = 4 \Rightarrow x_1 = \log_5 4$ $4^x - 5 = 0 \Rightarrow 4^x = 5 \Rightarrow x_2 = \log_4 5$ $x_1 \cdot x_2 = \log_5 4 \cdot \log_4 5 = \frac{\log 4}{\log 5} \cdot \frac{\log 5}{\log 4} = 1$															
	<p>a). 1                      b). 0                      c). <math>\frac{\log_5^2 4}{\log_4^2 5}</math>                      d). <math>\frac{\log_4^2 5}{\log_5^2 4}</math></p>															
4.	$\sqrt{1-16x^2} \geq 1-7x \Leftrightarrow \begin{cases} 1-16x^2 \geq 0 \\ 1-7x < 0 \end{cases} \vee \begin{cases} 1-16x^2 \geq (1-7x)^2 \\ 1-7x \geq 0 \end{cases}$ $1^\circ 1-16x^2 \geq 0 \Rightarrow x \in \left[-\frac{1}{4}, \frac{1}{4}\right] \wedge 1-7x < 0 \Rightarrow x > \frac{1}{7}, \text{ tj. } x \in \left(\frac{1}{7}, \frac{1}{4}\right].$ $2^\circ 1-16x^2 \geq (1-7x)^2, 65x^2 - 14x \leq 0 \Rightarrow x \in \left[0, \frac{14}{65}\right] \wedge 1-7x \geq 0 \Rightarrow x \leq \frac{1}{7}, \text{ tj. } x \in \left[0, \frac{1}{7}\right].$ <p>Rješenje nejednačine: <math>1^\circ \cup 2^\circ; x \in \left[0, \frac{1}{7}\right] \cup \left(\frac{1}{7}, \frac{1}{4}\right] \Rightarrow x \in \left[0, \frac{1}{4}\right].</math> Cijeli broj je <math>x = 0</math>.</p>															
	<p>a). 0                      b). 1                      c). 2                      d). 3</p>															
5.	$\log_{(x+3)}(4-x) \geq 0,$ <p>DP: <math>4-x &gt; 0, x+3 &gt; 0, x+3 \neq 1</math></p> <p>DP: <math>x \in (-3, -2) \cup (-2, 4)</math></p> $\frac{\log(4-x)}{\log(x+3)} \geq 0$ <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td></td> <td style="text-align: center;">-3</td> <td style="text-align: center;">-2</td> <td style="text-align: center;">3</td> <td style="text-align: center;">4</td> </tr> <tr> <td style="text-align: center;">log(4-x)</td> <td style="text-align: center;">+</td> <td style="text-align: center;">+</td> <td style="text-align: center;">-</td> <td style="text-align: center;">-</td> </tr> <tr> <td style="text-align: center;">log(x+3)</td> <td style="text-align: center;">-</td> <td style="text-align: center;">+</td> <td style="text-align: center;">+</td> <td style="text-align: center;">-</td> </tr> </table> $x \in (-2, 3] \quad x = -1, 0, 1, 2, 3. \text{ Broj cjelobrojnih rješenja} = 5.$		-3	-2	3	4	log(4-x)	+	+	-	-	log(x+3)	-	+	+	-
	-3	-2	3	4												
log(4-x)	+	+	-	-												
log(x+3)	-	+	+	-												
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6.	$(1+i)(\cos 30^\circ - i \sin 30^\circ) = (1+i) \left( \frac{\sqrt{3}}{2} - i \frac{1}{2} \right) = \frac{\sqrt{3}}{2} - i \frac{1}{2} + i \frac{\sqrt{3}}{2} + \frac{1}{2} = \frac{\sqrt{3}+1}{2} + i \frac{\sqrt{3}-1}{2}$ <p>a). <math>\frac{\sqrt{3}+1}{2} - i \frac{\sqrt{3}-1}{2}</math>      b). <math>\frac{\sqrt{3}-1}{2} + i \frac{\sqrt{3}-1}{2}</math>      c). <math>\frac{\sqrt{3}+1}{2} + i \frac{\sqrt{3}+1}{2}</math>      d). <math>\frac{\sqrt{3}+1}{2} + i \frac{\sqrt{3}-1}{2}</math></p>																				
7.	$\left  \frac{1-5x}{4x+1} \right  \leq 1 \Rightarrow \begin{cases} 1-5x, x \leq \frac{1}{5} \\ -(1-5x), x > \frac{1}{5} \end{cases}, \quad  4x+1  = \begin{cases} 4x+1, x > -\frac{1}{4} \\ -(4x+1), x < -\frac{1}{4} \end{cases}$ <p>Za <math>x \in \left(-\infty, -\frac{1}{4}\right) \Rightarrow \frac{1-5x}{-(4x+1)} \leq 1 \Rightarrow \frac{x-2}{4x+1} \leq 0 \Rightarrow x \in \left(-\frac{1}{4}, 2\right]</math> odnosno nema rješenja.</p> <p>Za <math>x \in \left(-\frac{1}{4}, \frac{1}{5}\right] \Rightarrow \frac{1-5x}{4x+1} \leq 1 \Rightarrow \frac{9x}{4x+1} \geq 0 \Rightarrow x \in \left(-\infty, -\frac{1}{4}\right) \cup [0, +\infty)</math> odnosno <math>x \in \left[0, \frac{1}{5}\right]</math></p> <p>Za <math>x \in \left(\frac{1}{5}, +\infty\right) \Rightarrow \frac{-(1-5x)}{4x+1} \leq 1 \Rightarrow \frac{x-2}{4x+1} \leq 0 \Rightarrow x \in \left(-\frac{1}{4}, 2\right]</math> odnosno <math>x \in \left(\frac{1}{5}, 2\right]</math></p> <p>Rješenje nejednačine: <math>x \in \left[0, \frac{1}{5}\right] \cup \left(\frac{1}{5}, 2\right]</math> odnosno <math>x \in [0, 2]</math></p> <p>a). <math>x \in [0, 2]</math>      b). <math>x \in \left(-\frac{1}{4}, 0\right]</math>      c). <math>x \in \left[2, \frac{9}{4}\right)</math>      d). <math>x \in \left[-2, -\frac{1}{4}\right)</math></p>																				
8.	$\frac{2 \sin x - 1}{2 \cos x - \sqrt{2}} > 0,$ $2 \sin x - 1 > 0 \Rightarrow x \in \left(\frac{\pi}{6}, \frac{\pi}{2}\right)$ $2 \cos x - \sqrt{2} > 0 \Rightarrow \left(0, \frac{\pi}{4}\right)$ <table border="1" data-bbox="853 817 1284 1086"> <thead> <tr> <th></th> <th>0</th> <th><math>\frac{\pi}{6}</math></th> <th><math>\frac{\pi}{4}</math></th> <th><math>\frac{\pi}{2}</math></th> </tr> </thead> <tbody> <tr> <td>2 sin x - 1</td> <td></td> <td>-</td> <td>+</td> <td>+</td> </tr> <tr> <td>2 cos x - <math>\sqrt{2}</math></td> <td>+</td> <td>+</td> <td>-</td> <td></td> </tr> <tr> <td></td> <td>-</td> <td>+</td> <td>-</td> <td></td> </tr> </tbody> </table> <p>Rješenje nejednačine: <math>x \in \left(\frac{\pi}{6}, \frac{\pi}{4}\right)</math></p> <p>a). <math>\left(\frac{\pi}{4}, \frac{\pi}{3}\right)</math>      b). <math>\left(\frac{\pi}{6}, \frac{\pi}{4}\right)</math>      c). <math>\left(0, \frac{\pi}{6}\right)</math>      d). <math>\left(\frac{\pi}{3}, \frac{\pi}{2}\right)</math></p>		0	$\frac{\pi}{6}$	$\frac{\pi}{4}$	$\frac{\pi}{2}$	2 sin x - 1		-	+	+	2 cos x - $\sqrt{2}$	+	+	-			-	+	-	
	0	$\frac{\pi}{6}$	$\frac{\pi}{4}$	$\frac{\pi}{2}$																	
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9.	<p><math>x</math> – broj godina djeda, <math>y</math> – broj godina oca, <math>z</math> – broj godina sina</p> $x + y + z = 121$ $z - 2 = 2(y - 2) \quad (12, 37, 72)$ $z + 3 = 5(x + 3)$ <p>a). 14, 37, 70      b). 10, 39, 72      c). 12, 39, 70      d). 12, 37, 72</p>																				
10.	<p>Kod pravouglog trougla vrijedi da je hipotenuza jednaka prečniku opisane kružnice (<math>c=2R</math>).</p> $a:b=3:4=k, a=3k \text{ i } b=4k$ $a^2 + b^2 = c^2 \Rightarrow 25k^2 = 100 \Rightarrow k = 2, a = 6, b = 8$ $P = \frac{a \cdot b}{2} = 24 [cm^2]$ <p>a). 48[cm<sup>2</sup>]      b). 24[cm<sup>2</sup>]      c). 36[cm<sup>2</sup>]      d). 12[cm<sup>2</sup>]</p>																				

<b>UNIVERZITET U TUZLI</b> Fakultet elektrotehnike Tuzla, 01.07.2013.godine	<b>KVALIFIKACIONI ISPIT IZ</b> <b>MATEMATIKE</b>	<b>GRUPA C</b>
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1.	Za koju vrijednost parametra $a$ će polinom $P(x) = x^4 + x^3 - 14x^2 + 3x + a + 12$ biti djeljiv polinomom $Q(x) = x^2 - 4x + 3$ bez ostatka? a). $a = -1$ b). $a = 2$ c). $a = 3$ d). $a = -3$
2.	Za koje vrijednosti parametra $p$ je proizvod rješenja jednačine $(p+1)x^2 + 11px + p - 4 = 0$ uvijek negativan? a). $p \in (6, +\infty)$ b). $p \in (-1, 4)$ c). $p \in (-4, -1)$ d). $p \in (4, 6)$
3.	Proizvod rješenja jednačine $12^x + 12 = 4 \cdot 4^x + 3 \cdot 3^x$ iznosi: a). $\frac{\log_3^2 4}{\log_4^2 3}$ b). $\frac{\log_4^2 3}{\log_3^2 4}$ c). 1                      d). 0
4.	Broj cjelobrojnih, realnih rješenja nejednačine $\sqrt{1-9x^2} \geq 1-13x$ je: a). 1                      b). 3                      c). 1                      d). 2
5.	Broj cjelobrojnih, realnih rješenja nejednačine $\log_{(x+2)}(4-x) \geq 0$ je: a). 1                      b). 3                      c). 4                      d). 0
6.	Vrijednost kompleksnog izraza $(1-i)(\cos 60^\circ + i \sin 60^\circ)$ u algebarskom obliku je: a). $\frac{\sqrt{3}+1}{2} - i \frac{\sqrt{3}-1}{2}$ b). $\frac{\sqrt{3}+1}{2} + i \frac{\sqrt{3}-1}{2}$ c). $\frac{\sqrt{3}-1}{2} + i \frac{\sqrt{3}-1}{2}$ d). $\frac{\sqrt{3}+1}{2} + i \frac{\sqrt{3}+1}{2}$
7.	Skup rješenja nejednačine $\left  \frac{1-7x}{6x+1} \right  \leq 1$ je: a). $x \in \left[ 2, \frac{13}{6} \right)$ b). $x \in \left( -\frac{1}{6}, 0 \right]$ c). $x \in \left[ -2, -\frac{1}{6} \right)$ d). $x \in [0, 2]$
8.	Skup rješenja nejednačine $\frac{2 \sin x - \sqrt{2}}{2 \cos x - \sqrt{3}} > 0$ iz prvog kvadranta je: a). $\left( 0, \frac{\pi}{6} \right)$ b). $\left( \frac{\pi}{4}, \frac{\pi}{3} \right)$ c). $\left( \frac{\pi}{6}, \frac{\pi}{4} \right)$ d). $\left( \frac{\pi}{3}, \frac{\pi}{2} \right)$
9.	Sin, otac i djed zajedno imaju 129 godina. Prije dvije godine djed je bio dva puta stariji od oca, a za dvije godine će biti četiri puta stariji od sina. Koliko imaju godina pojedinačno? a). 15, 38, 76                      b). 17, 38, 74                      c). 16, 39, 74                      d). 15, 40, 74
10.	Prečnik opisane kružnice pravougloug trougla iznosi 15[cm], a odnos kateta je 3:4. Kolika je površina trougla? a). 27[cm <sup>2</sup> ]                      b). 36[cm <sup>2</sup> ]                      c). 9[cm <sup>2</sup> ]                      d). 54[cm <sup>2</sup> ]

<b>NAPOMENA</b>	<b>Poslije svakog zadatka ponuđena su četiri odgovora.</b> <b>Zaokružite odgovor koji smatrate tačnim.</b> <b>Tačno zaokružen odgovor nosi 4 boda.</b> <b>Nezaokružen odgovor nosi 0 bodova.</b>
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UNIVERZITET U TUZLI Fakultet elektrotehnike Tuzla, 01.07.2013.godine	KVALIFIKACIONI ISPIT IZ MATEMATIKE	GRUPA C
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**RJEŠENJA ZADATAKA**

1.	$(x^4 + x^3 - 14x^2 + 3x + a + 12) : (x^2 - 4x + 3) = x^2 - 5x + 3$ $\begin{array}{r} \underline{\pm x^4 \mp 4x^3 \pm 3x^2} \\ 5x^3 - 17x^2 + 3x + a + 12 \\ \underline{\pm 5x^3 \mp 20x^2 \pm 15x} \\ 3x^2 - 12x + a + 12 \\ \underline{\pm 3x^2 \mp 12x \pm 9} \\ a + 12 - 9 = 0 \Rightarrow a = -3. \end{array}$																				
<p>a). <math>a = -1</math>                      b). <math>a = 2</math>                      c). <math>a = 3</math>                      d). <math>a = -3</math></p>																					
2.	$(p+1)x^2 + 11px + p - 4 = 0 \quad / : (p+1)$ $x^2 + \frac{11p}{p+1}x + \frac{p-4}{p+1} = 0$ <p>Iz Vietovih pravila se dobija da je <math>x_1 \cdot x_2 = \frac{p-4}{p+1} &lt; 0 \Rightarrow p \in (-1, 4)</math></p>																				
<p>a). <math>p \in (6, +\infty)</math>                      b). <math>p \in (-1, 4)</math>                      c). <math>p \in (-4, -1)</math>                      d). <math>p \in (4, 6)</math></p>																					
3.	$12^x + 12 = 4 \cdot 4^x + 3 \cdot 3^x \Rightarrow 4^x \cdot 3^x - 4 \cdot 4^x - 3 \cdot 3^x + 12 = 0 \Rightarrow (4^x - 3)(3^x - 4) = 0$ $4^x - 3 = 0 \Rightarrow 4^x = 3 \Rightarrow x_1 = \log_4 3$ $3^x - 4 = 0 \Rightarrow 3^x = 4 \Rightarrow x_2 = \log_3 4$ $x_1 \cdot x_2 = \log_4 3 \cdot \log_3 4 = \frac{\log 3}{\log 4} \cdot \frac{\log 4}{\log 3} = 1$																				
<p>a). <math>\frac{\log_3^2 4}{\log_4^2 3}</math>                      b). <math>\frac{\log_4^2 3}{\log_3^2 4}</math>                      c). 1                      d). 0</p>																					
4.	$\sqrt{1-9x^2} \geq 1-13x \Leftrightarrow \left\{ \begin{array}{l} 1-9x^2 \geq 0 \\ 1-13x < 0 \end{array} \right\} \vee \left\{ \begin{array}{l} 1-9x^2 \geq (1-13x)^2 \\ 1-13x \geq 0 \end{array} \right\}$ <p>1° <math>1-9x^2 \geq 0 \Rightarrow x \in \left[-\frac{1}{3}, \frac{1}{3}\right] \wedge 1-13x &lt; 0 \Rightarrow x &gt; \frac{1}{13}</math>, tj. <math>x \in \left(\frac{1}{13}, \frac{1}{3}\right]</math>.</p> <p>2° <math>1-9x^2 \geq (1-13x)^2, 178x^2 - 26x \leq 0 \Rightarrow x \in \left[0, \frac{13}{89}\right] \wedge 1-13x \geq 0 \Rightarrow x \leq \frac{1}{13}</math>, tj. <math>x \in \left[0, \frac{1}{13}\right]</math>.</p> <p>Rješenje nejednačine: <math>1^\circ \cup 2^\circ; x \in \left[0, \frac{1}{13}\right] \cup \left(\frac{1}{13}, \frac{1}{3}\right] \Rightarrow x \in \left[0, \frac{1}{3}\right]</math>. Cijeli broj je <math>x = 0</math>.</p>																				
<p>a). 1                      b). 3                      c). 0                      d). 2</p>																					
5.	$\log_{(x+2)}(4-x) \geq 0,$ <p>DP: <math>4-x &gt; 0, x+2 &gt; 0, x+2 \neq 1</math></p> <p>DP: <math>x \in (-2, -1) \cup (-1, 4)</math></p> $\frac{\log(4-x)}{\log(x+2)} \geq 0$ <table border="1" data-bbox="853 1675 1236 1892" style="margin-left: auto; margin-right: auto;"> <tr> <td></td> <td align="center">-2</td> <td align="center">-1</td> <td align="center">3</td> <td align="center">4</td> </tr> <tr> <td align="center"><math>\log(4-x)</math></td> <td align="center">+</td> <td align="center">+</td> <td align="center">-</td> <td></td> </tr> <tr> <td align="center"><math>\log(x+2)</math></td> <td align="center">-</td> <td align="center">+</td> <td align="center">+</td> <td></td> </tr> <tr> <td></td> <td align="center">-</td> <td align="center">+</td> <td align="center">-</td> <td></td> </tr> </table> <p><math>x \in (-1, 3] \quad x = 0, 1, 2, 3</math>. Broj cjelobrojnih rješenja = 4.</p>		-2	-1	3	4	$\log(4-x)$	+	+	-		$\log(x+2)$	-	+	+			-	+	-	
	-2	-1	3	4																	
$\log(4-x)$	+	+	-																		
$\log(x+2)$	-	+	+																		
	-	+	-																		
<p>a). 1                      b). 3                      c). 4                      d). 0</p>																					

6.	$(1-i)(\cos 60^\circ + i \sin 60^\circ) = (1-i)\left(\frac{1}{2} + i \frac{\sqrt{3}}{2}\right) = \frac{1}{2} + i \frac{\sqrt{3}}{2} - i \frac{1}{2} + \frac{\sqrt{3}}{2} = \frac{\sqrt{3}+1}{2} + i \frac{\sqrt{3}-1}{2}$ <p>a). <math>\frac{\sqrt{3}+1}{2} - i \frac{\sqrt{3}-1}{2}</math>      b). <math>\frac{\sqrt{3}+1}{2} + i \frac{\sqrt{3}-1}{2}</math>      c). <math>\frac{\sqrt{3}-1}{2} + i \frac{\sqrt{3}-1}{2}</math>      d). <math>\frac{\sqrt{3}+1}{2} + i \frac{\sqrt{3}+1}{2}</math></p>																				
7.	$\left  \frac{1-7x}{6x+1} \right  \leq 1 \Rightarrow \begin{cases} 1-7x, x \leq \frac{1}{7} \\ -(1-7x), x > \frac{1}{7} \end{cases},  6x+1  = \begin{cases} 6x+1, x > -\frac{1}{6} \\ -(6x+1), x < -\frac{1}{6} \end{cases}$ <p>Za <math>x \in \left(-\infty, -\frac{1}{6}\right) \Rightarrow \frac{1-7x}{-(6x+1)} \leq 1 \Rightarrow \frac{x-2}{6x+1} \leq 0 \Rightarrow x \in \left(-\frac{1}{6}, 2\right]</math> odnosno nema rješenja.</p> <p>Za <math>x \in \left(-\frac{1}{6}, \frac{1}{7}\right] \Rightarrow \frac{1-7x}{6x+1} \leq 1 \Rightarrow \frac{13x}{6x+1} \geq 0 \Rightarrow x \in \left(-\infty, -\frac{1}{6}\right) \cup [0, +\infty)</math> odnosno <math>x \in \left[0, \frac{1}{7}\right]</math></p> <p>Za <math>x \in \left(\frac{1}{7}, +\infty\right) \Rightarrow \frac{-(1-7x)}{6x+1} \leq 1 \Rightarrow \frac{x-2}{6x+1} \leq 0 \Rightarrow x \in \left(-\frac{1}{6}, 2\right]</math> odnosno <math>x \in \left(\frac{1}{7}, 2\right]</math></p> <p>Rješenje nejednačine: <math>x \in \left[0, \frac{1}{7}\right] \cup \left(\frac{1}{7}, 2\right]</math> odnosno <math>x \in [0, 2]</math></p> <p>a). <math>x \in \left[2, \frac{13}{6}\right)</math>      b). <math>x \in \left(-\frac{1}{6}, 0\right]</math>      c). <math>x \in \left[-2, -\frac{1}{6}\right)</math>      d). <math>x \in [0, 2]</math></p>																				
8.	$\frac{2 \sin x - \sqrt{2}}{2 \cos x - \sqrt{3}} > 0,$ $2 \sin x - \sqrt{2} > 0 \Rightarrow x \in \left(\frac{\pi}{4}, \frac{\pi}{2}\right)$ $2 \cos x - \sqrt{3} > 0 \Rightarrow \left(0, \frac{\pi}{6}\right)$ <table border="1" data-bbox="853 817 1284 1086" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th></th> <th>0</th> <th><math>\frac{\pi}{6}</math></th> <th><math>\frac{\pi}{4}</math></th> <th><math>\frac{\pi}{2}</math></th> </tr> </thead> <tbody> <tr> <td><math>2 \sin x - \sqrt{2}</math></td> <td></td> <td>-</td> <td>-</td> <td>+</td> </tr> <tr> <td><math>2 \cos x - \sqrt{3}</math></td> <td>+</td> <td></td> <td>-</td> <td>-</td> </tr> <tr> <td></td> <td>-</td> <td>+</td> <td>-</td> <td></td> </tr> </tbody> </table> <p>Rješenje nejednačine: <math>x \in \left(\frac{\pi}{6}, \frac{\pi}{4}\right)</math></p> <p>a). <math>\left(0, \frac{\pi}{6}\right)</math>      b). <math>\left(\frac{\pi}{4}, \frac{\pi}{3}\right)</math>      c). <math>\left(\frac{\pi}{6}, \frac{\pi}{4}\right)</math>      d). <math>\left(\frac{\pi}{3}, \frac{\pi}{2}\right)</math></p>		0	$\frac{\pi}{6}$	$\frac{\pi}{4}$	$\frac{\pi}{2}$	$2 \sin x - \sqrt{2}$		-	-	+	$2 \cos x - \sqrt{3}$	+		-	-		-	+	-	
	0	$\frac{\pi}{6}$	$\frac{\pi}{4}$	$\frac{\pi}{2}$																	
$2 \sin x - \sqrt{2}$		-	-	+																	
$2 \cos x - \sqrt{3}$	+		-	-																	
	-	+	-																		
9.	<p><math>x</math> – broj godina djeda, <math>y</math> – broj godina oca, <math>z</math> – broj godina sina</p> $x + y + z = 129$ $z - 2 = 2(y - 2) \quad (17, 38, 74)$ $z + 2 = 4(x + 2)$ <p>a). 15, 38, 76      b). 17, 38, 74      c). 16, 39, 74      d). 15, 40, 74</p>																				
10.	<p>Kod pravouglog trougla vrijedi da je hipotenuza jednaka prečniku opisane kružnice (<math>c=2R</math>).</p> $a:b=3:4=k, a=3k \text{ i } b=4k$ $a^2 + b^2 = c^2 \Rightarrow 25k^2 = 225 \Rightarrow k = 3, a = 9, b = 12$ $P = \frac{a \cdot b}{2} = 54 [cm^2]$ <p>a). <math>27[cm^2]</math>      b). <math>36[cm^2]</math>      c). <math>9[cm^2]</math>      d). <math>54[cm^2]</math></p>																				

<b>UNIVERZITET U TUZLI</b> Fakultet elektrotehnike Tuzla, 01.07.2013.godine	<b>KVALIFIKACIONI ISPIT IZ</b> <b>MATEMATIKE</b>	<b>GRUPA D</b>
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1.	Za koju vrijednost parametra $a$ će polinom $P(x) = x^4 - x^3 - 14x^2 - 3x + a + 10$ biti djeljiv polinomom $Q(x) = x^2 + 4x + 3$ bez ostatka? a). $a = 0$ b). $a = 2$ c). $a = -1$ d). $a = 3$
2.	Za koje vrijednosti parametra $p$ je proizvod rješenja jednačine $(p+4)x^2 - 13px + p - 1 = 0$ uvijek negativan? a). $p \in (-4, 1)$ b). $p \in (1, 4)$ c). $p \in (4, 6)$ d). $p \in (6, +\infty)$
3.	Proizvod rješenja jednačine $10^x + 10 = 5 \cdot 5^x + 2 \cdot 2^x$ iznosi: a). $\frac{\log_2^2 5}{\log_5^2 2}$ b). $\frac{\log_5^2 2}{\log_2^2 5}$ c). 0                      d). 1
4.	Broj cjelobrojnih, realnih rješenja nejednačine $\sqrt{1-4x^2} \geq 1-11x$ je: a). 0                      b). 1                      c). 2                      d). 3
5.	Broj cjelobrojnih, realnih rješenja nejednačine $\log_{(x+3)}(2-x) \geq 0$ je: a). 2                      b). 3                      c). 4                      d). 0
6.	Vrijednost kompleksnog izraza $(1-i)(\cos 30^\circ + i \sin 30^\circ)$ u algebarskom obliku je: a). $\frac{\sqrt{3}+1}{2} - i \frac{\sqrt{3}-1}{2}$ b). $\frac{\sqrt{3}-1}{2} + i \frac{\sqrt{3}+1}{2}$ c). $\frac{\sqrt{3}-1}{2} - i \frac{\sqrt{3}+1}{2}$ d). $\frac{\sqrt{3}-1}{2} - i \frac{\sqrt{3}-1}{2}$
7.	Skup rješenja nejednačine $\left  \frac{1-6x}{5x+1} \right  \leq 1$ je: a). $x \in \left[ -2, -\frac{1}{5} \right)$ b). $x \in \left( -\frac{1}{5}, 0 \right]$ c). $x \in [0, 2]$ d). $x \in \left[ 2, \frac{11}{5} \right)$
8.	Skup rješenja nejednačine $\frac{2 \sin x - \sqrt{3}}{2 \cos x - \sqrt{2}} > 0$ iz prvog kvadranta je: a). $\left( 0, \frac{\pi}{6} \right)$ b). $\left( \frac{\pi}{6}, \frac{\pi}{4} \right)$ c). $\left( \frac{\pi}{3}, \frac{\pi}{2} \right)$ d). $\left( \frac{\pi}{4}, \frac{\pi}{3} \right)$
9.	Sin, otac i djed zajedno imaju 127 godina. Prije tri godine djed je bio dva puta stariji od oca, a za tri godine će biti četiri puta stariji od sina. Koliko imaju godina pojedinačno? a). 16, 38, 73                      b). 15, 39, 73                      c). 15, 38, 74                      d). 16, 36, 75
10.	Prečnik opisane kružnice pravougloug trougla iznosi 5[cm], a odnos kateta je 6:8. Kolika je površina trougla? a). 3[cm <sup>2</sup> ]                      b). 12[cm <sup>2</sup> ]                      c). 4[cm <sup>2</sup> ]                      d). 6[cm <sup>2</sup> ]
<b>NAPOMENA</b>	<b>Poslije svakog zadatka ponuđena su četiri odgovora.</b> <b>Zaokružite odgovor koji smatrate tačnim.</b> <b>Tačno zaokružen odgovor nosi 4 boda.</b> <b>Nezaokružen odgovor nosi 0 bodova.</b>

<b>UNIVERZITET U TUZLI</b> Fakultet elektrotehnike Tuzla, 01.07.2013.godine	<b>KVALIFIKACIONI ISPIT IZ</b> <b>MATEMATIKE</b>	<b>GRUPA D</b>
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**RJEŠENJA ZADATAKA**

1.	$(x^4 - x^3 - 14x^2 - 3x + a + 10) : (x^2 + 4x + 3) = x^2 - 5x + 3$ $\begin{array}{r} \underline{\pm x^4 \pm 4x^3 \pm 3x^2} \\ -5x^3 - 17x^2 - 3x + a + 10 \\ \underline{\mp 5x^3 \mp 20x^2 \mp 15x} \\ 3x^2 + 12x + a + 10 \\ \underline{\pm 3x^2 \pm 12x \pm 9} \\ a + 10 - 9 = 0 \Rightarrow a = -1. \end{array}$															
	a). $a = 0$ b). $a = 2$ c). $a = -1$ d). $a = 3$															
2.	$(p+4)x^2 - 13px + p - 1 = 0 \quad / : (p+4)$ $x^2 - \frac{13p}{p+4}x + \frac{p-1}{p+4} = 0$ <p>Iz Vietovih pravila se dobija da je <math>x_1 \cdot x_2 = \frac{p-1}{p+4} &lt; 0 \Rightarrow p \in (-4, 1)</math></p>															
	a). $p \in (-4, 1)$ b). $p \in (1, 4)$ c). $p \in (4, 6)$ d). $p \in (6, +\infty)$															
3.	$10^x + 10 = 5 \cdot 5^x + 2 \cdot 2^x \Rightarrow 5^x \cdot 2^x - 5 \cdot 5^x - 2 \cdot 2^x + 10 = 0 \Rightarrow (5^x - 2)(2^x - 5) = 0$ $5^x - 2 = 0 \Rightarrow 5^x = 2 \Rightarrow x_1 = \log_5 2$ $2^x - 5 = 0 \Rightarrow 2^x = 5 \Rightarrow x_2 = \log_2 5$ $x_1 \cdot x_2 = \log_5 2 \cdot \log_2 5 = \frac{\log 2}{\log 5} \cdot \frac{\log 5}{\log 2} = 1$															
	a). $\frac{\log_2^2 5}{\log_5^2 2}$ b). $\frac{\log_5^2 2}{\log_2^2 5}$ c). 0                      d). 1															
4.	$\sqrt{1-4x^2} \geq 1-11x \Leftrightarrow \left\{ \begin{array}{l} 1-4x^2 \geq 0 \\ 1-11x < 0 \end{array} \right\} \vee \left\{ \begin{array}{l} 1-4x^2 \geq (1-11x)^2 \\ 1-11x \geq 0 \end{array} \right\}$ <p>1° <math>1-4x^2 \geq 0 \Rightarrow x \in \left[-\frac{1}{2}, \frac{1}{2}\right] \wedge 1-11x &lt; 0 \Rightarrow x &gt; \frac{1}{11}</math>, tj. <math>x \in \left(\frac{1}{11}, \frac{1}{2}\right]</math>.</p> <p>2° <math>1-4x^2 \geq (1-11x)^2, 125x^2 - 22x \leq 0 \Rightarrow x \in \left[0, \frac{22}{125}\right] \wedge 1-11x \geq 0 \Rightarrow x \leq \frac{1}{11}</math>, tj. <math>x \in \left[0, \frac{1}{11}\right]</math>.</p> <p>Rješenje nejednačine: <math>1^\circ \cup 2^\circ; x \in \left[0, \frac{1}{11}\right] \cup \left(\frac{1}{11}, \frac{1}{2}\right] \Rightarrow x \in \left[0, \frac{1}{2}\right]</math>. Cijeli broj je <math>x = 0</math>.</p>															
	a). 0                      b). 1                      c). 2                      d). 3															
5.	$\log_{(x+3)}(2-x) \geq 0,$ <p>DP: <math>2-x &gt; 0, x+3 &gt; 0, x+3 \neq 1</math></p> <p>DP: <math>x \in (-3, -2) \cup (-2, 2)</math></p> $\frac{\log(2-x)}{\log(x+3)} \geq 0$ <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td></td> <td align="center">-3</td> <td align="center">-2</td> <td align="center">1</td> <td align="center">2</td> </tr> <tr> <td align="center"><math>\log(2-x)</math></td> <td align="center">+</td> <td align="center">+</td> <td align="center">-</td> <td align="center">-</td> </tr> <tr> <td align="center"><math>\log(x+3)</math></td> <td align="center">-</td> <td align="center">+</td> <td align="center">+</td> <td align="center">-</td> </tr> </table> <p><math>x \in (-2, 1] \quad x = -1, 0, 1</math>. Broj cjelobrojnih rješenja = 3.</p>		-3	-2	1	2	$\log(2-x)$	+	+	-	-	$\log(x+3)$	-	+	+	-
	-3	-2	1	2												
$\log(2-x)$	+	+	-	-												
$\log(x+3)$	-	+	+	-												
	a). 2                      b). 3                      c). 4                      d). 0															

6.	$(1-i)(\cos 30^\circ + i \sin 30^\circ) = (1-i) \left( \frac{\sqrt{3}}{2} + i \frac{1}{2} \right) = \frac{\sqrt{3}}{2} + i \frac{1}{2} - i \frac{\sqrt{3}}{2} + \frac{1}{2} = \frac{\sqrt{3}+1}{2} - i \frac{\sqrt{3}-1}{2}$																				
	<p>a). <math>\frac{\sqrt{3}+1}{2} - i \frac{\sqrt{3}-1}{2}</math>      b). <math>\frac{\sqrt{3}-1}{2} + i \frac{\sqrt{3}+1}{2}</math>      c). <math>\frac{\sqrt{3}-1}{2} - i \frac{\sqrt{3}+1}{2}</math>      d). <math>\frac{\sqrt{3}-1}{2} - i \frac{\sqrt{3}-1}{2}</math></p>																				
7.	$\left  \frac{1-6x}{5x+1} \right  \leq 1 \Rightarrow \begin{cases} 1-6x, x \leq \frac{1}{6} \\ -(1-6x), x > \frac{1}{6} \end{cases}, \quad  5x+1  = \begin{cases} 5x+1, x > -\frac{1}{5} \\ -(5x+1), x < -\frac{1}{5} \end{cases}$ <p>Za <math>x \in \left(-\infty, -\frac{1}{5}\right) \Rightarrow \frac{1-6x}{-(5x+1)} \leq 1 \Rightarrow \frac{x-2}{5x+1} \leq 0 \Rightarrow x \in \left(-\frac{1}{5}, 2\right]</math> <i>odnosno nema rješenja.</i></p> <p>Za <math>x \in \left(-\frac{1}{5}, \frac{1}{6}\right] \Rightarrow \frac{1-6x}{5x+1} \leq 1 \Rightarrow \frac{11x}{5x+1} \geq 0 \Rightarrow x \in \left(-\infty, -\frac{1}{5}\right) \cup [0, +\infty)</math> <i>odnosno</i> <math>x \in \left[0, \frac{1}{6}\right]</math></p> <p>Za <math>x \in \left(\frac{1}{6}, +\infty\right) \Rightarrow \frac{-(1-6x)}{5x+1} \leq 1 \Rightarrow \frac{x-2}{5x+1} \leq 0 \Rightarrow x \in \left(-\frac{1}{5}, 2\right]</math> <i>odnosno</i> <math>x \in \left(\frac{1}{6}, 2\right]</math></p> <p><i>Rješenje nejednačine:</i> <math>x \in \left[0, \frac{1}{6}\right] \cup \left(\frac{1}{6}, 2\right]</math> <i>odnosno</i> <math>x \in [0, 2]</math></p>																				
	<p>a). <math>x \in \left[-2, -\frac{1}{5}\right)</math>      b). <math>x \in \left(-\frac{1}{5}, 0\right]</math>      c). <math>x \in [0, 2]</math>      d). <math>x \in \left[2, \frac{11}{5}\right)</math></p>																				
8.	$\frac{2 \sin x - \sqrt{3}}{2 \cos x - \sqrt{2}} > 0,$ $2 \sin x - \sqrt{3} > 0 \Rightarrow x \in \left(\frac{\pi}{3}, \frac{\pi}{2}\right)$ $2 \cos x - \sqrt{2} > 0 \Rightarrow \left(0, \frac{\pi}{4}\right)$ <table border="1" data-bbox="853 828 1284 1086" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th></th> <th>0</th> <th><math>\frac{\pi}{4}</math></th> <th><math>\frac{\pi}{3}</math></th> <th><math>\frac{\pi}{2}</math></th> </tr> </thead> <tbody> <tr> <td><math>2 \sin x - \sqrt{3}</math></td> <td></td> <td>-</td> <td>-</td> <td>+</td> </tr> <tr> <td><math>2 \cos x - \sqrt{2}</math></td> <td>+</td> <td></td> <td>-</td> <td>-</td> </tr> <tr> <td></td> <td>-</td> <td>+</td> <td>-</td> <td></td> </tr> </tbody> </table> <p><i>Rješenje nejednačine:</i> <math>x \in \left(\frac{\pi}{4}, \frac{\pi}{3}\right)</math></p>		0	$\frac{\pi}{4}$	$\frac{\pi}{3}$	$\frac{\pi}{2}$	$2 \sin x - \sqrt{3}$		-	-	+	$2 \cos x - \sqrt{2}$	+		-	-		-	+	-	
	0	$\frac{\pi}{4}$	$\frac{\pi}{3}$	$\frac{\pi}{2}$																	
$2 \sin x - \sqrt{3}$		-	-	+																	
$2 \cos x - \sqrt{2}$	+		-	-																	
	-	+	-																		
	<p>a). <math>\left(0, \frac{\pi}{6}\right)</math>      b). <math>\left(\frac{\pi}{6}, \frac{\pi}{4}\right)</math>      c). <math>\left(\frac{\pi}{3}, \frac{\pi}{2}\right)</math>      d). <math>\left(\frac{\pi}{4}, \frac{\pi}{3}\right)</math></p>																				
9.	<p><math>x</math> – broj godina djeda, <math>y</math> – broj godina oca, <math>z</math> – broj godina sina</p> $x + y + z = 127$ $z - 3 = 2(y - 3) \quad (16, 38, 73)$ $z + 3 = 4(x + 3)$ <p>a). 16, 38, 73      b). 15, 39, 73      c). 15, 38, 74      d). 16, 36, 75</p>																				
10.	<p>Kod pravouglog trougla vrijedi da je hipotenuza jednaka prečniku opisane kružnice (<math>c=2R</math>).</p> $a:b=6:8=k, a=6k \text{ i } b=8k$ $a^2 + b^2 = c^2 \Rightarrow 100k^2 = 25 \Rightarrow k = \frac{1}{2}, a = 3, b = 4$ $P = \frac{a \cdot b}{2} = 6 \text{ [cm}^2\text{]}$ <p>a). 3[cm<sup>2</sup>]      b). 12[cm<sup>2</sup>]      c). 4[cm<sup>2</sup>]      d). 6[cm<sup>2</sup>]</p>																				

UNIVERZITET U TUZLI Fakultet elektrotehnike Tuzla, 29.06.2012.godine	KVALIFIKACIONI ISPIT IZ MATEMATIKE	GRUPA A
1.	Ako su $a, b \neq 0$ , onda izraz $\left[ \frac{1}{\left(a^{\frac{1}{2}} + b^{\frac{1}{2}}\right)^{-2}} - \left(\frac{\sqrt{a} - \sqrt{b}}{a^{\frac{3}{2}} - b^{\frac{3}{2}}}\right)^{-1} \right] \times (ab)^{-\frac{1}{2}}$ ima vrijednost:	
	a) -1                      b) $\frac{1}{\sqrt{ab}}$ c) 1                      d) $\sqrt{ab}$	
2.	Za koje vrijednosti parametra $p$ kvadratna jednačina $(p-3)x^2 - 8px + p - 3 = 0$ nema realnih rješenja?	
	a) $\left(-3, -\frac{5}{2}\right)$ b) 0                      c) $\left(1, \frac{5}{2}\right)$ d) $\left(-1, \frac{3}{5}\right)$	
3.	Skup rješenja nejednačine $\frac{x^2 + 3x + 6}{2x - 1} \leq \frac{x^2 - 3x + 6}{2x + 1}$ je:	
	a) $(-3, -1)$ b) $(1, 3)$ c) $\left(\frac{2}{3}, 1\right)$ d) $\left(-\frac{1}{2}, \frac{1}{2}\right)$	
4.	Zbir kvadrata rješenja jednačine $3 \times 9^{x-1} = 4 \times 3^x - 9$ je:	
	a) 90                      b) 5                      c) 73                      d) 41	
5.	Zbir kvadrata realnih rješenja jednačine $\log_3(4^{x-1} + 5) = 1 + \log_3 \frac{5 \times 2^{x-1} + 1}{3}$ je:	
	a) 10                      b) 25                      c) 5                      d) 41	
6.	Skup rješenja nejednačine $\left  \frac{1-7x}{2x+1} \right  \leq 1$ je:	
	a) $\left[-2, -\frac{3}{2}\right]$ b) $[-1, 0]$ c) $\left[0, \frac{2}{5}\right]$ d) $\left[\frac{5}{2}, +\infty\right)$	
7.	Modul kompleksnog broja $\frac{\sqrt{3} - i\sqrt{3}}{\cos 15^\circ + i \sin 15^\circ}$ je:	
	a) $2\sqrt{3}$ b) $2\sqrt{6}$ c) $3\sqrt{2}$ d) $\sqrt{6}$	
8.	Rješenje trigonometrijske jednačine $2 \sin^2 x - 5 \cos x + 1 = 0$ u prvom kvadrantu je:	
	a) $\frac{\pi}{3}$ b) $\frac{\pi}{6}$ c) $\frac{\pi}{15}$ d) $\frac{\pi}{4}$	
9.	Koordinatni početak i tačke u kojima prava $8x + 7y - 56 = 0$ siječe $x$ i $y$ ose čine trougao. Koliko iznosi površina tog trougla?	
	a) 56                      b) 28                      c) 42                      d) 14	
10.	Osnovica jednakokrakog trougla je 3[cm] i njen naspramni ugao je $30^\circ$ . Koliko iznosi površina trougla?	
	a) $\frac{9(2-\sqrt{3})}{4} [cm^2]$ b) $\frac{3(2+\sqrt{3})}{2} [cm^2]$ c) $\frac{9(2+\sqrt{3})}{4} [cm^2]$ d) $\frac{3(2-\sqrt{3})}{2} [cm^2]$	
<b>NAPOMENA</b>	<b>Poslije svakog zadatka ponuđena su četiri odgovora. Zaokružite odgovor koji smatrate tačnim. Tačno zaokružen odgovor nosi 4 boda. Nezaokružen odgovor nosi 0 bodova.</b>	



UNIVERZITET U TUZLI Fakultet elektrotehnike Tuzla, 29.06.2012.godine	KVALIFIKACIONI ISPIT IZ MATEMATIKE	GRUPA B
1.	Ako su $a, b \neq 0$ , onda izraz $\left[ \frac{(\sqrt{a} + \sqrt{b})^{-1}}{a^{\frac{3}{2}} + b^{\frac{3}{2}}} - \frac{1}{(a^{\frac{1}{2}} - b^{\frac{1}{2}})^{-2}} \right] (ab)^{\frac{1}{2}}$ ima vrijednost:	
	a) $\sqrt{ab}$	b) 1
	c) $\frac{1}{\sqrt{ab}}$	d) -1
2.	Za koje vrijednosti parametra $p$ kvadratna jednačina $(p-5)x^2 - 6px + p-5 = 0$ nema realnih rješenja?	
	a) $\left(-2, -\frac{5}{2}\right)$	b) 0
	c) $\left(-\frac{5}{2}, \frac{5}{4}\right)$	d) $\left(1, \frac{5}{2}\right)$
3.	Skup rješenja nejednačine $\frac{x^2 + 2x + 4}{3x - 1} \leq \frac{x^2 - 2x + 4}{3x + 1}$ je:	
	a) $\left(-\frac{1}{3}, \frac{1}{3}\right)$	b) $(-2, -1)$
	c) $\left(-1, -\frac{1}{2}\right)$	d) $\left(\frac{1}{2}, 1\right)$
4.	Zbir kvadrata rješenja jednačine $4^{x-1} = 3 \times 2^x - 8$ je:	
	a) 90	b) 25
	c) 13	d) 73
5.	Zbir kvadrata realnih rješenja jednačine $\log_2(9^{x-1} + 7) = 2 + \log_2(3^{x-1} + 1)$ je:	
	a) 41	b) 25
	c) 13	d) 5
6.	Skup rješenja nejednačine $\left  \frac{1-5x}{3x+1} \right  \leq 1$ je:	
	a) $[0, 1]$	b) $\left[-\frac{5}{2}, -1\right]$
	c) $[-5, -3]$	d) $\left[\frac{5}{2}, +\infty\right)$
7.	Modul kompleksnog broja $\frac{\sqrt{3} + i\sqrt{3}}{\cos 75^\circ + i \sin 75^\circ}$ je:	
	a) $2\sqrt{6}$	b) $\sqrt{6}$
	c) $3\sqrt{2}$	d) $2\sqrt{3}$
8.	Rješenje trigonometrijske jednačine $2 \cos^2 x - 7 \sin x + 2 = 0$ u prvom kvadrantu je:	
	a) $\frac{\pi}{15}$	b) $\frac{\pi}{3}$
	c) $\frac{\pi}{4}$	d) $\frac{\pi}{6}$
9.	Koordinatni početak i tačke u kojima prava $7x + 8y - 56 = 0$ siječe $x$ i $y$ ose čine trougao. Koliko iznosi površina tog trougla?	
	a) 28	b) 14
	c) 56	d) 42
10.	Osnovica jednakokrakog trougla je 6[cm] i njen naspramni ugao je $150^\circ$ . Koliko iznosi površina trougla?	
	a) $9(2 + \sqrt{3}) [cm^2]$	b) $3(2 - \sqrt{3}) [cm^2]$
	c) $9(2 - \sqrt{3}) [cm^2]$	d) $3(2 + \sqrt{3}) [cm^2]$
<b>NAPOMENA</b> Poslije svakog zadatka ponuđena su četiri odgovora. <b>Zaokružite odgovor koji smatrate tačnim.</b> <b>Tačno zaokružen odgovor nosi 4 boda.</b> <b>Nezaokružen odgovor nosi 0 bodova.</b>		

1.	$\left[ \frac{1}{\left(a^{\frac{1}{2}} + b^{\frac{1}{2}}\right)^2} - \left(\frac{\sqrt{a} - \sqrt{b}}{a^{\frac{3}{2}} - b^{\frac{3}{2}}}\right)^{-1} \right] \times (ab)^{-\frac{1}{2}} = \left[ (\sqrt{a} + \sqrt{b})^2 - \frac{(\sqrt{a})^3 - (\sqrt{b})^3}{\sqrt{a} - \sqrt{b}} \right] \times \frac{1}{\sqrt{ab}} =$ $= \left[ a + 2\sqrt{ab} + b - \frac{(\sqrt{a} - \sqrt{b})(a + \sqrt{ab} + b)}{\sqrt{a} - \sqrt{b}} \right] \times \frac{1}{\sqrt{ab}} = (a + 2\sqrt{ab} + b - a - \sqrt{ab} - b) \times \frac{1}{\sqrt{ab}} = \frac{\sqrt{ab}}{\sqrt{ab}} = 1$
	<p>a) -1                      b) <math>\frac{1}{\sqrt{ab}}</math>                      c) 1                      d) <math>\sqrt{ab}</math></p>
2.	<p><math>(p-3)x^2 - 8px + p - 3 = 0</math>. Izuslova zadatka slijedi da je diskriminanta kvadratne jednačine</p> $D = b^2 - 4ac < 0. D = 64p^2 - 4(p-3)^2 < 0 \Rightarrow (p+1) \times (5p-3) < 0 \Rightarrow p \in \left(-1, \frac{3}{5}\right)$
	<p>a) <math>\left(-3, -\frac{5}{2}\right)</math>                      b) 0                      c) <math>\left(1, \frac{5}{2}\right)</math>                      d) <math>\left(-1, \frac{3}{5}\right)</math></p>
3.	$\frac{x^2 + 3x + 6}{2x-1} \leq \frac{x^2 - 3x + 6}{2x+1}. DP: 2x-1 \neq 0 \wedge 2x+1 \neq 0 \Rightarrow x \neq \frac{1}{2} \wedge x \neq -\frac{1}{2}$ $\frac{x^2 + 3x + 6}{2x-1} - \frac{x^2 - 3x + 6}{2x+1} \leq 0, \frac{(x^2 + 3x + 6) \times (2x+1) - (x^2 - 3x + 6) \times (2x-1)}{(2x-1) \times (2x+1)} \leq 0,$ $\frac{2x^3 + x^2 + 6x^2 + 3x + 12x + 6 - (2x^3 - x^2 - 6x^2 + 3x + 12x - 6)}{(2x-1) \times (2x+1)} \leq 0,$ $\frac{14x^2 + 12}{(2x-1) \times (2x+1)} \leq 0, 14x^2 + 12 > 0 \text{ za } \forall x \in R \Rightarrow (2x-1) \times (2x+1) < 0 \Rightarrow x \in \left(-\frac{1}{2}, \frac{1}{2}\right)$
	<p>a) (-3, -1)                      b) (1, 3)                      c) <math>\left(\frac{2}{3}, 1\right)</math>                      d) <math>\left(-\frac{1}{2}, \frac{1}{2}\right)</math></p>
4.	$3 \times 9^{x-1} = 4 \times 3^x - 9, \frac{3^{2x}}{3} - 4 \times 3^x + 9 = 0, 3^{2x} - 12 \times 3^x + 27 = 0. 3^x = t \Rightarrow t^2 - 12t + 27 = 0.$ $t_1 = 3 \wedge t_2 = 9. 3^x = 3 = 3^1 \Rightarrow x_1 = 1 \wedge 3^x = 9 = 3^2 \Rightarrow x_2 = 2. x_1^2 + x_2^2 = 1^2 + 2^2 = 5$
	<p>a) 90                      b) 5                      c) 73                      d) 41</p>
5.	$\log_3(4^{x-1} + 5) = 1 + \log_3 \frac{5 \times 2^{x-1} + 1}{3}, \log_3(4^{x-1} + 5) = \log_3 3 + \log_3 \frac{5 \times 2^{x-1} + 1}{3}$ $4^{x-1} + 5 = 3 \times \frac{5 \times 2^{x-1} + 1}{3}, \frac{4^x}{4} + 5 = 5 \times \frac{2^x}{2} + 1, 2^{2x} - 10 \times 2^x + 16 = 0$ $2^x = 8 \Rightarrow x = 3 \wedge 2^x = 2 \Rightarrow x = 1. x_1^2 + x_2^2 = 3^2 + 1^2 = 10.$
	<p>a) 10                      b) 25                      c) 5                      d) 41</p>
6.	$\frac{ 1-7x }{ 2x+1 } \leq 1.  1-7x  = \begin{cases} 1-7x, & x \leq \frac{1}{7} \\ -(1-7x), & x > \frac{1}{7} \end{cases},  2x+1  = \begin{cases} (2x+1), & x > -\frac{1}{2} \\ -(2x+1), & x < -\frac{1}{2} \end{cases}$ $I: x \in \left(-\infty, -\frac{1}{2}\right) \Rightarrow \frac{+(1-7x)}{-(2x+1)} - 1 \leq 0, \frac{7x-1}{2x+1} - 1 \leq 0, \frac{5x-2}{2x+1} \leq 0, x \in \left(-\frac{1}{3}, \frac{2}{5}\right] \notin I \Rightarrow R_1: x \in \{\emptyset\}$ $II: x \in \left(-\frac{1}{2}, \frac{1}{7}\right) \Rightarrow \frac{+(1-7x)}{+(2x+1)} - 1 \leq 0, \frac{1-7x-2x+1}{2x+1} - 1 \leq 0, \frac{-9x}{2x+1} \leq 0, \frac{-x}{2x+1} \geq 0 \Rightarrow$ $x \in \left\{ \left(-\infty, -\frac{1}{2}\right) \cup [0, +\infty) \right\} \cap II \Rightarrow R_2: x \in \left[0, \frac{1}{7}\right].$ $III: x \in \left(\frac{1}{7}, +\infty\right) \Rightarrow \frac{-(1-7x)}{+(2x+1)} - 1 \leq 0, \frac{7x-1}{2x+1} - 1 \leq 0, \frac{5x-2}{2x+1} \leq 0, x \in \left(-\frac{1}{2}, \frac{2}{5}\right] \cap III \Rightarrow R_3: x \in \left(\frac{1}{5}, 1\right].$ $R = R_1 \cup R_2 \cup R_3 \Rightarrow x \in \left[0, \frac{2}{5}\right].$
	<p>a) <math>\left[-2, -\frac{3}{2}\right]</math>                      b) [-1, 0]                      c) <math>\left[0, \frac{2}{5}\right]</math>                      d) <math>\left[\frac{5}{2}, +\infty\right)</math></p>

7.	$\left  \frac{\sqrt{3}-i\sqrt{3}}{\cos 15^\circ+i\sin 15^\circ} \right  = \frac{ \sqrt{3}-i\sqrt{3} }{ \cos 15^\circ+i\sin 15^\circ } = \frac{\sqrt{(\sqrt{3})^2+(-\sqrt{3})^2}}{ 1 \cdot e^{i15^\circ} } = \frac{\sqrt{6}}{1} = \sqrt{6}$
	<p>a) <math>2\sqrt{3}</math>                      b) <math>2\sqrt{6}</math>                      c) <math>3\sqrt{2}</math>                      d) <math>\sqrt{6}</math></p>
8.	<p><math>2\sin^2 x - 5\cos x + 1 = 0</math>; <math>2(1 - \cos^2 x) - 5\cos x + 1 = 0</math>; <math>2\cos^2 x + 5\sin x - 3 = 0</math>  <i>Smjena</i>: <math>\cos x = t</math>; <math>2t^2 + 5t - 3 = 0 \Rightarrow t_1 = -3</math> (<math>\cos x = -3 \Rightarrow x \notin R</math>)  <math>t_2 = \frac{1}{2}</math>, <math>\cos x = \frac{1}{2} \Rightarrow x_1 = \frac{\pi}{3} + 2k\pi \wedge x_2 = -\frac{\pi}{3} + 2k\pi</math>. <i>Rješenje u prvom kvadrantu je</i> <math>x = \frac{\pi}{3}</math>.</p>
	<p>a) <math>\frac{\pi}{3}</math>                      b) <math>\frac{\pi}{6}</math>                      c) <math>\frac{\pi}{15}</math>                      d) <math>\frac{\pi}{4}</math></p>
9.	<p><math>8x + 7y - 56 = 0</math>. <math>A(x_A, 0) \Rightarrow x_A = 7</math>. <math>B(0, y_B) \Rightarrow y_B = 8</math>.  <math>P = \frac{a \cdot h}{2} = \frac{7 \cdot 8}{2} = 28</math>.</p>
	<p>a) 56                      b) 28                      c) 42                      d) 14</p>
10.	<p><math>tg \frac{\alpha}{2} = \frac{a/2}{h} \Rightarrow h = \frac{a}{2tg \frac{\alpha}{2}}</math>. <math>tg 15^\circ = tg(45^\circ - 30^\circ) = \frac{tg 45^\circ - tg 30^\circ}{1 + tg 45^\circ \cdot tg 30^\circ} = \frac{1 - \frac{\sqrt{3}}{3}}{1 + 1 \cdot \frac{\sqrt{3}}{3}}</math>  <math>tg 15^\circ = \frac{\sqrt{3}+1}{\sqrt{3}-1} = 2 + \sqrt{3}</math>. <math>h = \frac{3(\sqrt{3}+1)}{2(\sqrt{3}-1)} = \frac{3}{2}(2 + \sqrt{3})</math>.  <math>P = \frac{a \cdot h}{2} = \frac{3 \cdot \frac{3}{2}(2 + \sqrt{3})}{2} = \frac{9(2 + \sqrt{3})}{4}</math>.</p>
	<p>a) <math>\frac{9(2-\sqrt{3})}{4} [cm^2]</math>      b) <math>\frac{3(2+\sqrt{3})}{2} [cm^2]</math>      c) <math>\frac{9(2+\sqrt{3})}{4} [cm^2]</math>      d) <math>\frac{3(2-\sqrt{3})}{2} [cm^2]</math></p>
<b>NAPOMENA</b>	<p><b>Poslije svakog zadatka ponuđena su četiri odgovora.          Zaokružite odgovor koji smatrate tačnim.          Tačno zaokružen odgovor nosi 4 boda.          Nezaokružen odgovor nosi 0 bodova.</b></p>

1.	$\left[ \frac{(\sqrt{a} + \sqrt{b})^{-1}}{a^{\frac{3}{2}} + b^{\frac{3}{2}}} - \frac{1}{(a^{\frac{1}{2}} - b^{\frac{1}{2}})^{-2}} \right] \times (ab)^{\frac{1}{2}} = \left[ \frac{(\sqrt{a})^3 + (\sqrt{b})^3}{\sqrt{a} + \sqrt{b}} - (\sqrt{a} - \sqrt{b})^2 \right] \times \frac{1}{\sqrt{ab}} =$ $= \left[ \frac{(\sqrt{a} + \sqrt{b})(a - \sqrt{ab} + b)}{\sqrt{a} + \sqrt{b}} - (a + 2\sqrt{ab} + b) \right] \times \frac{1}{\sqrt{ab}} = (a - \sqrt{ab} + b - a + 2\sqrt{ab} - b) \times \frac{1}{\sqrt{ab}} = \frac{\sqrt{ab}}{\sqrt{ab}} = 1$
	<p>a) <math>\sqrt{ab}</math>                      b) 1                      c) <math>\frac{1}{\sqrt{ab}}</math>                      d) -1</p>
2.	<p><math>(p-5)x^2 - 6px + p - 5 = 0</math>. Iz uslova zadatka slijedi da je diskriminanta kvadratne jednačine</p> $D = b^2 - 4ac < 0. D = 36p^2 - 4(p-5)^2 < 0 \Rightarrow (2p+5)(4p-5) < 0 \Rightarrow p \in \left(-\frac{5}{2}, \frac{5}{4}\right)$
	<p>a) <math>\left(-2, -\frac{5}{2}\right)</math>                      b) 0                      c) <math>\left(-\frac{5}{2}, \frac{5}{4}\right)</math>                      d) <math>\left(1, \frac{5}{2}\right)</math></p>
3.	$\frac{x^2 + 2x + 4}{3x - 1} \leq \frac{x^2 - 2x + 4}{3x + 1}. DP: 3x - 1 \neq 0 \wedge 3x + 1 \neq 0 \Rightarrow x \neq \frac{1}{3} \wedge x \neq -\frac{1}{3}.$ $\frac{x^2 + 2x + 4}{3x - 1} - \frac{x^2 - 2x + 4}{3x + 1} \leq 0, \frac{(x^2 + 2x + 4)(3x + 1) - (x^2 - 2x + 4)(3x - 1)}{(3x - 1)(3x + 1)} \leq 0,$ $\frac{3x^3 + x^2 + 6x^2 + 2x + 12x + 4 - (3x^3 - x^2 - 6x^2 + 2x + 12x - 4)}{(2x - 1)(3x + 1)} \leq 0,$ $\frac{14x^2 + 8}{(3x - 1)(3x + 1)} \leq 0, 14x^2 + 8 > 0 \text{ za } \forall x \in \mathbb{R} \Rightarrow (3x - 1)(3x + 1) < 0 \Rightarrow x \in \left(-\frac{1}{3}, \frac{1}{3}\right)$
	<p>a) <math>\left(-\frac{1}{3}, \frac{1}{3}\right)</math>                      b) <math>(-2, -1)</math>                      c) <math>\left(-1, -\frac{1}{2}\right)</math>                      d) <math>\left(\frac{1}{2}, 1\right)</math></p>
4.	$4^{x-1} = 3 \times 2^x - 8, \frac{2^{2x}}{4} - 3 \times 2^x + 8 = 0, 2^{2x} - 12 \times 2^x + 32 = 0. 2^x = t \Rightarrow t^2 - 12t + 32 = 0.$ $t_1 = 8 \wedge t_2 = 4. 2^x = 8 = 2^3 \Rightarrow x_1 = 3 \wedge 2^x = 4 = 2^2 \Rightarrow x_2 = 2. x_1^2 + x_2^2 = 3^2 + 2^2 = 13$
	<p>a) 90                      b) 25                      c) 13                      d) 73</p>
5.	$\log_2(9^{x-1} + 7) = 2 + \log_2(3^{x-1} + 1), \log_2(9^{x-1} + 7) = \log_2 4 + \log_2(3^{x-1} + 1)$ $9^{x-1} + 7 = 4(3^{x-1} + 1), \frac{9^x}{9} + 7 = 4 \times \frac{3^x}{3} + 4, 3^{2x} - 12 \times 3^x + 27 = 0$ $3^x = 9 \Rightarrow x = 2 \wedge 3^x = 3 \Rightarrow x = 1. x_1^2 + x_2^2 = 2^2 + 1^2 = 5.$
	<p>a) 41                      b) 25                      c) 13                      d) 5</p>
6.	$\frac{ 1-5x }{ 3x+1 } \leq 1.  1-5x  = \begin{cases} 1-5x, & x \leq \frac{1}{5} \\ -(1-5x), & x > \frac{1}{5} \end{cases},  3x+1  = \begin{cases} (3x+1), & x > -\frac{1}{3} \\ -(3x+1), & x < -\frac{1}{3} \end{cases}$ $I: x \in \left(-\infty, -\frac{1}{3}\right) \Rightarrow \frac{+(1-5x)}{-(3x+1)} - 1 \leq 0, \frac{5x-1}{3x+1} - 1 \leq 0, \frac{2x-2}{3x+1} \leq 0, x \in \left(-\frac{1}{3}, 1\right] \notin I \Rightarrow R_1: x \in \{\emptyset\}$ $II: x \in \left(-\frac{1}{3}, \frac{1}{5}\right) \Rightarrow \frac{+(1-5x)}{+(3x+1)} - 1 \leq 0, \frac{1-5x-3x+1}{3x+1} - 1 \leq 0, \frac{-8x}{3x+1} \leq 0, \frac{x}{3x+1} \geq 0 \Rightarrow$ $x \in \left\{ \left(-\infty, -\frac{1}{3}\right) \cup [0, +\infty) \right\} \cap II \Rightarrow R_2: x \in \left[0, \frac{1}{5}\right].$ $III: x \in \left(\frac{1}{5}, +\infty\right) \Rightarrow \frac{-(1-5x)}{+(3x+1)} - 1 \leq 0, \frac{5x-1}{3x+1} - 1 \leq 0, \frac{2x-2}{3x+1} \leq 0, x \in \left(-\frac{1}{3}, 1\right] \cap III \Rightarrow R_3: x \in \left(\frac{1}{5}, 1\right].$ $R = R_1 \cup R_2 \cup R_3 \Rightarrow x \in [0, 1].$
	<p>a) <math>[0, 1]</math>                      b) <math>\left[-\frac{5}{2}, -1\right]</math>                      c) <math>[-5, -3]</math>                      d) <math>\left[\frac{5}{2}, +\infty\right)</math></p>

7.	$\left  \frac{\sqrt{3} + i\sqrt{3}}{\cos 75^\circ + i \sin 75^\circ} \right  = \frac{ \sqrt{3} + i\sqrt{3} }{ \cos 75^\circ + i \sin 75^\circ } = \frac{\sqrt{(\sqrt{3})^2 + (\sqrt{3})^2}}{ 1e^{i75^\circ} } = \frac{\sqrt{6}}{1} = \sqrt{6}$
	<p>a) <math>2\sqrt{6}</math>                      b) <math>\sqrt{6}</math>                      c) <math>3\sqrt{2}</math>                      d) <math>2\sqrt{3}</math></p>
8.	<p><math>2 \cos^2 x - 7 \sin x + 2 = 0</math>; <math>2(1 - \sin^2 x) - 7 \sin x + 2 = 0</math>; <math>2 \sin^2 x + 7 \sin x - 4 = 0</math>  <i>Smjena</i>: <math>\sin x = t</math>; <math>2t^2 + 7t - 4 = 0 \Rightarrow t_1 = 4</math> (<math>\sin x = 4 \Rightarrow x \notin R</math>)  <math>t_2 = \frac{1}{2}</math>, <math>\sin x = \frac{1}{2} \Rightarrow x_1 = \frac{\pi}{6} + 2k\pi \wedge x_2 = \frac{5\pi}{6} + 2k\pi</math>. <i>Rješenje u prvom kvadrantu je</i> <math>x = \frac{\pi}{6}</math>.</p>
9.	<p><math>7x + 8y - 56 = 0</math>. <math>A(x_A, 0) \Rightarrow x_A = 8</math>. <math>B(0, y_B) \Rightarrow y_B = 7</math>.  <math>P = \frac{a \times h}{2} = \frac{8 \times 7}{2} = 28</math>.</p>
	<p>a) 28                      b) 14                      c) 56                      d) 42</p>
10.	<p><math>\operatorname{tg} \frac{\alpha}{2} = \frac{a/2}{h} \Rightarrow h = \frac{a}{2 \operatorname{tg} \frac{\alpha}{2}}</math>. <math>\operatorname{tg} 75^\circ = \operatorname{tg}(45^\circ + 30^\circ) = \frac{\operatorname{tg} 45^\circ + \operatorname{tg} 30^\circ}{1 - \operatorname{tg} 45^\circ \times \operatorname{tg} 30^\circ} = \frac{1 + \frac{\sqrt{3}}{3}}{1 - 1 \times \frac{\sqrt{3}}{3}}</math>  <math>\operatorname{tg} 75^\circ = \frac{\sqrt{3} + 1}{\sqrt{3} - 1} = 2 + \sqrt{3}</math>. <math>h = \frac{6(\sqrt{3} - 1)}{2(\sqrt{3} + 1)} = 3(2 - \sqrt{3})</math>.  <math>P = \frac{a \times h}{2} = \frac{6 \times 3(2 - \sqrt{3})}{2} = 9(2 - \sqrt{3})</math>.</p>
	<p>a) <math>9(2 + \sqrt{3}) [cm^2]</math>    b) <math>3(2 - \sqrt{3}) [cm^2]</math>    c) <math>9(2 - \sqrt{3}) [cm^2]</math>    d) <math>3(2 + \sqrt{3}) [cm^2]</math></p>
<b>NAPOMENA</b>	<p><b>Poslije svakog zadatka ponuđena su četiri odgovora.  Zaokružite odgovor koji smatrate tačnim.  Tačno zaokružen odgovor nosi 4 boda.  Nezaokružen odgovor nosi 0 bodova.</b></p>

UNIVERZITET U TUZLI Fakultet elektrotehnike Tuzla, 01.07.2011.godine	KVALIFIKACIONI ISPIT IZ MATEMATIKE	GRUPA A
1.	Vrijednost izraza $\frac{2a}{4a^2 - 10ab + 25b^2} - \frac{1}{2a + 5b} - \frac{4a^2 + 10ab}{8a^3 + 125b^3}$ je?	
	a) $\frac{1}{2a + 5b}$	b) $\frac{2a - 5b}{2a + 5b}$
	c) $-\frac{1}{2a + 5b}$	d) $\frac{1}{4a^2 - 10ab + 25b^2}$
2.	Zbir rješenja sistema jednačina $\frac{6}{x+y} - \frac{4}{x-y} = -\frac{10}{3}$ i $\frac{5}{x+y} + \frac{7}{x-y} = -\frac{23}{12}$ je?	
	a) -2	b) -10
	c) 2	d) -12
3.	Zbir rješenja jednačina $ x^2 - 2x  - 2 x  = 4$ je:	
	a) 4	b) $2 - 2\sqrt{2}$
	c) $2\sqrt{2}$	d) $2 + 2\sqrt{2}$
4.	Proizvod rješenja jednačine $3 \cdot 9^{\log x} - 28 \cdot 3^{\log x} + 9 = 0$ je?	
	a) 100	b) 1
	c) 10	d) $10^{-1}$
5.	Rješenje izraza je $\sqrt[4]{9 + 4\sqrt{5}} \cdot \sqrt{\sqrt{5} - 2}$ je?	
	a) 1	b) -1
	c) 2	d) 4
6.	Skup rješenja nejednačine $\log_{\frac{1}{2}}(x^2 - x) \geq -1$ je?	
	a) $(-\infty, -2)$	b) $[-1, 0) \cup (1, 2]$
	c) $(0, 1)$	d) $(2, +\infty)$
7.	Rješenje jednačine $\sin^2 x - \frac{\sin 2x}{2} + 2 \sin x - 2 \cos x = 0$ je?	
	a) $x = k\pi$	b) $x = \frac{\pi}{2} + k\pi$
	c) $x = -\frac{\pi}{4} + k\pi$	d) $x = \frac{\pi}{4} + k\pi$
8.	Koliko iznosi modul kompleksnog broja $\underline{z} = \frac{1 + 6i + \underline{z}_1}{\underline{z}_1 - i}$ ako je $\underline{z}_1 = -1 + 4i$ ?	
	a) 10	b) $\sqrt{20}$
	c) $\sqrt{10}$	d) $\sqrt{5}$
9.	Obim pravouglog trougla je 36 i stranice imaju proporciju 2:3:7. Koliko iznosi površina trougla?	
	a) 9	b) 27
	c) 81	d) 54
10.	Rastojanje tačke presjeka pravih $3x - y - 1 = 0$ i $x + 4y = 9$ od koordinatnog početka je:	
	a) $\sqrt{5}$	b) $\sqrt{10}$
	c) $\sqrt{20}$	d) 5
<b>NAPOMENA</b> Poslije svakog zadatka ponuđena su četiri odgovora. Zaokružite odgovor koji smatrate tačnim. Tačno zaokružen odgovor nosi 4 boda. Nezaokružen odgovor nosi 0 bodova.		

<b>UNIVERZITET U TUZLI</b> <b>Fakultet elektrotehnike</b> <b>Tuzla, 01.07.2011.godine</b>	<b>KVALIFIKACIONI ISPIT IZ</b> <b>MATEMATIKE</b>	<b>GRUPA B</b>
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1.	Vrijednost izraza $\frac{3a}{9a^2 - 12ab + 16b^2} - \frac{1}{3a + 4b} - \frac{9a^2 + 12ab}{27a^3 + 64b^3}$ je?
	a) $\frac{1}{9a^2 - 12ab + 16b^2}$ b) $-\frac{1}{3a + 4b}$ c) $\frac{1}{3a + 4b}$ d) $-\frac{b}{3a + 4b}$
2.	Zbir rješenja sistema jednačina $\frac{7}{x+y} - \frac{3}{x-y} = -\frac{19}{5}$ i $\frac{4}{x+y} + \frac{5}{x-y} = -\frac{3}{2}$ je?
	a) -2    b) 2    c) -4    d) 4
3.	Rješenje jednačine $ x^2 - 3x  - 3 x  = 9$ je:
	a) $3 - 3\sqrt{2}$ b) $3\sqrt{2}$ c) $-3\sqrt{2}$ d) $3 + 3\sqrt{2}$
4.	Proizvod rješenja jednačine $2 \cdot 4^{\log x} - 17 \cdot 2^{\log x} + 8 = 0$ je?
	a) 1    b) 100    c) $10^{-1}$ d) 10
5.	Rješenje izraza je $\sqrt[4]{9 - 4\sqrt{5}} \cdot \sqrt{\sqrt{5} + 2}$ je?
	a) 1    b) 4    c) 2    d) -1
6.	Skup rješenja nejednačine $\log_{\frac{1}{3}}(x^2 - 2x) \geq -1$ je?
	a) $(3, +\infty)$ b) $(-\infty, -1)$ c) $[-1, 0) \cup (2, 3]$ d) $[4, +\infty)$
7.	Rješenje jednačine $\cos^2 x + \frac{\sin 2x}{2} - 2 \sin x - 2 \cos x = 0$ je?
	a) $x = \frac{\pi}{4} + k\pi$ b) $x = \frac{\pi}{2} + k\pi$ c) $x = -\frac{\pi}{4} + k\pi$ d) $x = k\pi$
8.	Koliko iznosi modul kompleksnog broja $\underline{Z} = \frac{1+i-2\underline{Z}_1}{3+\underline{Z}_1}$ ako je $\underline{Z}_1 = -2+3i$ ?
	a) $\sqrt{2}$ b) $\sqrt{5}$ c) $\sqrt{10}$ d) 5
9.	Obim pravougloug trougla je 30 i stranice imaju proporciju 2:3:5. Koliko iznosi površina trougla?
	a) 54    b) 81    c) 9    d) 27
10.	Rastojanje tačke presjeka pravih $2x+y-7=0$ i $x-2y=1$ od koordinatnog početka je:
	a) $\sqrt{10}$ b) 10    c) $\sqrt{20}$ d) 5
<b>NAPOMENA</b>	<b>Poslije svakog zadatka ponuđena su četiri odgovora.</b> <b>Zaokružite odgovor koji smatrate tačnim.</b> <b>Tačno zaokružen odgovor nosi 4 boda.</b> <b>Nezaokružen odgovor nosi 0 bodova.</b>

<b>UNIVERZITET U TUZLI</b> <b>Fakultet elektrotehnike</b> <b>Tuzla, 01.07.2011.godine</b>	<b>KVALIFIKACIONI ISPIT IZ</b> <b>MATEMATIKE</b>	<b>GRUPA A</b>
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**RJEŠENJA ZADATAKA**

1.	$\frac{2a}{4a^2 - 10ab + 25b^2} - \frac{1}{2a + 5b} - \frac{4a^2 + 10ab}{8a^3 + 125b^3} = \frac{4a^2 + 10ab - 4a^2 + 10ab - 25b^2 - 4a^2 - 10ab}{(2a + 5b)(4a^2 - 10ab + 25b^2)} = -\frac{1}{2a + 5b}$			
	a) $\frac{1}{2a + 5b}$	b) $\frac{2a - 5b}{2a + 5b}$	c) $-\frac{1}{2a + 5b}$	d) $\frac{1}{4a^2 - 10ab + 25b^2}$
2.	$\frac{1}{x+y} = u; \frac{1}{x-y} = v \quad 6u - 4v = -\frac{10}{3}; \quad 5u + 7v = -\frac{23}{12} \Rightarrow u = -\frac{1}{2}; v = \frac{1}{12}; x + y = -2; x - y = 12 \Rightarrow x = 5 \wedge y = -7.$			
	a) -2	b) -10	c) 2	d) -12
3.	$ x^2 - 2x  = \begin{cases} x^2 - 2x, x \in (-\infty, 0] \cup [2, +\infty) \\ -(x^2 - 2x), x \in (0, 2) \end{cases}, \quad  x  = \begin{cases} x, x \geq 0 \\ -x, x < 0 \end{cases}$ <p><i>I</i> : <math>x \in (-\infty, 0]</math>; <math>(x^2 - 2x) + 2x = 4, x^2 - 2x + 2x = 4, x^2 = 4, x = \pm 2, x_1 = -2, x_2 = 2 \notin I</math></p> <p><i>II</i> : <math>x \in (0, 2)</math>; <math>-(x^2 - 2x) - 2x = 4, -x^2 + 2x - 2x - 4 = 0, x^2 = -4 \Rightarrow x \notin R</math></p> <p><i>III</i> : <math>x \in [2, +\infty)</math>; <math>x^2 - 2x - 2x - 4 = 0; x^2 - 4x - 4 = 0; x_{3,4} = 2 \pm 2\sqrt{2}.</math></p> <p><math>x_3 = 2 - 2\sqrt{2} \notin III, x_4 = 2 + 2\sqrt{2}, x_1 + x_4 = 2\sqrt{2}.</math></p>			
	a) 4	b) $2 - 2\sqrt{2}$	c) $2\sqrt{2}$	d) $2 + 2\sqrt{2}$
4.	$3 \cdot 3^{2\log x} - 28 \cdot 3^{\log x} + 9 = 0; 3^{\log x} = t; 3t^2 - 28t + 9 = 0;$ $t_1 = \frac{1}{3} = 3^{-1} \Rightarrow \log x = -1 \Rightarrow x_1 = 10^{-1} = \frac{1}{10}$ $t_2 = 9 = 3^2 \Rightarrow \log x = 2 \Rightarrow x_1 = 10^2 = 100.$ $\frac{1}{10} \cdot 100 = 10$			
	a) 100	b) 1	c) 10	d) $10^{-1}$
5.	$\sqrt[4]{9 + 4\sqrt{5}} \cdot \sqrt[4]{(\sqrt{5} - 2)^2} = \sqrt[4]{(9 + 4\sqrt{5}) \cdot (9 - 4\sqrt{5})} = \sqrt[4]{81 - 80} = \sqrt[4]{1} = 1$			
	a) 1	b) -1	c) 2	d) 4
6.	$DP : x^2 - x > 0 \Rightarrow x \in (-\infty, 0) \cup (1, +\infty). \log_{\frac{1}{2}}(x^2 - x) \geq -1 \cdot \log_{\frac{1}{2}} \frac{1}{2} = \log_{\frac{1}{2}} 2 \Rightarrow x^2 - x \leq 2; x^2 - x - 2 \leq 0; R_1 : x \in [-1, 2]$ $R = DP \cap R_1 : [-1, 0) \cup (1, 2]$			
	a) $(-\infty, -2)$	b) $[-1, 0) \cup (1, 2]$	c) $(0, 1)$	d) $(2, +\infty)$



7.	$\sin^2 x - \frac{2 \sin x \cos x}{2} + 2 \sin x - 2 \cos x = 0; \sin^2 x - \sin x \cos x + 2 \sin x - 2 \cos x = 0;$ $\sin x (\sin x - \cos x) + 2 (\sin x - \cos x) = 0; (\sin x - \cos x) (\sin x + 2) = 0$ $1^0 : \sin x + 2 = 0 \Rightarrow x \notin R \quad \text{je?}$ $2^0 : \sin x - \cos x = 0; \sin x - \sin\left(\frac{\pi}{2} - x\right) = 2 \sin \frac{x - \frac{\pi}{2} + x}{2} \cos \sin \frac{x + \frac{\pi}{2} - x}{2} = 0$ $2 \sin\left(x - \frac{\pi}{4}\right) \cdot \frac{\sqrt{2}}{2} = 0 \Rightarrow x - \frac{\pi}{4} = k\pi \Rightarrow x = \frac{\pi}{4} + k\pi.$
8.	$\frac{1+6i-1+4i}{-1+4i-i} = \frac{10i}{-1+3i} \Rightarrow \left  \frac{10i}{-1+3i} \right  = \frac{10}{\sqrt{(-1)^2+3^2}} = \sqrt{10}$
	<p>a) 10                      b) <math>\sqrt{20}</math>                      c) <math>\sqrt{10}</math>                      d) <math>\sqrt{5}</math></p>
9.	$a : b : c = 2 : 3 : 7 = k \Rightarrow a = 2k, b = 3k, c = 7k. 2k + 3k + 7k = 36 \Rightarrow k = 3, a = 6, b = 9, c = 21.$
10.	$3x - y = 1, x + 4y = 9. x = 1 \wedge y = 2. d = \sqrt{x^2 + y^2} = \sqrt{5}$
	<p>a) <math>\sqrt{5}</math>                      b) <math>\sqrt{10}</math>                      c) <math>\sqrt{20}</math>                      d) 5</p>

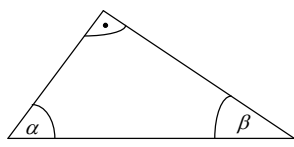
<b>UNIVERZITET U TUZLI</b> <b>Fakultet elektrotehnike</b> <b>Tuzla, 01.07.2011.godine</b>	<b>KVALIFIKACIONI ISPIT IZ</b> <b>MATEMATIKE</b>	<b>GRUPA B</b>
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**RJEŠENJA ZADATAKA**

1.	$\frac{3a}{9a^2-12ab+16b^2} - \frac{1}{3a+4b} - \frac{9a^2+12ab}{27a^3+64b^3} = \frac{9a^2+12ab-9a^2+12ab-16b^2-9a^2-12ab}{(3a+4b)(9a^2-12ab+16b^2)} = -\frac{1}{3a+4b}$
	<p>a) <math>\frac{1}{9a^2-12ab+16b^2}</math>    b) <math>-\frac{1}{3a+4b}</math>    c) <math>\frac{1}{3a+4b}</math>    d) <math>-\frac{b}{3a+4b}</math></p>
2.	$\frac{1}{x+y} = u; \frac{1}{x-y} = v \quad 7u-3v = -\frac{19}{5}; \quad 4u+5v = -\frac{3}{2} \Rightarrow u = -\frac{1}{2}; v = \frac{1}{1}$ <p><math>x+y = -2; x-y = 10 \Rightarrow x = 4 \wedge y = -6. \quad x+y = -2.</math></p>
	<p>a) -2                                      b) 2                                      c) -4                                      d) 4</p>
3.	$ x^2-3x  = \begin{cases} x^2-3x, x \in (-\infty, 0] \cup [3, +\infty) \\ -(x^2-3x), x \in (0, 3) \end{cases}, \quad  x  = \begin{cases} x, x \geq 0 \\ -x, x < 0 \end{cases}$ <p><math>I: x \in (-\infty, 0]; (x^2-3x)+3x=9, x^2-3x+3x=9, x^2=9, x=\pm 3, x_1=-3, x_2=3 \notin I</math></p> <p><math>II: x \in (0, 3); -(x^2-3x)-3x=9, -x^2+3x-3x-9=0, x^2=-9 \Rightarrow x \notin R</math></p> <p><math>III: x \in [3, +\infty); x^2-3x-3x-9=0; x^2-6x-9=0; x_{3,4} = 3 \pm 3\sqrt{2}.</math></p> <p><math>x_3 = 3-3\sqrt{2} \notin III, x_4 = 3+3\sqrt{2}. x_1+x_4 = 3\sqrt{2}.</math></p>
	<p>a) <math>3-3\sqrt{2}</math>                                      b) <math>3\sqrt{2}</math>                                      c) <math>-3\sqrt{2}</math>                                      d) <math>3+3\sqrt{2}</math></p>
4.	$2 \cdot 2^{2\log x} - 17 \cdot 3^{\log x} + 8 = 0; 3^{\log x} = t; 2t^2 - 17t + 8 = 0;$ <p><math>t_1 = \frac{1}{2} = 2^{-1} \Rightarrow \log x = -1 \Rightarrow x_1 = 10^{-1} = \frac{1}{10}</math></p> <p><math>t_2 = 8 = 2^3 \Rightarrow \log x = 3 \Rightarrow x_1 = 10^3 = 1000.</math></p> <p><math>\frac{1}{10} \cdot 1000 = 100</math></p>
	<p>a) 1                                      b) 100                                      c) <math>10^{-1}</math>                                      d) 10</p>
5.	$\sqrt[4]{9-4\sqrt{5}} \cdot \sqrt[4]{(\sqrt{5}+2)^2} = \sqrt[4]{(9-4\sqrt{5}) \cdot (9+4\sqrt{5})} = \sqrt[4]{81-80} = \sqrt[4]{1} = 1$
	<p>a) 1                                      b) 4                                      c) 2                                      d) -1</p>
6.	$DP: x^2 - 2x > 0 \Rightarrow x \in (-\infty, 0) \cup (2, +\infty). \log_{\frac{1}{3}}(x^2 - 2x) \geq -1 \cdot \log_{\frac{1}{3}} \frac{1}{2} = \log_{\frac{1}{3}} 3 \Rightarrow x^2 - 2x \leq 3; x^2 - 2x -$ <p><math>R = DP \cap R_1: [-1, 0) \cup (2, 3]</math></p>
	<p>a) <math>(3, +\infty)</math>                                      b) <math>(-\infty, -1)</math>                                      c) <math>[-1, 0) \cup (2, 3]</math>                                      d) <math>[4, +\infty)</math></p>

7.	$\cos^2 x + \frac{2 \sin x \cos x}{2} - 2 \sin x - 2 \cos x = 0; \cos^2 x + \sin x \cos x - 2 \sin x - 2 \cos x = 0;$ $\cos x (\sin x + \cos x) - 2 (\sin x + \cos x) = 0; (\sin x + \cos x) (\cos x - 2) = 0$ $1^0 : \cos x - 2 = 0 \Rightarrow x \notin R \quad \text{je?}$ $2^0 : \sin x + \cos x = 0; \sin x + \sin \left( \frac{\pi}{2} - x \right) = 2 \sin \frac{x - \frac{\pi}{2}}{2} \cos \sin \frac{x - \frac{\pi}{2} + x}{2} = 0$ $2 \frac{\sqrt{2}}{2} \cdot \cos \left( x - \frac{\pi}{4} \right) = 0 \Rightarrow x - \frac{\pi}{4} = -\frac{\pi}{2} + k\pi \Rightarrow x = -\frac{\pi}{4} + k\pi.$
	<p>a) <math>x = \frac{\pi}{4} + k\pi</math>      b) <math>x = \frac{\pi}{2} + k\pi</math>      c) <math>x = -\frac{\pi}{4} + k\pi</math>      d) <math>x = k\pi</math></p>
8.	$\frac{1+i+4-6i}{3-2+3i} = \frac{5-5i}{1+3i} \Rightarrow \left  \frac{5-5i}{1+3i} \right  = \frac{\sqrt{50}}{\sqrt{1^2+3^2}} = \sqrt{5}$
	<p>a) <math>\sqrt{2}</math>      b) <math>\sqrt{5}</math>      c) <math>\sqrt{10}</math>      d) 5</p>
9.	$a : b : c = 2 : 3 : 5 = k \Rightarrow a = 2k, b = 3k, c = 5k. 2k + 3k + 5k = 30 \Rightarrow k = 3, a = 6, b = 9, c = 15.$
	<p>a) 54      b) 81      c) 9      d) 27</p>
10.	$2xyy = 1, x - 2y = 1. x = 3 \wedge y = 1. d = \sqrt{x^2 + y^2} = \sqrt{10}$
	<p>a) <math>\sqrt{10}</math>      b) 10      c) <math>\sqrt{20}</math>      d) 5</p>

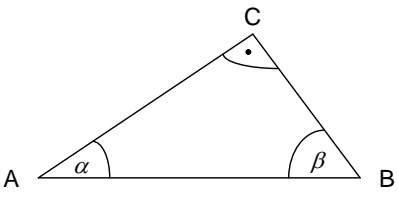
<b>UNIVERZITET U TUZLI</b> <b>Fakultet elektrotehnike</b> <b>Tuzla, 01.07.2010.godine</b>	<b>KVALIFIKACIONI ISPIT IZ</b> <b>MATEMATIKE</b>	<b>GRUPA A</b>
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1.	Ako je $P(x) = ax^2 + bx + c$ i $P(0) = -2$ , $P(1) = 2$ i $P(-1) = 0$ tada je $(a, b, c)$ jednako: a) $(6, -1, -2)$ b) $(6, -1, 4)$ c) $(3, 1, -2)$ d) $(3, 1, 2)$
2.	Proizvod rješenja sistema jednačina $\frac{3}{x} + \frac{2}{y} = -1$ i $\frac{5}{x} + \frac{3}{y} = 1$ je: a) $-\frac{1}{40}$ b) $\frac{1}{42}$ c) $-\frac{1}{42}$ d) $-\frac{1}{56}$
3.	Za koje realne vrijednosti parametra $k$ funkcija $f(x) = (2-k)x^2 + 4kx + 4$ zadovoljava uslov da je uvijek pozitivna. a) $(-2, 1)$ b) $(2, 6)$ c) $(-\infty, -2)$ d) $(6, +\infty)$
4.	Rješenje jednačine $\frac{2 - \sqrt{4 - 25x^2}}{x} = 5$ pripada intervalu: a) $x \in [1, +\infty)$ b) $x \in \left(-\infty, -\frac{2}{5}\right]$ c) $x \in \left[-\frac{2}{5}, 0\right]$ d) $x \in \left(0, \frac{2}{5}\right]$
5.	Realna vrijednost izraza $\sqrt[3]{\sqrt{80} - 9} - \sqrt[3]{\sqrt{80} + 9}$ je: a) -3      b) 2      c) 3      d) -2
6.	Zbir rješenja jednačine $3^{x+1} - 10 + \frac{1}{3^{x-1}} = 0$ je: a) 6      b) 2      c) 0      d) -2
7.	Skup rješenja nejednačine $\log_3(x^2 - 2x) \leq 1$ je: a) $x \in (-\infty, -1)$ b) $x \in [-1, 0) \cup (2, 3]$ c) $x \in (3, +\infty)$ d) $x \in [0, 2]$
8.	Kompleksni broj $z$ koji zadovoljava jednačinu $ z  + z = 3 - 4i$ je: a) $\frac{7}{6} - 4i$ b) $-\frac{6}{7} - 4i$ c) $-\frac{7}{6} - 4i$ d) $-\frac{7}{6} + 4i$
9.	Rješenja jednačine $3 - 5 \sin x - \cos 2x = 0$ na intervalu $\left[0, \frac{\pi}{2}\right]$ je: a) $\frac{\pi}{3}$ b) $\frac{\pi}{6}$ c) $\frac{\pi}{2}$ d) 0
10.	Površina pravouglog trougla kod kojeg je poznato $O = (3 + \sqrt{3})$ , $\alpha = 60^\circ$ i $\beta = 30^\circ$ je:  a) $2\sqrt{3}$ b) 2      c) $\sqrt{3}$ d) $\frac{\sqrt{3}}{2}$

**NAPOMENA**

**Poslije svakog zadatka ponuđena su četiri odgovora.**  
**Zaokružite odgovor koji smatrate tačnim.**  
**Tačno zaokružen odgovor nosi 4 boda.**  
**Nezaokružen odgovor nosi 0 bodova.**

<b>UNIVERZITET U TUZLI</b> <b>Fakultet elektrotehnike</b> <b>Tuzla, 01.07.2010.godine</b>	<b>KVALIFIKACIONI ISPIT IZ</b> <b>MATEMATIKE</b>	<b>GRUPA B</b>
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1.	Ako je $P(x) = ax^2 + bx + c$ i $P(0) = 2$ , $P(1) = 0$ i $P(-1) = 6$ tada je $(a, b, c)$ jednako: a) $(1, -3, 2)$ b) $(3, -3, 6)$ c) $(1, 3, -2)$ d) $(1, -4, 3)$
2.	Proizvod rješenja sistema jednačina $\frac{3}{x} + \frac{2}{y} = 4$ i $\frac{6}{x} + \frac{5}{y} = 1$ je: a) $-\frac{1}{40}$ b) $\frac{1}{35}$ c) $-\frac{1}{35}$ d) $-\frac{1}{42}$
3.	Za koje realne vrijednosti parametra $k$ funkcija $f(x) = (k-3)x^2 + 2kx - 4$ zadovoljava uslov da je uvijek negativna. a) $(2, 3)$ b) $(-6, 2)$ c) $(-\infty, -6)$ d) $(3, +\infty)$
4.	Rješenje jednačine $\frac{3 - \sqrt{9 - 16x^2}}{x} = 4$ pripada intervalu: a) $x \in \left(0, \frac{3}{4}\right]$ b) $x \in [1, +\infty)$ c) $x \in \left(-\infty, -\frac{3}{4}\right]$ d) $x \in \left[-\frac{3}{4}, 0\right]$
5.	Realna vrijednost izraza $\sqrt[3]{\sqrt{50} - 7} - \sqrt[3]{\sqrt{50} + 7}$ je: a) -4      b) 2      c) -2      d) 4
6.	Zbir rješenja jednačine $2^{x+2} - 17 + \frac{1}{2^{x-2}} = 0$ je: a) 2      b) -2      c) 0      d) 4
7.	Skup rješenja nejednačine $\log_2(x^2 - 2x) \leq 3$ je: a) $x \in [0, 2]$ b) $x \in (4, +\infty)$ c) $x \in (-\infty, 2)$ d) $x \in [-2, 0) \cup (2, 4]$
8.	Kompleksni broj $z$ koji zadovoljava jednačinu $ z  - z = 4 + 3i$ je: a) $-\frac{8}{7} - 3i$ b) $-\frac{7}{8} - 3i$ c) $\frac{7}{8} - 3i$ d) $-\frac{7}{8} + 3i$
9.	Rješenje jednačine $\cos 2x + 3 \cos x - 1 = 0$ na intervalu $\left[0, \frac{\pi}{2}\right]$ je: a) $\frac{\pi}{3}$ b) $\frac{\pi}{2}$ c) $\frac{\pi}{6}$ d) 0
10.	Površina pravouglog trougla kod kojeg je poznato $O = 2(3 + \sqrt{3})$ , $\alpha = 30^\circ$ i $\beta = 60^\circ$ je:  a) $4\sqrt{3}$ b) $\sqrt{3}$ c) $2\sqrt{3}$ d) 2

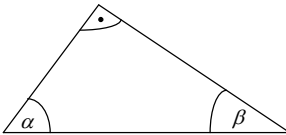
**NAPOMENA**

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### RJEŠENJA ZADATAKA

1.	$P(0) = a \cdot 0^2 + b \cdot 0 + c = -2 \Rightarrow c = -2;$ $P(1) = a \cdot 1^2 + b \cdot 1 + c = 2 \Rightarrow a + b = 4;$ $P(-1) = a \cdot (-1)^2 + b \cdot (-1) + c = 0 \Rightarrow a - b = 2;$ $a + b = 4 \wedge a - b = 2 \Rightarrow a = 3 \wedge b = 1.$
	<p>a) (6, -1, -2)      b) (6, -1, 4)      c) (3, 1, -2)      d) (3, 1, 2)</p>
2.	<p>Nakon smjene <math>\frac{1}{x} = u</math> i <math>\frac{1}{y} = v</math> dobija se:</p> $\begin{cases} 3u + 2v = -1/3 \\ 5u + 3v = 1/(-2) \end{cases} \Rightarrow \begin{cases} 9u + 6v = -3 \\ -10u - 6v = -2 \end{cases} \Rightarrow u = 5$ $5 \cdot 5 + 3v = 1 \Rightarrow v = -8. \quad x = \frac{1}{u} = \frac{1}{5} \wedge y = \frac{1}{v} = -\frac{1}{8} \Rightarrow \frac{1}{5} \cdot -\frac{1}{8} = -\frac{1}{40}$
	<p>a) <math>-\frac{1}{40}</math>      b) <math>\frac{1}{42}</math>      c) <math>-\frac{1}{42}</math>      d) <math>-\frac{1}{56}</math></p>
3.	<p>Da bi kvadratna funkcija <math>f(x) = ax^2 + bx + c</math> uvijek bila pozitivna za <math>\forall x \in R</math> potrebno je da budu zadovoljeni uslovi <math>a &gt; 0 \wedge D = b^2 - 4ac &lt; 0</math>.</p> $a = 2 - k > 0 \Rightarrow 1^\circ k < 2 \wedge D = b^2 - 4ac = 16k^2 - 16(2 - k) < 0 \Rightarrow k^2 + k - 2 < 0 \Rightarrow (k - 1)(k + 2) < 0 \Rightarrow 2^\circ k \in (-2, 1).$ <p>Na kraju je rješenje presjek dobijenih (<math>1^\circ \cap 2^\circ</math>): <math>k \in (-2, 1)</math>.</p>
	<p>a) (-2, 1)      b) (2, 6)      c) <math>(-\infty, -2)</math>      d) (6, +<math>\infty</math>)</p>
4.	$\frac{2 - \sqrt{4 - 25x^2}}{x} = 5 \Rightarrow 4 - 25x^2 \geq 0 \Rightarrow x \in \left[-\frac{2}{5}, \frac{2}{5}\right] \wedge x \neq 0; DP: x \in \left[-\frac{2}{5}, 0\right) \cup \left(0, \frac{2}{5}\right].$ $2 - \sqrt{4 - 25x^2} = 5x; 2 - 5x = \sqrt{4 - 25x^2}; 4 - 20x + 25x^2 = 4 - 25x^2; 50x^2 - 20x = 0$ $x_1 = 0 \notin DP \wedge x_2 = \frac{2}{5} \in DP.$
	<p>a) <math>x \in [1, +\infty)</math>      b) <math>x \in \left(-\infty, -\frac{2}{5}\right]</math>      c) <math>x \in \left[-\frac{2}{5}, 0\right]</math>      d) <math>x \in \left(0, \frac{2}{5}\right]</math></p>
5.	$I = \sqrt[3]{\sqrt{80} - 9} - \sqrt[3]{\sqrt{80} + 9} \Rightarrow I^3 = \left(\sqrt[3]{\sqrt{80} - 9} - \sqrt[3]{\sqrt{80} + 9}\right)^3$ $I^3 = \left(\sqrt[3]{\sqrt{80} - 9}\right)^3 - 3\left(\sqrt[3]{\sqrt{80} - 9}\right)^2\sqrt[3]{\sqrt{80} + 9} + 3\sqrt[3]{\sqrt{80} - 9}\left(\sqrt[3]{\sqrt{80} + 9}\right)^2 - \left(\sqrt[3]{\sqrt{80} + 9}\right)^3$ $I^3 = \sqrt{80} - 9 - 3\sqrt[3]{\sqrt{80} - 9}\sqrt[3]{\sqrt{80} + 9}\left(\sqrt[3]{\sqrt{80} - 9} - \sqrt[3]{\sqrt{80} + 9}\right) - \sqrt{80} - 9$ $I^3 = -18 - 3(-1)I; I^3 - 3I + 18 = 0; I^3 + 27 - 3I - 9 = 0; (I + 3)(I^2 - 3I + 9) - 3(I + 3) = 0$ $(I + 3)(I^2 - 3I + 6) = 0 \Rightarrow I_1 = -3 \wedge I^2 - 3I + 6 = 0 \Rightarrow I_{2,3} \notin R.$
	<p>a) -3      b) 2      c) 3      d) -2</p>

6.	$3^{x+1} - 10 + \frac{1}{3^{x-1}} = 0; 3^x \cdot 3 - 10 + \frac{3}{3^x} = 0 / 3^x; 3 \cdot 3^{2x} - 10 \cdot 3^x + 3 = 0, \text{ smjena: }  3^x = t $ $3t^2 - 10t + 3 = 0; t_{1/2} = \frac{10 \pm \sqrt{100 - 4 \cdot 3 \cdot 3}}{6} = \frac{10 \pm \sqrt{64}}{6} = \frac{10 \pm 8}{6} \Rightarrow t_1 = 3 \wedge t_2 = \frac{1}{3}.$ $3^x = 3 \Rightarrow x_1 = 1 \wedge 3^x = \frac{1}{3} \Rightarrow x_1 = -1 \Rightarrow 1 + (-1) = 0.$
	<p>a) 6                                      b) 2                                      c) 0                                      d) -2</p>
7.	$DP: x^2 - 2x > 0 \Rightarrow 1^\circ x \in (-\infty, 0) \cup (2, +\infty)$ $\log_3(x^2 - 2x) \leq 1 \cdot \log_3 3 = \log_3 3;$ $x^2 - 2x \leq 3; x^2 - 2x - 3 \leq 0; (x-3)(x+1) \leq 0 \Rightarrow 2^\circ x \in [-1, 3].$ Rješenje je: $1^\circ \cap 2^\circ: x \in [-1, 0) \cup (2, 3]$
	<p>a) <math>x \in (-\infty, -1)</math>                      b) <math>x \in [-1, 0) \cup (2, 3]</math>                      c) <math>x \in (3, +\infty)</math>                      d) <math>x \in [0, 2]</math></p>
8.	$ z  + z = 3 - 4i; \sqrt{x^2 + y^2} + x + iy = 3 - 4i \Rightarrow \sqrt{x^2 + y^2} + x = 3 \wedge y = -4$ $\sqrt{x^2 + 16} + x = 3; \sqrt{x^2 + 16} = 3 - x / 2 \Rightarrow x^2 + 16 = 9 - 6x + x^2; 6x = -7; x = -\frac{7}{6}$ $z = x + iy = -\frac{7}{6} - 4i.$
	<p>a) <math>\frac{7}{6} - 4i</math>                                      b) <math>-\frac{6}{7} - 4i</math>                                      c) <math>-\frac{7}{6} - 4i</math>                                      d) <math>-\frac{7}{6} + 4i</math></p>
9.	$3 - 5 \sin x - \cos 2x = 0; 3 - 5 \sin x - (\cos^2 x - \sin^2 x) = 0; 3 - 5 \sin x - \cos^2 x + \sin^2 x = 0;$ $3 - 5 \sin x - (1 - \sin^2 x) + \sin^2 x = 0; 2 \sin^2 x - 5 \sin x + 2 = 0 \Rightarrow (2 \sin x - 1)(\sin x - 2) = 0$ $1^\circ 2 \sin x - 1 = 0 \Rightarrow \sin x = \frac{1}{2} \Rightarrow x_1 = \frac{\pi}{6} + 2k\pi, x_2 = \frac{5\pi}{6} + 2k\pi, k \in \mathbb{Z}, x_1 = \frac{\pi}{6} \in \left[0, \frac{\pi}{2}\right], x_2 \notin \left[0, \frac{\pi}{2}\right]$ $2^\circ \sin x - 2 = 0 \Rightarrow \sin x = 2 \Rightarrow x_3 \notin \mathbb{R}.$
	<p>a) <math>\frac{\pi}{3}</math>                                      b) <math>\frac{\pi}{6}</math>                                      c) <math>\frac{\pi}{2}</math>                                      d) 0</p>
10.	 $\sin \alpha = \frac{a}{c} \Rightarrow \frac{\sqrt{3}}{2} = \frac{a}{c} \Rightarrow a = c \frac{\sqrt{3}}{2}$ $\cos \alpha = \frac{b}{c} \Rightarrow \frac{1}{2} = \frac{b}{c} \Rightarrow b = c \frac{1}{2}$ $O = a + b + c = c \frac{\sqrt{3}}{2} + c \frac{1}{2} + c = c \left( \frac{\sqrt{3}}{2} + \frac{1}{2} + 1 \right) = c \frac{\sqrt{3} + 3}{2} = \sqrt{3} + 3 \Rightarrow c = 2$ $a = \sqrt{3}, b = 1; P = \frac{a \cdot b}{2} = \frac{\sqrt{3}}{2}$
	<p>a) <math>2\sqrt{3}</math>                                      b) 2                                      c) <math>\sqrt{3}</math>                                      d) <math>\frac{\sqrt{3}}{2}</math></p>

<b>UNIVERZITET U TUZLI</b> Fakultet elektrotehnike Tuzla, 01.07.2010.godine	<b>KVALIFIKACIONI ISPIT IZ</b> <b>MATEMATIKE</b>	<b>GRUPA B</b>
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**RJEŠENJA ZADATAKA**

1.	$P(0) = a \cdot 0^2 + b \cdot 0 + c = 2 \Rightarrow c = 2;$ $P(1) = a \cdot 1^2 + b \cdot 1 + c = 0 \Rightarrow a + b = -2;$ $P(-1) = a \cdot (-1)^2 + b \cdot (-1) + c = 6 \Rightarrow a - b = 4;$ $a + b = -2 \wedge a - b = 4 \Rightarrow a = 1 \wedge b = -3.$
	<b>a)</b> (1, -3, 2) <b>b)</b> (3, -3, 6) <b>c)</b> (1, 3, -2) <b>d)</b> (1, -4, 3)
2.	Nakon smjene $\frac{1}{x} = u$ i $\frac{1}{y} = v$ dobija se: $3u + 2v = 4/(-2) \Rightarrow -6u - 4v = -8 \Rightarrow v = -7$ $6u + 5v = 1$ $6u + 5v = 1$ $6u + 5(-7) = 1 \Rightarrow u = 6.$ $x = \frac{1}{u} = \frac{1}{6} \wedge y = \frac{1}{v} = -\frac{1}{7} \Rightarrow \frac{1}{6} \cdot \frac{1}{-7} = -\frac{1}{42}$
	<b>a)</b> $-\frac{1}{40}$ <b>b)</b> $\frac{1}{35}$ <b>c)</b> $-\frac{1}{35}$ <b>d)</b> $-\frac{1}{42}$
3.	Da bi kvadratna funkcija $f(x) = ax^2 + bx + c$ uvijek bila negativna za $\forall x \in R$ potrebno je da budu zadovoljeni uslovi $a < 0 \wedge D = b^2 - 4ac < 0.$ $a = k - 3 < 0 \Rightarrow 1^o k < 3 \wedge D = b^2 - 4ac = 4k^2 + 16(k - 3) < 0 \Rightarrow k^2 + 4k - 12 < 0 \Rightarrow (k + 6)(k - 2) < 0 \Rightarrow 2^o k \in (-6, 2).$ Rješenje je presjek dobijenih ( $1^o \cap 2^o$ ): $k \in (-6, 2).$
	<b>a)</b> (2,3) <b>b)</b> (-6,2) <b>c)</b> $(-\infty, -6)$ <b>d)</b> $(3, +\infty)$
4.	$\frac{3 - \sqrt{9 - 16x^2}}{x} = 4 \Rightarrow 9 - 16x^2 \geq 0 \Rightarrow x \in \left[-\frac{3}{4}, \frac{3}{4}\right] \wedge x \neq 0; DP: x \in \left[-\frac{3}{4}, 0\right) \cup \left(0, \frac{3}{4}\right].$ $3 - \sqrt{9 - 16x^2} = 4x; 3 - 4x = \sqrt{9 - 16x^2}; 9 - 24x + 16x^2 = 9 - 16x^2; 32x^2 - 24x = 0$ $x_1 = 0 \notin DP \wedge x_2 = \frac{3}{4} \in DP.$
	<b>a)</b> $x \in \left(0, \frac{3}{4}\right]$ <b>b)</b> $x \in [1, +\infty)$ <b>c)</b> $x \in \left(-\infty, -\frac{3}{4}\right]$ <b>d)</b> $x \in \left[-\frac{3}{4}, 0\right]$
5.	$I = \sqrt[3]{\sqrt{50} - 7} - \sqrt[3]{\sqrt{50} + 7} / I^3 \Rightarrow I^3 = \left(\sqrt[3]{\sqrt{50} - 7} - \sqrt[3]{\sqrt{50} + 7}\right)^3$ $I^3 = \left(\sqrt[3]{\sqrt{50} - 7}\right)^3 - 3\left(\sqrt[3]{\sqrt{50} - 7}\right)^2 \sqrt[3]{\sqrt{50} + 7} + 3\sqrt[3]{\sqrt{50} - 7} \left(\sqrt[3]{\sqrt{50} + 7}\right)^2 - \left(\sqrt[3]{\sqrt{50} + 7}\right)^3$ $I^3 = \sqrt{50} - 7 - 3\sqrt[3]{\sqrt{50} - 7} \sqrt[3]{\sqrt{50} + 7} \left(\sqrt[3]{\sqrt{50} - 7} - \sqrt[3]{\sqrt{50} + 7}\right) - \sqrt{50} - 7$ $I^3 = -14 - 3 \cdot 1 \cdot I; I^3 + 3I + 14 = 0; I^3 + 8 + 3I + 6 = 0; (I + 2)(I^2 - 2I + 4) + 3(I + 2) = 0$ $(I + 2)(I^2 - 2I + 7) = 0 \Rightarrow I_1 = -2 \wedge I^2 - 2I + 7 = 0 \Rightarrow I_{2,3} \notin R.$
	<b>a)</b> -4 <b>b)</b> 2 <b>c)</b> -2 <b>d)</b> 4





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1.	Vrijednost izraza $\left(\frac{a\sqrt{b}+b\sqrt{a}+1}{\sqrt{a}+\sqrt{b}-1} - \frac{a\sqrt{b}+b\sqrt{a}-1}{\sqrt{a}+\sqrt{b}+1}\right) \cdot \frac{a+2\sqrt{ab}+b-1}{2(\sqrt{a}+\sqrt{b})}$ uz uslov $a > 0, b > 0$ je:
	a) $\sqrt{a} + \sqrt{b}$ b) $\sqrt{ab} - 1$ c) $\sqrt{ab} + 1$ d) $\sqrt{a} - \sqrt{b}$
2.	Za koju vrijednost parametra $a$ će polinom $P(x) = x^3 - x^2 - 4x + ax - 12$ biti djeljiv polinom $Q(x) = x - 3$ bez ostatka?
	a) 1      b) 2      c) -1      d) -2
3.	Zadate su funkcije $f(x) = 4x - 3$ i $g(x) = 2 - 3x$ . Izračunati $f[g^{-1}(-1)]$ .
	a) 2      b) 0      c) -2      d) 1
4.	Proizvod rješenja sistema jednačina $\frac{3}{x+y} + \frac{7}{x-y} = \frac{8}{5}$ i $\frac{-1}{x+y} + \frac{10}{x-y} = -3$ je:
	a) 2      b) -8      c) -6      d) 4
5.	Realna rješenja nejednačine $\left \frac{1-3x}{2x+1}\right  \leq 1$ pripadaju intervalu:
	a) $\left(-\frac{1}{2}, 2\right]$ b) $[2, +\infty)$ c) $\left(-\infty, -\frac{1}{2}\right)$ d) $[0, 2]$
6.	Broj cjelobrojnih, realnih rješenja nejednačine $\sqrt{1-4x^2} \geq 1-5x$ je:
	a) 3      b) 2      c) 1      d) 0
7.	Vrijednost izraza $2\log_{100} 256 + \log \frac{3}{192} - 2\log \frac{3}{147} - 2\log_{100} 49$ je:
	a) $\log 144$ b) $\log 98$ c) $\log 28$ d) $\log 196$
8.	Zbir svih rješenja jednačine $4^{\cos^2 x} + 8 \cdot \frac{1}{4^{\frac{\cos 2x}{2}}} - 5 = 0$ na intervalu $[0, 2\pi]$ je:
	a) $\pi$ b) $\frac{\pi}{2}$ c) $2\pi$ d) $-\frac{\pi}{2}$
9.	Vrijednost kompleksnog izraza $(1 - i\sqrt{3})(\cos 75^\circ - i \sin 75^\circ)$ je:
	a) $-\sqrt{2} - i\sqrt{2}$ b) $-\frac{\sqrt{2}}{2} + i\frac{\sqrt{2}}{2}$ c) $-\frac{\sqrt{2}}{2} - i\frac{\sqrt{2}}{2}$ d) $-1 + i$
10.	U jednakokraki trougao stranica $a = 18$ i $b = 15$ je upisan kvadrat. Dužina stranice kvadrata je:
	a) 7      b) $\frac{36}{5}$ c) 6      d) $\frac{18}{5}$

**NAPOMENA**

**Poslije svakog zadatka ponuđena su četiri odgovora.**  
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**Tačno zaokružen odgovor nosi 4 boda.**  
**Nezaokružen odgovor nosi 0 bodova.**

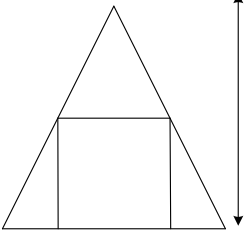
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1.	Vrijednost izraza $\left(\frac{\sqrt{a}+\sqrt{b}}{\sqrt{a+b}}-\frac{\sqrt{a+b}}{\sqrt{a+\sqrt{b}}}\right)^{-2}-\left(\frac{\sqrt{a}-\sqrt{b}}{\sqrt{a+b}}-\frac{\sqrt{a+b}}{\sqrt{a-\sqrt{b}}}\right)^{-2}$ uz uslov $a > 0, b > 0$ i $a \neq b$ je:
	a) $\sqrt{\frac{ab}{a-b}}$ b) $\sqrt{\frac{a}{b}}-\sqrt{\frac{b}{a}}$ c) $\sqrt{\frac{ab}{a+b}}$ d) $\sqrt{\frac{a}{b}}+\sqrt{\frac{b}{a}}$
2.	Za koju vrijednost parametra $a$ će polinom $P(x)=x^3+x^2+x+ax-18$ biti djeljiv polinom $Q(x)=x-2$ bez ostatka?
	a) 2      b) -1      c) 1      d) 0
3.	Zadate su funkcije $f(x)=3x-2$ i $g(x)=1-2x$ . Izračunati $f[g^{-1}(-1)]$ .
	a) 2      b) 1      c) -1      d) 0
4.	Proizvod rješenja sistema jednačina $\frac{2}{x+y}+\frac{5}{x-y}=-1$ i $\frac{-3}{x+y}-\frac{4}{x-y}=\frac{11}{5}$ je:
	a) 8      b) 0      c) -6      d) -4
5.	Realna rješenja nejednačine $\left \frac{1-4x}{3x+1}\right  \leq 1$ pripadaju intervalu:
	a) $(2,+\infty)$ b) $\left(-\frac{1}{3},0\right)$ c) $\left(-\infty,-\frac{1}{3}\right)$ d) $[0,2]$
6.	Broj cjelobrojnih, realnih rješenja nejednačine $\sqrt{1-9x^2} \geq 1-4x$ je:
	a) 0      b) 1      c) 2      d) 3
7.	Vrijednost izraza $4\log_{100} 81+2\log\frac{4}{108}+2\log\frac{3}{75}+3\log_{100} 625$ je:
	a) $\log 20$ b) $\log 225$ c) $\log 200$ d) $\log 50$
8.	Zbir svih rješenja jednačine $4^{\sin^2 x}+2\cdot 4^{\frac{\cos 2x}{2}}-5=0$ na intervalu $[0,2\pi]$ je:
	a) $\pi$ b) 0      c) $\frac{\pi}{2}$ d) $2\pi$
9.	Vrijednost kompleksnog izraza $(\sqrt{3}-i)(\cos 105^\circ-i\sin 105^\circ)$ je:
	a) $-\frac{\sqrt{2}}{2}-i\frac{\sqrt{2}}{2}$ b) $-\sqrt{2}-i\sqrt{2}$ c) $1-i2$ d) $-\frac{\sqrt{2}}{2}+i1$
10.	U jednakokraki trougao stranica $a=10$ i $b=13$ je upisan kvadrat. Dužina stranice kvadrata je:
	a) $\frac{60}{11}$ b) 6      c) $\frac{30}{11}$ d) 5
<b>NAPOMENA</b>	<b>Poslije svakog zadatka ponuđena su četiri odgovora.</b> <b>Zaokružite odgovor koji smatrate tačnim.</b> <b>Tačno zaokružen odgovor nosi 4 boda.</b> <b>Nezaokružen odgovor nosi 0 bodova.</b>

<b>UNIVERZITET U TUZLI</b> <b>Fakultet elektrotehnike</b> <b>Tuzla, 02.09.2010.godine</b>	<b>KVALIFIKACIONI ISPIT IZ</b> <b>MATEMATIKE</b>	<b>GRUPA A</b>
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### RJEŠENJA ZADATAKA

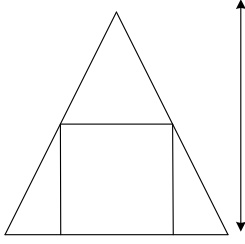
1.	$\frac{(a\sqrt{b} + b\sqrt{a} + 1)(\sqrt{a} + \sqrt{b} + 1) - (a\sqrt{b} + b\sqrt{a} - 1)(\sqrt{a} + \sqrt{b} - 1)}{(\sqrt{a} + \sqrt{b} - 1)(\sqrt{a} + \sqrt{b} + 1)} \cdot \frac{a + 2\sqrt{ab} + b - 1}{2(\sqrt{a} + \sqrt{b})} =$ $\frac{a\sqrt{ab} + ab + a\sqrt{b} + ab + b\sqrt{ab} + b\sqrt{a} + \sqrt{a} + \sqrt{b} + 1 - a\sqrt{ab} - ab + a\sqrt{b} - ab - b\sqrt{ab} + b\sqrt{a} + \sqrt{a} + \sqrt{b} - 1}{(\sqrt{a} + \sqrt{b})^2 - 1}$ $\frac{a + 2\sqrt{ab} + b - 1}{2(\sqrt{a} + \sqrt{b})} = \frac{2a\sqrt{b} + 2b\sqrt{a} + 2\sqrt{a} + 2\sqrt{b}}{a + 2\sqrt{ab} + b - 1} \cdot \frac{a + 2\sqrt{ab} + b - 1}{2(\sqrt{a} + \sqrt{b})} = \frac{2(\sqrt{a} + \sqrt{b})(\sqrt{ab} + 1)}{2(\sqrt{a} + \sqrt{b})} = (\sqrt{ab} + 1)$	<p>a) <math>\sqrt{a} + \sqrt{b}</math>      b) <math>\sqrt{ab} - 1</math>      c) <math>\sqrt{ab} + 1</math>      d) <math>\sqrt{a} - \sqrt{b}</math></p>
2.	$(x^3 - x^2 - 4x + ax - 12) : (x - 3) = x^2 + 2x + (2 + a)$ $\pm x^3 \mp 3x^2$ $2x^2 - 4x + ax - 12$ $\pm 2x^2 \mp 6x$ $2x + ax - 12$ $\pm (2 + a) \mp 3(2 + a)$ $-12 + 3(2 + a) = 0 \Rightarrow a = 2.$	<p>a) 1      b) 2      c) -1      d) -2</p>
3.	$g(x) = 2 - 3x \Rightarrow x = \frac{2 - g(x)}{3} \Rightarrow g^{-1}(x) = \frac{2 - x}{3}. \quad g^{-1}(-1) = \frac{2 - (-1)}{3} = 1. \quad f(1) = 4 \cdot 1 - 3 = 1.$	<p>a) 2      b) 0      c) -2      d) 1</p>
4.	$\left  \frac{1}{x+y} = u; \quad \frac{1}{x-y} = v \right  \Rightarrow \begin{cases} 3u + 7v = 8/5 \\ -u + 10v = -3 \end{cases} \Rightarrow \begin{cases} 15u + 35v = 8 \\ -15u + 150v = -45 \end{cases} \Rightarrow 185v = -37; \quad v = -1/5 \wedge u = -1.$ $\begin{cases} x + y = -1 \\ x - y = -5 \end{cases} \Rightarrow 2x = -6 \Rightarrow x = -3 \wedge y = 2. \quad x \cdot y = -6.$	<p>a) 2      b) -8      c) -6      d) 4</p>
5.	$\left  \frac{1-3x}{2x+1} \right  \leq 1, \quad \left  \frac{1-3x}{2x+1} \right  \leq 1, \quad  1-3x  = \begin{cases} 1-3x, x \leq \frac{1}{3} \\ -(1-3x), x > \frac{1}{3} \end{cases}, \quad  2x+1  = \begin{cases} 2x+1, x > -\frac{1}{2} \\ -(2x+1), x < -\frac{1}{2} \end{cases}$ $\text{Za } x \in \left(-\infty, -\frac{1}{2}\right) \Rightarrow \frac{1-3x}{-(2x+1)} \leq 1 \Rightarrow \frac{x-2}{2x+1} \leq 0 \Rightarrow x \in \left[-\frac{1}{2}, 2\right] \text{ odnosno nema rješenja.}$ $\text{Za } x \in \left(-\frac{1}{2}, \frac{1}{3}\right] \Rightarrow \frac{1-3x}{2x+1} \leq 1 \Rightarrow \frac{5x}{2x+1} \geq 0 \Rightarrow x \in \left(-\infty, -\frac{1}{2}\right) \cup [0, +\infty) \text{ odnosno } x \in \left[0, \frac{1}{3}\right]$ $\text{Za } x \in \left(\frac{1}{3}, +\infty\right) \Rightarrow \frac{-(1-3x)}{2x+1} \leq 1 \Rightarrow \frac{x-2}{2x+1} \leq 0 \Rightarrow x \in \left[-\frac{1}{2}, 2\right] \text{ odnosno } x \in \left(\frac{1}{3}, 2\right]$ $\text{Rješenje nejednačine je: } x \in \left[0, \frac{1}{3}\right] \cup \left(\frac{1}{3}, 2\right] \text{ odnosno } x \in [0, 2].$	<p>a) <math>\left[-\frac{1}{2}, 2\right]</math>      b) <math>[2, +\infty)</math>      c) <math>\left(-\infty, -\frac{1}{2}\right)</math>      d) <math>[0, 2]</math></p>

6.	$\sqrt{1-4x^2} \geq 1-5x \Leftrightarrow \begin{cases} 1-4x^2 \geq 0 \\ 1-5x < 0 \end{cases} \vee \begin{cases} 1-4x^2 \geq (1-5x)^2 \\ 1-5x \geq 0 \end{cases}$ $1^\circ 1-4x^2 \geq 0 \Rightarrow x \in \left[-\frac{1}{2}, \frac{1}{2}\right] \wedge 1-5x < 0 \Rightarrow x > \frac{1}{5}, \text{ tj. } x \in \left(\frac{1}{5}, \frac{1}{2}\right].$ $2^\circ 1-4x^2 \geq (1-5x)^2, 29x^2 - 10x \leq 0 \Rightarrow x \in \left[0, \frac{10}{29}\right] \wedge 1-5x \geq 0 \Rightarrow x \leq \frac{1}{5}, \text{ tj. } x \in \left[0, \frac{1}{5}\right].$ <p>Rješenje nejednačine je: <math>1^\circ \cup 2^\circ</math>; <math>x \in \left[0, \frac{1}{5}\right] \cup \left(\frac{1}{5}, \frac{1}{2}\right] \Rightarrow x \in \left[0, \frac{1}{2}\right]</math>. Cijeli broj je <math>x = 0</math>.</p>
	<p>a) 3                                      b) 2                                      c) 1                                      d) 0</p>
7.	$2 \frac{\log 256}{\log 100} + \log \frac{1}{64} - 2 \log \frac{1}{49} - 2 \frac{\log 49}{\log 100} = 2 \frac{\log 2^8}{2} + \log 2^{-6} - 2 \log 7^{-2} - 2 \frac{\log 7^2}{2} =$ $8 \log 2 - 6 \log 2 + 4 \log 7 - 2 \log 7 = 2 \log 2 + 2 \log 7 = 2 \log 14 = \log 196$
	<p>a) log144                                      b) log98                                      c) log28                                      d) log196</p>
8.	$4^{\cos^2 x} + 8 \cdot \frac{1}{4^{\cos 2x}} - 5 = 0; \quad 4^{\cos^2 x} + 2 \cdot \frac{1}{4^{\frac{2 \cos^2 x - 1}{2}}} - 5 = 0; \quad 4^{\cos^2 x} + 2 \cdot \frac{1}{4^{\frac{1}{2} \cdot 4^{\cos^2 x}}} - 5 = 0; \quad \left  4^{\cos^2 x} = t \right $ $t + \frac{4}{t} - 5 = 0; \quad t^2 - 5t + 4 = 0; \quad t_1 = 1 \wedge t_2 = 4. \quad 4^{\cos^2 x} = 1 = 4^0 \Rightarrow \cos^2 x = 0 \Rightarrow x_1 = \frac{\pi}{2} \wedge x_2 = -\frac{\pi}{2}.$ $4^{\cos^2 x} = 4 \Rightarrow \cos^2 x = 1 \Rightarrow \cos x = \pm 1 \Rightarrow x_3 = 0 \wedge x_4 = \pi. \quad x_1 + x_2 + x_3 + x_4 = \frac{\pi}{2} - \frac{\pi}{2} + 0 + \pi = \pi$
	<p>a) <math>\pi</math>                                      b) <math>\frac{\pi}{2}</math>                                      c) <math>2\pi</math>                                      d) <math>-\frac{\pi}{2}</math></p>
9.	$1 - i\sqrt{3} = \sqrt{1^2 + (-\sqrt{3})^2} e^{\operatorname{arctg} \frac{-\sqrt{3}}{1}} = 2e^{-i60^\circ}; \quad \cos 75^\circ - i \sin 75^\circ = e^{-i75^\circ}$ $2e^{-i60^\circ} \cdot e^{-i75^\circ} = 2e^{-i135^\circ} = 2(\cos 135^\circ - i \sin 135^\circ) = 2\left(-\frac{\sqrt{2}}{2} - i \frac{\sqrt{2}}{2}\right) = -\sqrt{2} - i\sqrt{2}$
	<p>a) <math>-\sqrt{2} - i\sqrt{2}</math>                                      b) <math>-\frac{\sqrt{2}}{2} + i \frac{\sqrt{2}}{2}</math>                                      c) <math>-\frac{\sqrt{2}}{2} - i \frac{\sqrt{2}}{2}</math>                                      d) <math>-1 + i</math></p>
10.	$a : x = h : (h - x)$ $ah - ax = hx$ $h = \sqrt{b^2 - \left(\frac{a}{2}\right)^2} = \sqrt{225 - 81} = 12$ $x = \frac{ah}{a+h} = \frac{18 \cdot 12}{30} = \frac{216}{30} = \frac{36}{5}$ 
	<p>a) 7                                      b) <math>\frac{36}{5}</math>                                      c) 6                                      d) <math>\frac{18}{5}</math></p>

<b>UNIVERZITET U TUZLI</b> <b>Fakultet elektrotehnike</b> <b>Tuzla, 02.09.2010.godine</b>	<b>KVALIFIKACIONI ISPIT IZ</b> <b>MATEMATIKE</b>	<b>GRUPA B</b>
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**RJEŠENJA ZADATAKA**

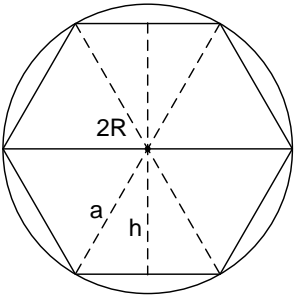
1.	$\left(\frac{a+2\sqrt{ab}+b-(a+b)}{\sqrt{a+b}(\sqrt{a}+\sqrt{b})}\right)^{-2} - \left(\frac{a-2\sqrt{ab}+b-(a+b)}{\sqrt{a+b}(\sqrt{a}-\sqrt{b})}\right)^{-2} = \frac{(a+b)(\sqrt{a}+\sqrt{b})^2}{4ab} - \frac{(a+b)(\sqrt{a}-\sqrt{b})^2}{4ab} =$ $\frac{a+b}{4ab}(a+2\sqrt{ab}+b-a+2\sqrt{ab}-b) = \frac{a+b}{4ab} \cdot 4\sqrt{ab} = \frac{a+b}{\sqrt{ab}} = \sqrt{\frac{a}{b}} + \sqrt{\frac{b}{a}}$
	<p>a) <math>\sqrt{\frac{ab}{a-b}}</math>      b) <math>\sqrt{\frac{a}{b}} - \sqrt{\frac{b}{a}}</math>      c) <math>\sqrt{\frac{ab}{a+b}}</math>      d) <math>\sqrt{\frac{a}{b}} + \sqrt{\frac{b}{a}}</math></p>
2.	$(x^3 + x^2 + x + ax - 18) : (x - 2) = x^2 + 3x + (7 + a)$ $\begin{array}{r} \pm x^3 \mp 2x^2 \\ \hline 3x^2 + x + ax - 18 \\ \pm 3x^2 \mp 6x \\ \hline 7x + ax - 18 \\ \pm (7 + a) \mp 2(7 + a) \\ \hline -18 + 2(7 + a) = 0 \Rightarrow a = 2. \end{array}$
	<p>a) 2      b) -1      c) 1      d) 0</p>
3.	$g(x) = 1 - 2x \Rightarrow x = \frac{1 - g(x)}{2} \Rightarrow g^{-1}(x) = \frac{1 - x}{2}. \quad g^{-1}(-1) = \frac{1 - (-1)}{2} = 1. \quad f(1) = 3 \cdot 1 - 2 = 1.$
	<p>a) 2      b) 1      c) -1      d) 0</p>
4.	$\left  \frac{1}{x+y} = u; \quad \frac{1}{x-y} = v \right  \Rightarrow \begin{cases} 2u + 5v = -1 \\ -3u - 4v = 11/5 \end{cases} \Rightarrow \begin{cases} 8u + 20v = -4 \\ -15u - 20v = 11 \end{cases} \Rightarrow -7u = 7; \quad u = -1 \wedge v = -1/5.$ $\begin{cases} x + y = 1 \\ x - y = -5 \end{cases} \Rightarrow 2x = -4 \Rightarrow x = -2 \wedge y = 3. \quad x \cdot y = -6.$
	<p>a) 8      b) 0      c) -6      d) -4</p>
5.	$\left  \frac{1-4x}{3x+1} \right  \leq 1, \left  \frac{1-4x}{3x+1} \right  \leq 1,  1-2x  = \begin{cases} 1-4x, x \leq \frac{1}{4} \\ -(1-4x), x > \frac{1}{4} \end{cases},  3x+1  = \begin{cases} 3x+1, x > -\frac{1}{3} \\ -(3x+1), x < -\frac{1}{3} \end{cases}$ $\text{Za } x \in \left(-\infty, -\frac{1}{3}\right) \Rightarrow \frac{1-4x}{-(3x+1)} \leq 1 \Rightarrow \frac{x-2}{3x+1} \leq 0 \Rightarrow x \in \left(-\frac{1}{3}, 2\right] \text{ odnosno nema rješenja.}$ $\text{Za } x \in \left(-\frac{1}{3}, \frac{1}{4}\right] \Rightarrow \frac{1-4x}{(3x+1)} \leq 1 \Rightarrow \frac{7x}{3x+1} \geq 0 \Rightarrow x \in \left(-\infty, -\frac{1}{3}\right) \cup [0, +\infty) \text{ odnosno } x \in \left[0, \frac{1}{4}\right]$ $\text{Za } x \in \left(\frac{1}{4}, +\infty\right) \Rightarrow \frac{-(1-4x)}{(3x+1)} \leq 1 \Rightarrow \frac{x-2}{3x+1} \leq 0 \Rightarrow x \in \left(-\frac{1}{3}, 2\right] \text{ odnosno } x \in \left(\frac{1}{4}, 2\right]$ $\text{Rješenje je: } x \in \left[0, \frac{1}{4}\right] \cup \left(\frac{1}{4}, 2\right] \text{ odnosno } x \in [0, 2]$
	<p>a) <math>(2, +\infty)</math>      b) <math>\left(-\frac{1}{3}, 0\right)</math>      c) <math>\left(-\infty, -\frac{1}{3}\right)</math>      d) <math>[0, 2]</math></p>

6.	$\sqrt{1-9x^2} \geq 1-4x \Leftrightarrow \left\{ \begin{array}{l} 1-9x^2 \geq 0 \\ 1-4x < 0 \end{array} \right\} \vee \left\{ \begin{array}{l} 1-9x^2 \geq (1-4x)^2 \\ 1-4x \geq 0 \end{array} \right\}$ <p>1° <math>1-9x^2 \geq 0 \Rightarrow x \in \left[-\frac{1}{3}, \frac{1}{3}\right] \wedge 1-4x &lt; 0 \Rightarrow x &gt; \frac{1}{4}</math>, tj. <math>x \in \left(\frac{1}{4}, \frac{1}{3}\right]</math>.</p> <p>2° <math>1-9x^2 \geq (1-4x)^2, 25x^2 - 8x \leq 0 \Rightarrow x \in \left[0, \frac{8}{25}\right] \wedge 1-4x \geq 0 \Rightarrow x \leq \frac{1}{4}</math>, tj. <math>x \in \left[0, \frac{1}{4}\right]</math>.</p> <p>Rješenje je: <math>1^\circ \cup 2^\circ; x \in \left[0, \frac{1}{4}\right] \cup \left(\frac{1}{4}, \frac{1}{3}\right] \Rightarrow x \in \left[0, \frac{1}{3}\right]</math>. Cijeli broj je <math>x = 0</math>.</p>
	<p>a) 0                      b) 1                      c) 2                      d) 3</p>
7.	$4 \frac{\log 81}{\log 100} + 2 \log \frac{1}{27} + 2 \log \frac{1}{25} + 3 \frac{\log 625}{\log 100} = 4 \frac{\log 3^4}{2} + 2 \log 3^{-3} + 2 \log 5^{-2} + 3 \frac{\log 5^4}{2} =$ $8 \log 3 - 6 \log 3 - 4 \log 5 + 6 \log 5 = 2 \log 3 + 2 \log 5 = 2 \log 15 = \log 225$
	<p>a) <math>\log 20</math>                      b) <math>\log 225</math>                      c) <math>\log 200</math>                      d) <math>\log 50</math></p>
8.	$4^{\sin^2 x} + 2 \cdot 4^{\frac{1-2\sin^2 x}{2}} = 5; \quad 4^{\sin^2 x} + 2 \cdot 4^{\frac{1}{2}} \cdot 4^{\frac{-2\sin^2 x}{2}} - 5 = 0; \quad 4^{\sin^2 x} + 4 \cdot 4^{-\sin^2 x} - 5 = 0; \quad  4^{\sin^2 x} = t $ $t + \frac{4}{t} - 5 = 0; \quad t^2 - 5t + 4 = 0; \quad t_1 = 1 \wedge t_2 = 4. \quad 4^{\sin^2 x} = 1 = 4^0 \Rightarrow \sin^2 x = 0 \Rightarrow x_1 = 0 \wedge x_2 = \pi.$ $4^{\sin^2 x} = 4 \Rightarrow \sin^2 x = 1 \Rightarrow \sin x = \pm 1 \Rightarrow x_3 = \frac{\pi}{2} \wedge x_4 = -\frac{\pi}{2}. \quad x_1 + x_2 + x_3 + x_4 = 0 + \pi + \frac{\pi}{2} - \frac{\pi}{2} = \pi$
	<p>a) <math>\pi</math>                      b) 0                      c) <math>\frac{\pi}{2}</math>                      d) <math>2\pi</math></p>
9.	$\sqrt{3} - i = \sqrt{(\sqrt{3})^2 + (-1)^2} e^{\arctg \frac{-1}{\sqrt{3}}} = 2e^{-i30^\circ}; \quad \cos 105^\circ - i \sin 105^\circ = e^{-i105^\circ}$ $2e^{-i30^\circ} \cdot e^{-i105^\circ} = 2e^{-i135^\circ} = 2(\cos 135^\circ - i \sin 135^\circ) = 2\left(-\frac{\sqrt{2}}{2} - i \frac{\sqrt{2}}{2}\right) = -\sqrt{2} - i\sqrt{2}$
	<p>a) <math>-\frac{\sqrt{2}}{2} - i \frac{\sqrt{2}}{2}</math>                      b) <math>-\sqrt{2} - i\sqrt{2}</math>                      c) <math>1 - i2</math>                      d) <math>-\frac{\sqrt{2}}{2} + i1</math></p>
10.	$a : x = h : (h - x)$ $ah - ax = hx$ $h = \sqrt{b^2 - \left(\frac{a}{2}\right)^2} = \sqrt{169 - 25} = 12$ $x = \frac{ah}{a+h} = \frac{10 \cdot 12}{22} = \frac{120}{22} = \frac{60}{11}$ 
	<p>a) <math>\frac{60}{11}</math>                      b) 6                      c) <math>\frac{30}{11}</math>                      d) 5</p>

1.	Broj realnih rješenja jednačine $\frac{7}{x^2-1} + \frac{8}{x^2-2x+1} = \frac{49-9x}{x^3-x^2-x+1}$ je:
	a) 3                                      b) 2                                      c) 1                                      d) 0
2.	Skup realnih rješenja nejednačine $\frac{3x-1}{4-x} \geq 1$ je:
	a) $\left[\frac{5}{4}, 4\right)$ b) $(-\infty, -4)$ c) $[-4, 1]$ d) $[4, +\infty)$
3.	Za koje vrijednosti parametra k jednačina $3x^2 - kx + 1 = 0$ zadovoljava uslov $x_1^2 + x_2^2 = \frac{1}{3}$ ?
	a) $\pm 1$ b) $\pm 2$ c) $\pm 3$ d) $\pm 4$
4.	Realno rješenje jednačine $2^{3x-2} - 8^{x-1} - 4^{\frac{3x-4}{2}} = 4$ je:
	a) -1                                      b) 2                                      c) 1                                      d) -2
5.	Proizvod rješenja jednačine $\sqrt{x^2+3} - 2x + 3 = 0$ je:
	a) $-2\sqrt{2}$ b) -2                                      c) $2\sqrt{2}$ d) 2
6.	Skup rješenja koja zadovoljavaju nejednačinu $\log_{\frac{1}{3}}(x^2 - 4x + 3) \geq -1$ je:
	a) $(-\infty, -1]$ b) $[0, 1) \cup (3, 4]$ c) $[6, +\infty)$ d) $(2, 3]$
7.	Rješenje jednačine $\cos 7x + 2 \sin 5x \sin 2x = 0$ je:
	a) $x = \frac{\pi}{3} + \frac{k\pi}{2}$ b) $x = \frac{\pi}{6} + \frac{k\pi}{6}$ c) $x = \frac{\pi}{6} + \frac{k\pi}{2}$ d) $x = \frac{\pi}{6} + \frac{k\pi}{3}$
8.	Koliko iznosi modul kompleksnog izraza $\frac{2Z - \bar{Z}}{1+Z}$ kada je $Z = -3 + i$ ?
	a) $\frac{3\sqrt{10}}{5}$ b) $\frac{3\sqrt{5}}{5}$ c) $\frac{3\sqrt{10}}{10}$ d) $\frac{3}{5}$
9.	Ako se broj doda brojniku i oduzme od nazivnika razlomka $\frac{17}{15}$ dobije se 7. Koji je to broj?
	a) 11                                      b) 13                                      c) 15                                      d) 17
10.	U kružnicu poluprečnika R=6 je upisan pravilni šestougao. Površina šestougla iznosi:
	a) 27                                      b) $54\sqrt{3}$ c) $27\sqrt{3}$ d) 54
<b>NAPOMENA</b>	<b>Poslije svakog zadatka ponuđena su četiri odgovora. Zaokružite odgovor koji smatrate tačnim. Tačno zaokružen odgovor nosi 4 boda. Nezaokružen odgovor nosi 0 bodova.</b>





6.	$\log_{\frac{1}{3}}(x^2 - 4x + 3) \geq -1$ ; $DP: x^2 - 4x + 3 > 0 \Rightarrow x \in (-\infty, 1) \cup (3, +\infty)$ ; $\log_{\frac{1}{3}}(x^2 - 4x + 3) \geq -1 \cdot \log_{\frac{1}{3}} \frac{1}{3} = \log_{\frac{1}{3}} 3$ ; $\log_{\frac{1}{3}}(x^2 - 4x + 3) \geq \log_{\frac{1}{3}} 3$ ; $x^2 - 4x + 3 \leq 3$ $x^2 - 4x \leq 0 \Rightarrow R_1: x \in [0, 4]$ . Rješenje je: $DP \cap R_1: x \in [0, 1) \cup (3, 4]$
	a) $(-\infty, -1]$ b) $[0, 1) \cup (3, 4]$ c) $[6, +\infty)$ d) $(2, 3]$
7.	$\cos 7x + 2 \sin 5x \sin 2x = 0$ ; $\cos 7x + 2 \cdot \frac{1}{2} [\cos(5x - 2x) - \cos(5x + 2x)] = 0$ ; $\cos 7x + \cos 3x - \cos 7x = 0$ $\cos 3x = 0 \Rightarrow 3x = \frac{\pi}{2} + k\pi \Rightarrow x = \frac{\pi}{6} + \frac{k\pi}{3}$ .
	a) $x = \frac{\pi}{3} + \frac{k\pi}{2}$ b) $x = \frac{\pi}{6} + \frac{k\pi}{6}$ c) $x = \frac{\pi}{6} + \frac{k\pi}{2}$ d) $x = \frac{\pi}{6} + \frac{k\pi}{3}$
8.	$Z = -3 + i$ ; $\bar{Z} = -3 - i$ $\left  \frac{2Z - \bar{Z}}{1 + Z} \right  = \left  \frac{2 \cdot (-3 + i) - (-3 - i)}{1 + (-3 + i)} \right  = \left  \frac{-6 + 2i + 3 + i}{1 - 3 + i} \right  = \left  \frac{-3 + 3i}{-2 + i} \right  = \frac{\sqrt{(-3)^2 + (3)^2}}{\sqrt{(-2)^2 + (1)^2}} = \frac{\sqrt{18}}{\sqrt{5}} = \frac{3\sqrt{2}}{\sqrt{5}} = \frac{3\sqrt{10}}{5}$
	a) $\frac{3\sqrt{10}}{5}$ b) $\frac{3\sqrt{5}}{5}$ c) $\frac{3\sqrt{10}}{10}$ d) $\frac{3}{5}$
9.	$\frac{17 + x}{15 - x} = 7$ ; $17 + x = 105 - 7x$ ; $8x = 88 \Rightarrow x = 11$ .
	a) 11                      b) 13                      c) 15                      d) 17
10.	 <p>Pravilni šestougao sadrži 6 jednakostraničnih trokuta. Površina pravilnog šestougla se može izračunati kao 6 površina ovih trokuta. Ako je šestougao upisan u kružnicu, onda je prečnik kružnice jednak dvostrukoj dužini stranice jednakostraničnog trokuta.</p> $2R = 2a \Rightarrow a = R;$ $P = 6 \cdot P_{tr} = 6 \cdot \frac{a^2 \sqrt{3}}{4} = 54\sqrt{3}$
	a) 27                      b) $54\sqrt{3}$ c) $27\sqrt{3}$ d) 54

<b>UNIVERZITET U TUZLI</b> <b>Fakultet elektrotehnike</b> <b>Tuzla, 10.07.2009.godine</b>	<b>KVALIFIKACIONI ISPIT IZ</b> <b>MATEMATIKE</b>	<b>GRUPA A</b>
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1.	Vrijednost izraza $\left(\frac{4x}{4x+3y} - \frac{3y}{3y-4x} - \frac{24xy}{16x^2-9y^2}\right) : \left(4x+3y - \frac{48xy}{4x+3y}\right)$ je:
	a) $\frac{1}{4x+3y}$ b) $\frac{1}{4x-3y}$ c) $\frac{1}{(4x+3y)(4x-3y)}$
2.	Broj realnih rješenja jednacine $\frac{2x^2}{x^2+3} - \frac{x^2}{x^2-3} = -\frac{6x^2}{x^4-9}$ je:
	a) 1                                      b) 2                                      c) 3
3.	Zbir kvadrata jednacine $3x^2 + kx - 5 = 0$ je $\frac{13}{3}$ . Kolika je vrijednost parametra k.
	a) $k = \pm\sqrt{3}$ b) $k = \pm 9$ c) $k = \pm 3$
4.	Rješenja nejednacine $\left \frac{2-x}{3x+1}\right  \leq 1$ pripadaju intervalu:
	a) $x \in \left(-\infty, -\frac{3}{2}\right] \cup [2, +\infty)$ b) $x \in \left(-\infty, -\frac{3}{2}\right] \cup \left[\frac{1}{4}, +\infty\right)$ c) $x \in \left(-\infty, -\frac{3}{2}\right]$
5.	Vrijednost izraza $(\sqrt{2} - i\sqrt{2})(\cos 105^\circ + i \sin 105^\circ)$ je:
	a) $\sqrt{2} + i\sqrt{6}$ b) $1 - i\sqrt{3}$ c) $1 + i\sqrt{3}$
6.	Skup rješenja nejednacine $\log \frac{2x-3}{\frac{1}{2}x^2+3} \geq 0$ je:
	a) $x \in \left(-\infty, \frac{3}{2}\right)$ b) $x \in \left[\frac{3}{2}, +\infty\right)$ c) $x \in \left(\frac{3}{2}, +\infty\right)$
7.	Broj rješenja jednacine $3^{\frac{4x^2+10x-3}{2}} \cdot 5^{2x^2+3} = 27^{0.5} \cdot 5^{-5x+6}$ koja pripadaju skupu prirodnih brojeva je:
	a) 0                                      b) 1                                      c) 2
8.	Rješenje jednacine $2 \cos^2 x - 7 \cos x + 3 = 0$ u intervalu $(0, p)$ iznosi:
	a) $\frac{2p}{3}$ b) $\frac{p}{6}$ c) $\frac{p}{3}$
9.	Zbir cifara dvocifrenog broja je 9. Ako cifre zamijene mjesta, dobijeni broj je za tri veći od trećine datog broja. Koji je to broj?
	a) 63                                      b) 72                                      c) 54
10.	Oko pravouglog trougla je opisana kružnica poluprecnika $R=5$ [cm]. Za vrijednost obima $O=24$ [cm] izračunati katete pravouglog trougla.
	a) 6 i 8                                      b) 5 i 9                                      c) 4 i 10

<b>NAPOMENA</b>	<b>Poslije svakog zadatka ponudena su tri odgovora. Zaokružite odgovor koji smatrate tačnim. Tačno zaokruženi odgovor nosi 4 boda. Nezaokruženi odgovor nosi 0 bodova.</b>
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<b>UNIVERZITET U TUZLI</b> <b>Fakultet elektrotehnike</b> <b>Tuzla, 10.07.2009.godine</b>	<b>KVALIFIKACIONI ISPIT IZ</b> <b>MATEMATIKE</b>	<b>GRUPA B</b>
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1.	Vrijednost izraza $\left(\frac{2x}{2x+5y} - \frac{5y}{5y-2x} - \frac{20xy}{4x^2-25y^2}\right) : \left(2x+5y - \frac{40xy}{2x+5y}\right)$ je: a) $\frac{1}{2x+5y}$ b) $\frac{1}{2x-5y}$ c) $\frac{1}{4x^2-25y^2}$
2.	Brojrealnih rješenja jednacine $\frac{x^2}{x^2-4} - \frac{4}{x^2+4} = \frac{4x^2+16}{x^4-16}$ je: a) 0                                      b) 1                                      c) 2
3.	Zbir kvadrata jednacine $2x^2 + kx - 3 = 0$ je 7. Kolika je vrijednost parametra k. a) $k = \pm 4$ b) $k = \pm 3$ c) $k = \pm 2$
4.	Rješenja nejednacine $\left \frac{1-x}{2x+3}\right  \leq 1$ pripadaju intervalu: a) $x \in (-\infty, -4]$ b) $x \in (-\infty, -4) \cup \left(-\frac{2}{3}, +\infty\right)$ c) $x \in (-\infty, -4] \cup \left[-\frac{2}{3}, +\infty\right)$
5.	Vrijednost izraza $(1+i)(\cos 15^\circ + i \sin 15^\circ)$ je: a) $\frac{\sqrt{2}}{2} + i \frac{\sqrt{6}}{2}$ b) $\frac{1}{2} + i \frac{\sqrt{3}}{2}$ c) $\frac{\sqrt{2}}{2} - i \frac{\sqrt{6}}{2}$
6.	Skup rješenja nejednacine $\log_{\frac{1}{3}} \frac{3x-1}{x^2+2} \geq 0$ je: a) $x \in \left[\frac{1}{3}, +\infty\right)$ b) $x \in \left(-\infty, \frac{1}{3}\right)$ c) $x \in \left(\frac{1}{3}, +\infty\right)$
7.	Broj rješenja jednacine $3^{\frac{4x^2-2x-3}{2}} \cdot 5^{x^2+3} = 27^{0.5} \cdot 5^{\frac{2x+9}{2}}$ koja pripadaju skupu prirodnih brojeva je: a) 2                                      b) 1                                      c) 0
8.	Rješenje jednacine $2 \cos^2 x - 7 \cos x - 4 = 0$ u intervalu $(0, p)$ iznosi: a) $\frac{p}{3}$ b) $\frac{2p}{3}$ c) $\frac{5p}{6}$
9.	Zbir cifara dvocifrenog broja je 8. Ako cifre zamijene mjesta, dobijeni broj je za pet manji od polovine datog broja. Koji je to broj? a) 62                                      b) 44                                      c) 26
10.	Oko pravouglog trougla je opisana kružnica poluprecnika $R=6,5[\text{cm}]$ . Za vrijednost obima $O=30[\text{cm}]$ izracunati katete pravouglog trougla. a) 5 i 12                                      b) 6 i 11                                      c) 7 i 10

<b>NAPOMENA</b>	<b>Poslije svakog zadatka ponudena su tri odgovora.</b> <b>Zaokružite odgovor koji smatrate tacnim.</b> <b>Tacno zaokružen odgovor nosi 4 boda.</b> <b>Nezaokružen odgovor nosi 0 bodova.</b>
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Fakultet elektrotehnike Tuzla, 10.07.2009.godine	RJEŠENJA ZADATAKA	GRUPA A
1.	$\left(\frac{4x}{4x+3y} - \frac{3y}{3y-4x} - \frac{24xy}{16x^2-9y^2}\right) : \left(4x+3y - \frac{48xy}{4x+3y}\right) = \left[\frac{4x}{4x+3y} + \frac{3y}{4x-3y} - \frac{24xy}{(4x+3y)(4x-3y)}\right] : \left[\frac{(4x+3y)^2-48xy}{4x+3y}\right]$ $= \frac{4x(4x-3y)+3y(4x+3y)-24xy}{(4x+3y)(4x-3y)} : \frac{16x^2+24xy+9y^2-48xy}{4x+3y} = \frac{16x^2-12xy+12xy+9y^2-24xy}{(4x+3y)(4x-3y)} : \frac{16x^2-24xy+9y^2}{4x+3y}$ $= \frac{(4x-3y)^2}{(4x+3y)(4x-3y)} \cdot \frac{4x+3y}{(4x-3y)^2} = \frac{1}{4x-3y}$	<p>a) <math>\frac{1}{4x+3y}</math>      b) <math>\frac{1}{4x-3y}</math>      c) <math>\frac{1}{(4x+3y)(4x-3y)}</math></p>
2.	$\frac{2x^2}{x^2+3} - \frac{x^2}{x^2-3} = -\frac{6x^2}{x^4-9} \Rightarrow 2x^2(x^2-3) - x^2(x^2+3) = -6x^2, DP: x^4-9 \neq 0$ $x^4-3x^2=0; \quad x=0, \quad x=\pm 3. \text{ Rješenje je samo } x=0, \text{ jer } x=\pm 3 \notin DP$	<p>a) 1      b) 2      c) 3</p>
3.	$3x^2+kx-5=0; \quad x^2+px+q=0; \quad x_1+x_2=-p \wedge x_1 \cdot x_2=q; \quad x_1^2+x_2^2=p^2-2q = \frac{k^2}{9} + \frac{10}{3} = \frac{13}{3} \Rightarrow k = \pm 3$	<p>a) <math>k = \pm\sqrt{3}</math>      b) <math>k = \pm 9</math>      c) <math>k = \pm 3</math></p>
4.	$\left \frac{2-x}{3x+1}\right  \leq 1, \left \frac{2-x}{3x+1}\right  \leq 1,  2-x  = \begin{cases} 2-x, x \leq 2 \\ -(2-x), x > 2 \end{cases},  3x+1  = \begin{cases} 3x+1, x \geq -\frac{1}{3} \\ -(3x+1), x < -\frac{1}{3} \end{cases}$ $\text{Za } x \in \left(-\infty, -\frac{1}{3}\right) \Rightarrow \frac{2-x}{-(3x+1)} \leq 1 \Rightarrow \frac{2x+3}{3x+1} \geq 0 \Rightarrow x \in \left(-\infty, -\frac{3}{2}\right] \cup \left(-\frac{1}{3}, +\infty\right) \text{ odnosno } x \in \left(-\infty, -\frac{3}{2}\right]$ $\text{Za } x \in \left[-\frac{1}{3}, 2\right] \Rightarrow \frac{2-x}{(3x+1)} \leq 1 \Rightarrow \frac{4x-1}{3x+1} \geq 0 \Rightarrow x \in \left(-\infty, -\frac{1}{3}\right) \cup \left[\frac{1}{4}, +\infty\right) \text{ odnosno } x \in \left[\frac{1}{4}, 2\right]$ $\text{Za } x \in (2, +\infty) \Rightarrow \frac{-(2-x)}{(3x+1)} \leq 1 \Rightarrow \frac{2x+3}{3x+1} \leq 0 \Rightarrow x \in \left(-\infty, -\frac{3}{2}\right] \cup \left(-\frac{1}{3}, +\infty\right) \text{ odnosno } x \in (2, +\infty)$ $\text{Rješenjenejednaceje : } x \in \left(-\infty, -\frac{3}{2}\right] \cup \left[-\frac{1}{4}, +\infty\right)$	<p>a) <math>x \in \left(-\infty, -\frac{3}{2}\right] \cup [2, +\infty)</math>      b) <math>x \in \left(-\infty, -\frac{3}{2}\right] \cup \left[\frac{1}{4}, +\infty\right)</math>      c) <math>x \in \left(-\infty, -\frac{3}{2}\right]</math></p>
5.	$\left(\sqrt{2}-i\sqrt{2}\right)\left(\cos 105^\circ+i\sin 105^\circ\right)=2e^{-i45^\circ} \cdot e^{i105^\circ}=2e^{i60^\circ}=2\left(\cos 60^\circ+i\sin 60^\circ\right)=2\left(\frac{1}{2}+i\frac{\sqrt{3}}{2}\right)=1+i\sqrt{3}$	<p>a) <math>\sqrt{2}+i\sqrt{6}</math>      b) <math>1-i\sqrt{3}</math>      c) <math>1+i\sqrt{3}</math></p>
6.	$\log_1 \frac{2x-3}{x^2+3} \geq 0, DP: \frac{2x-3}{x^2+3} > 0 \Rightarrow x > \frac{3}{2}, \log_1 \frac{2x-3}{x^2+3} \geq 0 \Rightarrow \log_1 \frac{2x-3}{x^2+3} \geq \log_1 1 \Rightarrow \frac{2x-3}{x^2+3} \leq 1 \Rightarrow \frac{x^2-2x+6}{x^2+3} \geq 0, \text{ za } \forall x \in \mathbb{R}$ $\text{Odnosnorješenje nejednaceje : } x > \frac{3}{2}$	<p>a) <math>x \in \left(-\infty, \frac{3}{2}\right)</math>      b) <math>x \in \left[\frac{3}{2}, +\infty\right)</math>      c) <math>x \in \left(\frac{3}{2}, +\infty\right)</math></p>
7.	$3^{\frac{4x^2+10x-3}{2}} \cdot 5^{2x^2+3} = 27^{0.5} \cdot 5^{-5x+6} \Rightarrow 3^{\frac{4x^2+10x-3}{2}-1.5} \cdot 5^{2x^2+3+5x-6} = 1 \Rightarrow 3^{\frac{4x^2+10x-3}{2}-\frac{3}{2}} \cdot 5^{2x^2+5x-3} = 1$ $3^{2x^2+5x-3} \cdot 5^{2x^2+5x-3} = 1 \Rightarrow 15^{2x^2+5x-3} = 15^0 \Rightarrow 2x^2+5x-3=0 \Rightarrow x_1 = -3 \notin \mathbb{N} \wedge x_2 = \frac{1}{2} \notin \mathbb{N}$ $\text{Odnosno nema rješenja.}$	<p>a) 0      b) 1      c) 2</p>
8.	$2\cos^2 x - 7\cos x + 3 = 0 \text{ smjena } \cos x = t \Rightarrow 2t^2 - 7t + 3 = 0 \Rightarrow t_1 = 3 \wedge t_2 = \frac{1}{2}$ $\text{Za } \cos x = 3 \Rightarrow x \notin \mathbb{R} \wedge \cos x = \frac{1}{2} \Rightarrow x = \pm \frac{p}{3} + 2kp, \text{ za } k \in \mathbb{Z} \Rightarrow x = \frac{p}{3}$	<p>a) <math>\frac{2p}{3}</math>      b) <math>\frac{p}{6}</math>      c) <math>\frac{p}{3}</math></p>
9.	$(10x+y) - \text{dvocifrenibroj } x+y=9. \text{ Zamjenommjesta dobija se } (10y+x). \text{ Odatle slijedi: } 10y-x-3 = \frac{10x+y}{3} \Rightarrow x=7 \wedge y=2$	<p>a) 63      b) 72      c) 54</p>
10.	$\text{Kod pravougloug trouglahipotenuza je jednaka precrecno pisanekružnice, tj. } c = 2R = 10[\text{cm}]$ $O = a+b+c \Rightarrow a+b = 14 \wedge a^2 + b^2 = c^2, \text{ odnosno } a^2 + b^2 = 100, \text{ dobija se : } a = 6[\text{cm}] \wedge b = 8[\text{cm}]$	<p>a) 6 i 8      b) 5 i 9      c) 4 i 10</p>

Fakultet elektrotehnike Tuzla, 10.07.2009.godine	RJEŠENJA ZADATAKA	GRUPA B
1.	$\left(\frac{2x}{2x+5y} - \frac{5y}{5y-2x} - \frac{20xy}{4x^2-25y^2}\right) : \left(2x+5y - \frac{40xy}{2x+5y}\right) = \left[\frac{2x}{2x+5y} + \frac{5y}{2x-5y} - \frac{20xy}{(2x+5y)(2x-5y)}\right] : \left[\frac{(2x+5y)^2 - 40xy}{2x+5y}\right]$ $= \frac{2x(2x-5y) + 5y(2x+5y) - 20xy}{(2x+5y)(2x-5y)} : \frac{4x^2 + 20xy + 25y^2 - 40xy}{2x+5y} = \frac{4x^2 - 10xy + 10xy + 25y^2 - 20xy}{(2x+5y)(2x-5y)} : \frac{4x^2 - 25xy + 25y^2}{2x+5y}$ $= \frac{(2x-5y)^2}{(2x+5y)(2x-5y)} \cdot \frac{2x+5y}{(2x-5y)^2} = \frac{1}{2x-5y}$	<p>a) <math>\frac{1}{2x+5y}</math>                      b) <math>\frac{1}{2x-5y}</math>                      c) <math>\frac{1}{4x^2-25y^2}</math></p>
2.	$\frac{x^2}{x^2-4} - \frac{4}{x^2+4} = \frac{4x^2+16}{x^4-16} \Rightarrow x^2(x^2+4) - 4(x^2-4) = 4x^2+16, DP: x^4-16 \neq 0$ $x^4 - 4x^2 = 0; \quad x = 0, \quad x = \pm 4. \text{ Rješenje je samo } x = 0, \text{ jer } x = \pm 4 \notin DP$	<p>a) 0                                      b) 1                                      c) 2</p>
3.	$2x^2 + kx - 3 = 0; \quad x^2 + px + q = 0; \quad x_1 + x_2 = -p \wedge x_1 \cdot x_2 = q; \quad x_1^2 + x_2^2 = p^2 - 2q = \frac{k^2}{4} - 3 = 7 \Rightarrow k = \pm 4$	<p>a) <math>k = \pm 4</math>                              b) <math>k = \pm 3</math>                              c) <math>k = \pm 2</math></p>
4.	$\left  \frac{1-x}{2x+3} \right  \leq 1, \quad \left  \frac{1-x}{2x+3} \right  \leq 1, \quad  1-x  = \begin{cases} 1-x, & x \leq 1 \\ -(1-x), & x > 1 \end{cases}, \quad  2x+3  = \begin{cases} 2x+3, & x \geq -\frac{3}{2} \\ -(2x+3), & x < -\frac{3}{2} \end{cases}$ $\text{Za } x \in \left(-\infty, -\frac{3}{2}\right) \Rightarrow \frac{1-x}{-(2x+3)} \leq 1 \Rightarrow \frac{x+4}{2x+3} \geq 0 \Rightarrow x \in (-\infty, -4] \cup \left(-\frac{3}{2}, +\infty\right) \text{ odnosno } x \in (-\infty, -4]$ $\text{Za } x \in \left[-\frac{3}{2}, 1\right] \Rightarrow \frac{1-x}{2x+3} \leq 1 \Rightarrow \frac{3x+2}{2x+3} \geq 0 \Rightarrow x \in \left(-\infty, -\frac{3}{2}\right) \cup \left[-\frac{2}{3}, +\infty\right) \text{ odnosno } x \in \left[-\frac{2}{3}, 1\right]$ $\text{Za } x \in (1, +\infty) \Rightarrow \frac{-(1-x)}{2x+3} \leq 1 \Rightarrow \frac{x+4}{2x+3} \geq 0 \Rightarrow x \in (-\infty, -4] \cup \left(-\frac{3}{2}, +\infty\right)$ $\text{Rješenje nejednače: } x \in (-\infty, -4] \cup \left[-\frac{3}{2}, +\infty\right)$	<p>a) <math>x \in (-\infty, -4]</math>                      b) <math>x \in (-\infty, -4] \cup \left[-\frac{2}{3}, +\infty\right)</math>                      c) <math>x \in (-\infty, -4] \cup \left[-\frac{2}{3}, +\infty\right)</math></p>
5.	$(1+i)(\cos 15^\circ + i \sin 15^\circ) = \sqrt{2}e^{i45^\circ} \cdot e^{i15^\circ} = 2e^{i60^\circ} = \sqrt{2}(\cos 60^\circ + i \sin 60^\circ) = \sqrt{2}\left(\frac{1}{2} + i \frac{\sqrt{3}}{2}\right) = \frac{\sqrt{2}}{2} + i \frac{\sqrt{6}}{2}$	<p>a) <math>\frac{\sqrt{2}}{2} + i \frac{\sqrt{6}}{2}</math>                      b) <math>\frac{1}{2} + i \frac{\sqrt{3}}{2}</math>                      c) <math>\frac{\sqrt{2}}{2} - i \frac{\sqrt{6}}{2}</math></p>
6.	$\log_{\frac{1}{3}} \frac{3x-1}{x^2+2} \geq 0, DP: \frac{3x-1}{x^2+2} > 0 \Rightarrow x > \frac{1}{3}, \log_{\frac{1}{3}} \frac{3x-1}{x^2+2} \geq 0 \Rightarrow \log_{\frac{1}{3}} \frac{3x-1}{x^2+2} \geq \log_{\frac{1}{3}} 1 \Rightarrow$ $\frac{3x-1}{x^2+2} \leq 1 \Rightarrow \frac{x^2-3x+3}{x^2+2} \geq 0, \text{ za } \forall x \in \mathbb{R}, \text{ odnosno rješenje nejednače: } x > \frac{1}{3}$	<p>a) <math>x \in \left[\frac{1}{3}, +\infty\right)</math>                      b) <math>x \in \left(-\infty, \frac{1}{3}\right)</math>                      c) <math>x \in \left(\frac{1}{3}, +\infty\right)</math></p>
7.	$\frac{4x^2-2x-3}{3} \cdot 5^{x^2+3} = 27 \cdot 0.5 \cdot \frac{2x+9}{2} \Rightarrow 3 \cdot \frac{4x^2-2x-3}{2} \cdot 1.5 \cdot 5^{x^2+3} \cdot \frac{2x+9}{2} = 1 \Rightarrow 3^{2x^2-x-3} \cdot 5^{2x^2-x-3} = 1$ $15^{2x^2-x-3} = 15^0 \Rightarrow 2x^2 - x - 3 = 0 \Rightarrow x_1 = -1 \notin N \wedge x_2 = \frac{3}{2} \notin N$ <p>Odnosnonemarješenja.</p>	<p>a) 2                                      b) 1                                      c) 0</p>
8.	$2\cos^2 x - 7\cos x - 4 = 0 \text{ smjena } \cos x = t \Rightarrow 2t^2 - 7t - 4 = 0 \Rightarrow t_1 = 4 \wedge t_2 = -\frac{1}{2}$ $\text{Za } \cos x = 4 \Rightarrow x \notin \mathbb{R} \wedge \cos x = -\frac{1}{2} \Rightarrow x = \pm \frac{2p}{3} + 2kp, \text{ za } k \in \mathbb{Z} \Rightarrow x = \frac{2p}{3}$	<p>a) <math>\frac{p}{3}</math>                                      b) <math>\frac{2p}{3}</math>                                      c) <math>\frac{5p}{6}</math></p>
9.	$(10x+y) - \text{dvocifreni broj. } x+y=8. \text{ Zamjenom mjesta dobija se } (10y+x). \text{ Odatle slijedi: } 10y-x-5 = \frac{10x+y}{2} \Rightarrow x=6 \wedge y=2$	<p>a) 62                                      b) 44                                      c) 26</p>
10.	<p>Kod pravoulog trougla hipotenuza je jednaka precrecn opisane kružnice, tj. <math>c = 2R = 13[\text{cm}]</math></p> $O = a + b + c \Rightarrow a + b = 17 \wedge a^2 + b^2 = c^2, \text{ odnosno } a^2 + b^2 = 169, \text{ dobija se: } a = 5[\text{cm}] \wedge b = 12[\text{cm}]$	<p>a) 5 i 12                                      b) 6 i 11                                      c) 7 i 10</p>

UNIVERZITET U TUZLI Fakultet elektrotehnike Tuzla, 02.07.2008.godine	KVALIFIKACIONI ISPIT IZ MATEMATIKE	GRUPA A
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1.	Vrijednost izraza $\sqrt[6]{9+4\sqrt{5}} \cdot \sqrt[3]{\sqrt{5}-2}$ je: a) 1                      b) $\sqrt{6}$ c) $2\sqrt{5}$
2.	Za koje vrijednosti parametra $m$ rješenja kvadratne jednacine $x^2 - (m-2)x + m + 1 = 0$ zadovoljavaju uslov $\left  \frac{1}{x_1} + \frac{1}{x_2} \right  < 2$ . a) $(-\infty, -4) \cup (0, \infty)$ b) $[-4, 1)$ c) $(-\infty, -3) \cup (1, \infty)$
3.	Zbir kvadrata svih realnih rješenja jednacine $x^2 - 3 x  - 4 = 0$ je: a) 2                      b) 17                      c) 32
4.	Ako je $z = \frac{1+i\sqrt{3}}{1-i}$ onda je $\operatorname{Re}\{z\} + \operatorname{Im}\{z\}$ jednako: a) $1 - \sqrt{3}$ b) 1                      c) $1 + \sqrt{3}$
5.	Broj realnih rješenja jednacine $\sqrt{12x} - \sqrt{5x+10} = 1$ je: a) 0                      b) 1                      c) 2
6.	Skup svih rješenja nejednacine $3^{x+0.5} + 3^{x-0.5} > 4^{x+0.5} - 2^{2x-1}$ je: a) $x < 0$ b) $x < \frac{1}{2}$ c) $x < \frac{3}{2}$
7.	Rješenje jednacine $\sin 3x \sin 5x = \sin 4x \sin 6x$ je: a) $\frac{k\pi}{9}, k \in 0, \pm 1, \pm 2, \dots$ b) $\frac{k\pi}{10}, k \in 0, \pm 1, \pm 2, \dots$ c) $\frac{k\pi}{11}, k \in 0, \pm 1, \pm 2, \dots$
8.	Proizvod rješenja jednacine $\log_{\frac{1}{3}} \log_4(x^2 - 5) = -1$ je: a) -69                      b) 69                      c) $\sqrt{69}$
9.	Broj stranica pravilnog mnogougla koji ima osam puta više dijagonala nego stranica iznosi: a) 18                      b) 19                      c) 20
10.	Iz kružne ploce je izrezan jednakostrančni trokut maksimalne površine. Stranica trokuta iznosi 2m. Kolika je površina otpatka? a) $p - \frac{3\sqrt{3}}{4} \text{ m}^2$ b) $4p - 3\sqrt{3} \text{ m}^2$ c) $\frac{4}{3}p - \sqrt{3} \text{ m}^2$

<b>NAPOMENA</b>	Poslije svakog zadatka ponudena su tri odgovora. Zaokružite odgovor koji smatrate tačnim. Tačno zaokružen odgovor nosi 4 boda. Nezaokružen odgovor nosi 0 bodova.
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<b>UNIVERZITET U TUZLI</b> Fakultet elektrotehnike Tuzla, 02.07.2008.godine	<b>KVALIFIKACIONI ISPIT IZ</b> <b>MATEMATIKE</b>	<b>GRUPA B</b>
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1.	Vrijednost izraza $\sqrt[4]{7+4\sqrt{3}} \cdot \sqrt[3]{2-\sqrt{3}}$ je: a) 1                      b) $\sqrt[3]{3}$ c) $2\sqrt[4]{3}$
2.	Za koje vrijednosti parametra $m$ rješenja kvadratne jednacine $x^2 + (2m+2)x + m = 0$ zadovoljavaju uslov $\frac{1}{x_1^2} + \frac{1}{x_2^2} < 3$ . a) $(-\infty, -3+\sqrt{5})$ b) $(-3-\sqrt{5}, \infty)$ c) $(-3-\sqrt{5}, -3+\sqrt{5})$
3.	Zbir kvadrata svih realnih rješenja jednacine $x^2 + 3 x  - 4 = 0$ je: a) 2                      b) 17                      c) 32
4.	Ako je $z = \frac{1-i}{1-i\sqrt{3}}$ onda je $\operatorname{Re}\{z\} - \operatorname{Im}\{z\}$ jednako: a) $\frac{1-\sqrt{3}}{2}$ b) $\frac{1}{2}$ c) $\frac{1+\sqrt{3}}{2}$
5.	Broj realnih rješenja jednacine $\sqrt{x+7} - \sqrt{2x} = 1$ je: a) 0                      b) 1                      c) 2
6.	Skup svih rješenja nejednacine $2^{x+0.5} + 2^{x-0.5} > 3^{x+0.5} - 3^{x-0.5}$ je: a) $x < 0$ b) $x < \frac{1}{2}$ c) $x < \frac{3}{2}$
7.	Rješenje jednacine $\sin 2x \sin 4x = \sin 5x \sin 7x$ je: a) $\frac{k\pi}{9}, k \in 0, \pm 1, \pm 2, \dots$ b) $\frac{k\pi}{10}, k \in 0, \pm 1, \pm 2, \dots$ c) $\frac{k\pi}{11}, k \in 0, \pm 1, \pm 2, \dots$
8.	Proizvod rješenja jednacine $\log_9 \log \frac{1}{2} \left( \frac{1}{x^2 - 60} \right) = \frac{1}{2}$ je: a) $7\sqrt{2}$ b) 68                      c) -68
9.	Broj stranica pravilnog mnogougla koji ima sedam puta više dijagonala nego vrhova iznosi: a) 15                      b) 16                      c) 17
10.	Iz kružne ploce poluprecnika 1m je izrezan jednakostrančni trokut maksimalne površine. Kolika je površina otpatka? a) $p - \frac{3\sqrt{3}}{4} \text{ m}^2$ b) $4p - 3\sqrt{3} \text{ m}^2$ c) $\frac{4}{3}p - \sqrt{3} \text{ m}^2$

<b>NAPOMENA</b>	Poslije svakog zadatka ponudena su tri odgovora. Zaokružite odgovor koji smatrate tačnim. Tačno zaokružen odgovor nosi 4 boda. Nezaokružen odgovor nosi 0 bodova.
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Fakultet elektrotehnike Tuzla, 02.07.2008.godine	RJEŠENJA ZADATAKA	GRUPA A
1.	$\sqrt[6]{9+4\sqrt{5}} \cdot \sqrt[3]{\sqrt{5}-2} = \sqrt[6]{9+4\sqrt{5}} \cdot \sqrt[6]{(\sqrt{5}-2)^2} = \sqrt[6]{9+4\sqrt{5}} \cdot \sqrt[6]{9-4\sqrt{5}} = \sqrt[6]{9^2 - (4\sqrt{5})^2} = 1$ <p>a) 1                                      b) <math>\sqrt{6}</math>                                      c) <math>2\sqrt{5}</math></p>	
2.	<p>Vietovim pravilima: <math>x_1 + x_2 = m - 2</math>, <math>x_1 \cdot x_2 = m + 1</math>, pa je <math>\left  \frac{1}{x_1} + \frac{1}{x_2} \right  &lt; 2 \Leftrightarrow \left  \frac{x_1 + x_2}{x_1 \cdot x_2} \right  &lt; 2 \Leftrightarrow \left  \frac{m-2}{m+1} \right  &lt; 2</math></p> <p>odakle je: <math>-2 &lt; \frac{m-2}{m+1} &lt; 2</math>. Rješenje lijeve nejednacine: <math>(-\infty, -1) \cup (0, \infty)</math>, a desne <math>(-\infty, -4) \cup (0, \infty)</math>.</p> <p>a) <math>(-\infty, -4) \cup (0, \infty)</math>      b) <math>[-4, 1)</math>                                      c) <math>(-\infty, -3) \cup (1, \infty)</math></p>	
3.	$x^2 - 3 x  - 4 = 0 \Rightarrow \begin{cases} x < 0, x^2 + 3x - 4 = 0 \\ x \geq 0, x^2 - 3x - 4 = 0 \end{cases} \Rightarrow \begin{cases} x < 0, x_1 = -4, x_2 = 1 \\ x \geq 0, x_1 = -1, x_2 = 4 \end{cases} \Rightarrow x_1 = -4, x_2 = 4 \Rightarrow x_1^2 + x_2^2 = 32$ <p>a) 2                                      b) 17                                      c) 32</p>	
4.	$z = \frac{1+i\sqrt{3}}{1-i} \cdot \frac{1+i}{1+i} = \frac{1+i+i\sqrt{3}-\sqrt{3}}{2} = \frac{1-\sqrt{3}}{2} + i \frac{1+\sqrt{3}}{2} = \operatorname{Re}\{z\} + i \operatorname{Im}\{z\} \Rightarrow \operatorname{Re}\{z\} + \operatorname{Im}\{z\} = 1$ <p>a) <math>1 - \sqrt{3}</math>                                      b) 1                                      c) <math>1 + \sqrt{3}</math></p>	
5.	$\sqrt{12x} - \sqrt{5x+10} = 1 (x \geq 0) \Leftrightarrow \sqrt{12x} = 1 + \sqrt{5x+10} \Rightarrow 12x = 1 + 5x + 10 + 2\sqrt{5x+10} \Rightarrow 7x - 11 = 2\sqrt{5x+10}$ <p>Za <math>x \geq \frac{11}{7}</math> kvadriranjem je: <math>49x^2 - 154x + 121 = 20x + 40 \Rightarrow 49x^2 - 174x + 81 = 0 \Rightarrow x_{1,2} = \frac{174 \pm 120}{98} \Rightarrow</math></p> <p><math>x_1 = 3, x_2 = \frac{54}{98} &lt; \frac{11}{7}</math>, pa je rješenje <math>x_1 = 3</math>.</p> <p>a) 0                                      b) 1                                      c) 2</p>	
6.	$3^{x+0.5} + 3^{x-0.5} > 4^{x+0.5} - 2^{2x-1} \Rightarrow \left(\sqrt{3} + \frac{1}{\sqrt{3}}\right) 3^x > \left(2 - \frac{1}{2}\right) 4^x \Rightarrow \frac{4}{\sqrt{3}} 3^x > \frac{3}{2} 4^x \Rightarrow \frac{8}{3\sqrt{3}} 3^x > 4^x$ $\left(\frac{2}{\sqrt{3}}\right)^3 > \left(\frac{2}{\sqrt{3}}\right)^{2x} \Rightarrow 2x < 3 \Rightarrow x < \frac{3}{2}$ <p>a) <math>x &lt; 0</math>                                      b) <math>x &lt; \frac{1}{2}</math>                                      c) <math>x &lt; \frac{3}{2}</math></p>	
7.	$\sin 3x \sin 5x = \sin 4x \sin 6x \Rightarrow -\frac{1}{2}(\cos 8x - \cos 2x) = -\frac{1}{2}(\cos 10x - \cos 2x) \Rightarrow \cos 10x - \cos 8x = 0 \Rightarrow$ $-2 \sin 9x \sin x = 0 \Rightarrow x = \frac{k\pi}{9} \vee x = k\pi$ <p>a) <math>\frac{k\pi}{9}, k \in 0, \pm 1, \pm 2, \dots</math>      b) <math>\frac{k\pi}{10}, k \in 0, \pm 1, \pm 2, \dots</math>      c) <math>\frac{k\pi}{11}, k \in 0, \pm 1, \pm 2, \dots</math></p>	
8.	$\log_{\frac{1}{3}} \log_4 (x^2 - 5) = -1 \Rightarrow \log_4 (x^2 - 5) = \left(\frac{1}{3}\right)^{-1} = 3 \Rightarrow (x^2 - 5) = 4^3 = 64 \Rightarrow x^2 - 69 = 0 \Rightarrow x_{1,2} = \pm\sqrt{69}$ <p>a) -69                                      b) 69                                      c) <math>\sqrt{69}</math></p>	
9.	$\frac{n(n-3)}{2} = 8n \Rightarrow \frac{n^2 - 3n}{2} - 8n = 0 \Rightarrow \frac{n^2 - 19n}{2} = 0 \Rightarrow \frac{n(n-19)}{2} = 0 \Rightarrow n = 19$ <p>a) 18                                      b) 19                                      c) 20</p>	
10.	<p>Visina trokuta <math>h = \frac{3}{2}R</math>, gdje je <math>R</math> poluprecnik kruga. Vrijedi i <math>a^2 - \left(\frac{a}{2}\right)^2 = \left(\frac{3}{2}R\right)^2 \Rightarrow \frac{3}{4}a^2 = \frac{9}{4}R^2</math>,</p> <p>pa je <math>a = \sqrt{3}R</math>. Tada je <math>R = \frac{2}{\sqrt{3}}</math> i <math>h = \sqrt{3}</math>, odnosno <math>O = P_K - P_T = R^2 p - \frac{1}{2}ah = \frac{4}{3}p - \sqrt{3}</math></p> <p>a) <math>p - \frac{3\sqrt{3}}{4} \text{ m}^2</math>                                      b) <math>4p - 3\sqrt{3} \text{ m}^2</math>                                      c) <math>\frac{4}{3}p - \sqrt{3} \text{ m}^2</math></p>	

Fakultet elektrotehnike Tuzla, 02.07.2008.godine	RJEŠENJA ZADATAKA	GRUPA B
1.	$\sqrt[6]{7+4\sqrt{3}} \cdot \sqrt[3]{2-\sqrt{3}} = \sqrt[6]{7+4\sqrt{3}} \cdot \sqrt[6]{(2-\sqrt{3})^2} = \sqrt[6]{7+4\sqrt{3}} \cdot \sqrt[6]{7-4\sqrt{3}} = \sqrt[6]{7^2 - (4\sqrt{3})^2} = 1$ <p>a) 1                                      b) <math>\sqrt[3]{3}</math>                                      c) <math>2\sqrt[6]{3}</math></p>	
2.	<p>Vietovim pravilima: <math>x_1 + x_2 = -2(m+1)</math>, <math>x_1 x_2 = m</math>, pa je <math>\frac{1}{x_1} + \frac{1}{x_2} = \frac{x_1^2 + x_2^2}{x_1^2 \cdot x_2^2} = \frac{(x_1 + x_2)^2 - 2x_1 x_2}{x_1^2 \cdot x_2^2} =</math></p> $= \frac{4(m+1)^2 - 2m}{m^2} = \frac{4m^2 + 6m + 4}{m^2} < 3 \Leftrightarrow \frac{m^2 + 6m + 4}{m^2} < 0 \Leftrightarrow m^2 + 6m + 4 < 0 \Leftrightarrow m_{1,2} = \frac{-6 \pm \sqrt{20}}{2} = -3 \pm \sqrt{5}$ <p>a) <math>(-\infty, -3 + \sqrt{5})</math>                      b) <math>(-3 - \sqrt{5}, \infty)</math>                      c) <math>(-3 - \sqrt{5}, -3 + \sqrt{5})</math></p>	
3.	$x^2 + 3 x  - 4 = 0 \Rightarrow \begin{cases} x < 0, x^2 - 3x - 4 = 0 \\ x \geq 0, x^2 + 3x - 4 = 0 \end{cases} \Rightarrow \begin{cases} x < 0, x_1 = -1, x_2 = 4 \\ x \geq 0, x_1 = 1, x_2 = -4 \end{cases} \Rightarrow x_1 = -1, x_2 = 1 \Rightarrow x_1^2 + x_2^2 = 2$ <p>a) 2                                      b) 17                                      c) 32</p>	
4.	$z = \frac{1-i}{1-i\sqrt{3}} \cdot \frac{1+i\sqrt{3}}{1+i\sqrt{3}} = \frac{1+i\sqrt{3}-i+\sqrt{3}}{4} = \frac{1+\sqrt{3}}{4} + i \frac{-1+\sqrt{3}}{4} = \operatorname{Re}\{z\} + i \operatorname{Im}\{z\} \Rightarrow \operatorname{Re}\{z\} - \operatorname{Im}\{z\} = \frac{1}{2}$ <p>a) <math>\frac{1-\sqrt{3}}{2}</math>                                      b) <math>\frac{1}{2}</math>                                      c) <math>\frac{1+\sqrt{3}}{2}</math></p>	
5.	$\sqrt{x+7} - \sqrt{2x} = 1 (x \geq 0) \Rightarrow \sqrt{x+7} = \sqrt{2x} + 1 \Rightarrow x+7 = 2x+1+2\sqrt{2x} \Rightarrow -x+6 = 2\sqrt{2x}$ <p>Za <math>x \leq 6</math> kvadriranjem je: <math>x^2 - 12x + 36 = 8x \Rightarrow x^2 - 20x + 36 = 0 \Rightarrow x_{1,2} = \frac{20 \pm 16}{2} = 10 \pm 8</math></p> <p>pa je rješenje <math>x_1 = 2</math>.</p> <p>a) 0                                      b) 1                                      c) 2</p>	
6.	$2^{x+0.5} + 2^{x-0.5} > 3^{x+0.5} - 3^{x-0.5} \Rightarrow \left(\sqrt{2} + \frac{1}{\sqrt{2}}\right) 2^x > \left(\sqrt{3} - \frac{1}{\sqrt{3}}\right) 3^x \Rightarrow \frac{3}{\sqrt{2}} 2^x > \frac{2}{\sqrt{3}} 3^x \Rightarrow \frac{3\sqrt{3}}{2\sqrt{2}} > \left(\frac{3}{2}\right)^x \Rightarrow \left(\frac{3}{2}\right)^{\frac{3}{2}} > \left(\frac{3}{2}\right)^x \Rightarrow x < \frac{3}{2}$ <p>a) <math>x &lt; 0</math>                                      b) <math>x &lt; \frac{1}{2}</math>                                      c) <math>x &lt; \frac{3}{2}</math></p>	
7.	$\sin 2x \sin 4x = \sin 5x \sin 7x \Rightarrow -\frac{1}{2}(\cos 6x - \cos 2x) = -\frac{1}{2}(\cos 12x - \cos 2x) \Rightarrow \cos 12x - \cos 6x = 0 \Rightarrow$ $-2 \sin 9x \sin 3x = 0 \Rightarrow x = \frac{k\pi}{9} \vee x = \frac{k\pi}{3}$ <p>a) <math>\frac{k\pi}{9}, k \in 0, \pm 1, \pm 2, \dots</math>      b) <math>\frac{k\pi}{10}, k \in 0, \pm 1, \pm 2, \dots</math>      c) <math>\frac{k\pi}{11}, k \in 0, \pm 1, \pm 2, \dots</math></p>	
8.	$\log_9 \log_{\frac{1}{2}} \frac{1}{x^2 - 60} = \frac{1}{2} \Rightarrow \log_{\frac{1}{2}} \frac{1}{x^2 - 60} = 9^{\frac{1}{2}} = 3 \Rightarrow \frac{1}{x^2 - 60} = \left(\frac{1}{2}\right)^3 = \frac{1}{8} \Rightarrow x^2 - 60 = 8 \Rightarrow x_{1,2} = \pm \sqrt{68}$ <p>a) <math>7\sqrt{2}</math>                                      b) 68                                      c) -68</p>	
9.	$\frac{n(n-3)}{2} = 7n \Rightarrow \frac{n^2 - 3n}{2} - 7n = 0 \Rightarrow \frac{n^2 - 17n}{2} = 0 \Rightarrow \frac{n(n-17)}{2} = 0 \Rightarrow n = 17$ <p>a) 15                                      b) 16                                      c) 17</p>	
10.	<p>Visina trokuta <math>h = \frac{3}{2}R = \frac{3}{2}</math>, gdje je <math>R</math> poluprecnik kruga. Vrijedi i <math>a^2 - \left(\frac{a}{2}\right)^2 = \left(\frac{3}{2}R\right)^2 \Rightarrow \frac{3}{4}a^2 = \frac{9}{4}R^2</math>,</p> <p>pa je <math>a = \sqrt{3}R = \sqrt{3}</math>. Tada je <math>O = P_K - P_T = R^2 p - \frac{1}{2}ah = p - \frac{3\sqrt{3}}{4}</math></p> <p>a) <math>p - \frac{3\sqrt{3}}{4} \text{ m}^2</math>                      b) <math>4p - 3\sqrt{3} \text{ m}^2</math>                      c) <math>\frac{4}{3}p - \sqrt{3} \text{ m}^2</math></p>	

<b>UNIVERZITET U TUZLI</b> <b>Fakultet elektrotehnike</b> <b>Tuzla, 02.07.2007.godine</b>	<b>KVALIFIKACIONI ISPIT IZ</b> <b>MATEMATIKE</b>	<b>GRUPA A</b>
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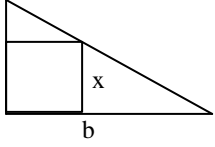
1.	Vrijednost izraza $\frac{a}{a^2 - a + 1} - \frac{1}{a + 1} - \frac{2a}{a^3 + 1}$ je:
	a) $\frac{1}{a^3 + 1}$ b) $-\frac{1}{a^3 + 1}$ c) $\frac{a^2}{a^3 + 1}$ d) $-\frac{a^2}{a^3 + 1}$
2.	Broj rješenja jednacine $\sqrt{x+2} + \sqrt{x+7} = 5$ je:
	a) nijedno      b) jedno      c) dva      d) tri
3.	Rješenje nejednacine $(x-4)(x+3) < 0$ je:
	a) $x \in (-3, 1] \cup [2, 4)$ b) $x \in (-3, 4)$ c) $x \in \left(\frac{1}{4}, \frac{3}{2}\right)$ d) $x \in \left(\frac{1}{4}, 1\right) \cup \left(1, \frac{3}{2}\right)$
4.	Broj rješenja jednacine $\log 2 + \log(4^{x-2} + 9) = 1 + \log(2^{x-2} + 1)$ je:
	a) nijedno      b) jedno      c) dva      d) tri
5.	Modul kompleksnog broja $\frac{1-i\sqrt{2}}{5+i\sqrt{2}}$ iznosi:
	a) $\frac{1}{9}$ b) $\frac{1}{3}$ c) 3      d) 9
6.	Rješenje nejednacine $\frac{1 + \cos x}{1 - \cos x} = 3$ u prvom kvadrantu iznosi:
	a) $x = \frac{\pi}{3}$ b) $x = \frac{\pi}{4}$ c) $x = \frac{\pi}{5}$ d) $x = \frac{\pi}{6}$
7.	Ako korijeni kvadratne funkcije $x^2 + bx + c$ iznose $x_{1/2} = \frac{5 \pm 3\sqrt{2}}{6}$ , tada je njena vrijednost u tacki 0 jednaka:
	a) $\frac{7}{36}$ b) $\frac{9}{36}$ c) $\frac{11}{36}$ d) $\frac{13}{36}$
8.	Ako se jedan broj doda brojniku i oduzme od nazivnika razlomka $\frac{7}{11}$ dobije se broj 2. Koji je to broj?
	a) 5      b) 6      c) 7      d) 8
9.	Ako se dužina ivice kocke poveća za 3 cm, površina joj se poveća 4 puta. Koliko puta se poveća zapremina kocke?
	a) 2 puta      b) 4 puta      c) 6 puta      d) 8 puta
10.	U pravougli trougao sa katetama dužine a=2 i b=4 upisan je kvadrat koji sa trouglom ima zajednicki pravi ugao. Dužina stranice upisanog kvadrata je:
	a) 1      b) $\frac{6}{5}$ c) $\frac{4}{3}$ d) 2

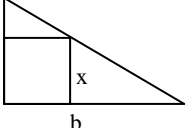
<b>NAPOMENA</b>	<b>Poslije svakog zadatka ponudena su cetiri odgovora. Zaokružite odgovor koji smatrate tacnim. Tacno zaokružen odgovor nosi 4 boda.</b>
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1.	Vrijednost izraza $\frac{a}{a^2 - a + 1} + \frac{1}{a + 1} - \frac{a^2 + 1}{a^3 + 1}$ je: a) $\frac{1}{a^3 + 1}$ b) $-\frac{1}{a^3 + 1}$ c) $\frac{a^2}{a^3 + 1}$ d) $-\frac{a^2}{a^3 + 1}$
2.	Broj rješenja jednacine $\sqrt{x + 4} + \sqrt{x + 11} = 7$ je: a) nijedno      b) jedno      c) dva      d) tri
3.	Rješenje nejednacine $(2x - 3)(1 - 4x) > 0$ je: a) $x \in (-3, 1] \cup [2, 4)$ b) $x \in (-3, 4)$ c) $x \in \left(\frac{1}{4}, \frac{3}{2}\right)$ d) $x \in \left(\frac{1}{4}, 1\right) \cup \left(1, \frac{3}{2}\right)$
4.	Broj rješenja jednacine $\log(9^x - 1) = 1 + \log(3^x - 1)$ je: a) nijedno      b) jedno      c) dva      d) tri
5.	Modul kompleksnog broja $\frac{5 - i\sqrt{2}}{1 + i\sqrt{2}}$ iznosi: a) $\frac{1}{9}$ b) $\frac{1}{3}$ c) 3      d) 9
6.	Rješenje nejednacine $\frac{1 + \sin x}{1 - \sin x} = 3$ u prvom kvadrantu iznosi: a) $x = \frac{\pi}{3}$ b) $x = \frac{\pi}{4}$ c) $x = \frac{\pi}{5}$ d) $x = \frac{\pi}{6}$
7.	Ako korijeni kvadratne funkcije $x^2 + bx + c$ iznose $x_{1/2} = \frac{5 \pm 2\sqrt{3}}{6}$ , tada je njena vrijednost u tacki 0 jednaka: a) $\frac{7}{36}$ b) $\frac{9}{36}$ c) $\frac{11}{36}$ d) $\frac{13}{36}$
8.	Ako se jedan broj doda brojniku i oduzme od nazivnika razlomka $\frac{7}{11}$ dobije se broj 5. Koji je to broj? a) 5      b) 6      c) 7      d) 8
9.	Ako se dužina ivice kocke poveća za 2 cm, površina joj se poveća 4 puta. Koliko puta se poveća zapremina kocke? a) 2 puta      b) 4 puta      c) 6 puta      d) 8 puta
10.	U pravougli trougao sa katetama dužine a=2 i b=3 upisan je kvadrat koji sa trouglom ima zajednicki pravi ugao. Dužina stranice upisanog kvadrata je: a) 1      b) $\frac{6}{5}$ c) $\frac{4}{3}$ d) 2

**NAPOMENA**

Poslije svakog zadatka ponudena su cetiri odgovora.  
Zaokružite odgovor koji smatrate tacnim.  
Tacno zaokružen odgovor nosi 4 boda.

Fakultet elektrotehnike Tuzla, 02.07.2007.godine	RJEŠENJA ZADATAKA	GRUPA A
1.	$\frac{a}{a^2-a+1} - \frac{1}{a+1} - \frac{2a}{a^3+1} = \frac{a(a+1) - (a^2-a+1) - 2a}{a^3+1} = \frac{a^2+a-a^2+a-1-2a}{a^3+1} = -\frac{1}{a^3+1}$	
2.	$\sqrt{x+2} + \sqrt{x+7} = 5, \quad x \geq -2 \wedge x \geq -7 \Rightarrow x \in [-2, \infty)$ $\sqrt{x+2} + \sqrt{x+7} = 5 \Rightarrow x+2 + 2\sqrt{(x+2)(x+7)} + x+7 = 25 \Rightarrow \sqrt{(x+2)(x+7)} = -x+8 \Rightarrow$ $(x+2)(x+7) = (8-x)^2 \Rightarrow x^2+9x+14 = x^2-16x+64 \Rightarrow 25x = 50 \Rightarrow x = 2$	
3.	$(x-4)(x+3) < 0 \Rightarrow \begin{cases} x-4 < 0 \\ x+3 > 0 \end{cases} \vee \begin{cases} x-4 > 0 \\ x+3 < 0 \end{cases} \Rightarrow \begin{cases} x < 4 \\ x > -3 \end{cases} \vee \begin{cases} x > 4 \\ x < -3 \end{cases} \Rightarrow x \in (-3, 4)$	
4.	$\log 2 + \log(4^{x-2} + 9) = 1 + \log(2^{x-2} + 1) \Rightarrow \log(2(4^{x-2} + 9)) = \log 10(2^{x-2} + 1) \Rightarrow 4^{x-2} + 9 = 5(2^{x-2} + 1) \Rightarrow$ $(2^{x-2})^2 + 9 = 5 \cdot 2^{x-2} + 5 \Rightarrow (2^{x-2})^2 - 5 \cdot 2^{x-2} + 4 = 0 \Rightarrow 2^{x-2} = \frac{5 \pm \sqrt{25-16}}{2} \Rightarrow 2^{x-2} = 4 \vee 2^{x-2} = 1 \Rightarrow$ $x_1 = 4 \vee x_2 = 2$	
5.	$\frac{1-i\sqrt{2}}{5+i\sqrt{2}} = \frac{1-i\sqrt{2}}{5+i\sqrt{2}} \cdot \frac{5-i\sqrt{2}}{5-i\sqrt{2}} = \frac{5-5i\sqrt{2}-i\sqrt{2}-2}{25+4} = \frac{3-6i\sqrt{2}}{27} = \frac{1-2i\sqrt{2}}{9}, \quad \sqrt{\left(\frac{1}{9}\right)^2 + \left(\frac{2\sqrt{2}}{9}\right)^2} = \sqrt{\frac{1}{81} + \frac{8}{81}} = \frac{1}{3}$	
6.	$\frac{1+\cos x}{1-\cos x} = 3 \Rightarrow 1+\cos x = 3(1-\cos x) \Rightarrow 4\cos x = 2 \Rightarrow \cos x = \frac{1}{2} \Rightarrow x = \frac{\pi}{3}$	
7.	$\left(x - \frac{5+3\sqrt{2}}{6}\right) \left(x - \frac{5-3\sqrt{2}}{6}\right) = \left[\left(x - \frac{5}{6}\right) - \frac{\sqrt{2}}{2}\right] \left[\left(x - \frac{5}{6}\right) + \frac{\sqrt{2}}{2}\right] = \left(x - \frac{5}{6}\right)^2 - \left(\frac{\sqrt{2}}{2}\right)^2 = x^2 - \frac{5}{3}x + \frac{25}{36} - \frac{1}{2} = x^2 - \frac{5}{3}x + \frac{7}{36}$	
8.	$\frac{7+x}{11-x} = 2 \Rightarrow 7+x = 22-2x \Rightarrow 3x = 15 \Rightarrow x = 5$	
9.	$\begin{cases} P = 6a^2 \\ 4P = 6(a+3)^2 \end{cases} \Rightarrow 4 = \frac{(a+3)^2}{a^2} \Rightarrow 4a^2 = a^2 + 6a + 9 \Rightarrow 3a^2 - 6a - 9 = 0 \Rightarrow a = \frac{6 \pm \sqrt{36+108}}{6} \Rightarrow a = 3$ $V_1 = a^3 = 27, V_2 = (a+3)^3 = 216 \Rightarrow \frac{V_2}{V_1} = \frac{216}{27} = 8$	
10.	 <p>Iz slicnosti trouglova je:</p> $\frac{b-x}{x} = \frac{b}{a} \Rightarrow ab - ax = bx \Rightarrow (a+b)x = ab \Rightarrow x = \frac{ab}{a+b} = \frac{4}{3}$	

Fakultet elektrotehnike Tuzla, 02.07.2007.godine	RJEŠENJA ZADATAKA	GRUPA B
1.	$\frac{a}{a^2-a+1} + \frac{1}{a+1} - \frac{a^2+1}{a^3+1} = \frac{a(a+1) + (a^2-a+1) - (a^2+1)}{a^3+1} = \frac{a^2+a+a^2-a+1-a^2-1}{a^3+1} = \frac{a^2}{a^3+1}$	
2.	$\sqrt{x+4} + \sqrt{x+11} = 7, \quad x \geq -4 \wedge x \geq -11 \Rightarrow x \in [-4, \infty)$ $\sqrt{x+4} + \sqrt{x+11} = 7 \Rightarrow x+4 + 2\sqrt{(x+4)(x+11)} + x+11 = 49 \Rightarrow \sqrt{(x+4)(x+11)} = -x+17 \Rightarrow$ $(x+4)(x+11) = (17-x)^2 \Rightarrow x^2 + 15x + 44 = x^2 - 34x + 289 \Rightarrow 49x = 245 \Rightarrow x = 5$	
3.	$(2x-3)(1-4x) > 0 \Rightarrow \begin{cases} 2x-3 < 0 \\ 1-4x < 0 \end{cases} \vee \begin{cases} 2x-3 > 0 \\ 1-4x > 0 \end{cases} \Rightarrow \begin{cases} x < \frac{3}{2} \\ x > \frac{1}{4} \end{cases} \vee \begin{cases} x > \frac{3}{2} \\ x < \frac{1}{4} \end{cases} \Rightarrow x \in \left(\frac{1}{4}, \frac{3}{2}\right)$	
4.	$\log(9^x - 1) = 1 + \log(3^x - 1) \mid d.p. \ x \neq 0 \Rightarrow \log(3^{2x} - 1) = \log 10(3^x - 1) \Rightarrow 3^{2x} - 1 = 10(3^x - 1) \Rightarrow$ $(3^x)^2 - 1 = 10 \cdot 3^x - 10 \Rightarrow (3^x)^2 - 10 \cdot 3^x + 9 = 0 \Rightarrow 3^x = \frac{10 \pm \sqrt{100 - 36}}{2} \Rightarrow 3^x = 9 \vee 3^x = 1 \Rightarrow$ $x_1 = 2$	
5.	$\frac{5-i\sqrt{2}}{1+i\sqrt{2}} = \frac{5-i\sqrt{2}}{1+i\sqrt{2}} \cdot \frac{1-i\sqrt{2}}{1-i\sqrt{2}} = \frac{5-5i\sqrt{2}-i\sqrt{2}-2}{1+2} = \frac{3-6i\sqrt{2}}{3} = 1-2i\sqrt{2}, \quad \sqrt{1^2 + (2\sqrt{2})^2} = \sqrt{1+8} = 3$	
6.	$\frac{1+\sin x}{1-\sin x} = 3 \Rightarrow 1+\sin x = 3(1-\sin x) \Rightarrow 4\sin x = 2 \Rightarrow \sin x = \frac{1}{2} \Rightarrow x = \frac{\pi}{6}$	
7.	$\left(x - \frac{5+2\sqrt{3}}{6}\right) \left(x - \frac{5-2\sqrt{3}}{6}\right) = \left[\left(x - \frac{5}{6}\right) - \frac{\sqrt{3}}{3}\right] \left[\left(x - \frac{5}{6}\right) + \frac{\sqrt{3}}{3}\right] = \left(x - \frac{5}{6}\right)^2 - \left(\frac{\sqrt{3}}{3}\right)^2 = x^2 - \frac{5}{3}x + \frac{25}{36} - \frac{1}{3} = x^2 - \frac{5}{3}x + \frac{13}{36}$	
8.	$\frac{7+x}{11-x} = 5 \Rightarrow 7+x = 55-5x \Rightarrow 6x = 48 \Rightarrow x = 8$	
9.	$\begin{cases} P = 6a^2 \\ 4P = 6(a+2)^2 \end{cases} \Rightarrow 4 = \frac{(a+2)^2}{a^2} \Rightarrow 4a^2 = a^2 + 4a + 4 \Rightarrow 3a^2 - 4a - 4 = 0 \Rightarrow a = \frac{4 \pm \sqrt{16+48}}{6} \Rightarrow a = 2$ $V_1 = a^3 = 8, \quad V_2 = (a+2)^3 = 64 \Rightarrow \frac{V_2}{V_1} = \frac{64}{8} = 8$	
10.	 <p>Iz slicnosti trouglova je:</p> $\frac{b-x}{x} = \frac{b}{a} \Rightarrow ab - ax = bx \Rightarrow (a+b)x = ab \Rightarrow x = \frac{ab}{a+b} = \frac{6}{5}$	

<b>UNIVERZITET U TUZLI</b> <b>Fakultet elektrotehnike</b> <b>Tuzla, 03.07.2006.godine</b>	<b>KVALIFIKACIONI ISPIT IZ</b> <b>MATEMATIKE</b>	<b>GRUPA A</b>
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1.	Vrijednost izraza $\frac{a}{a-1} + \frac{4a^2 - a}{1-a^3} + \frac{1}{a^2 + a + 1}$ je: a) $\frac{1}{a^2 + a + 1}$ b) $\frac{a-1}{a^2 + a + 1}$ c) $\frac{(a-1)^2}{a^2 + a + 1}$
2.	Vrijednost parametra $m$ u jednacini $x^2 - mx + 2 = 0$ takav da je zbir kvadrata rješenja jednacine jednak 12 je: a) $\pm 2$ b) $\pm 3$ c) $\pm 4$
3.	Broj rješenja jednacine $\frac{x-1}{1+\sqrt{x}} + \frac{1-\sqrt{x}}{2} = 4$ je: a) jedno rješenje      b) dva rješenja      c) tri rješenja
4.	Ako je $z = 2 - i$ vrijednost izraza $\frac{z + \bar{z}}{1 - z\bar{z}}$ je: a) -1      b) 0      c) 1
5.	Rješenje nejednacine $ 2x+1  + x \geq 6$ je: a) $x \in (-\infty, -7] \cup \left[\frac{5}{2}, \infty\right)$ b) $[-7, \infty)$ c) $x \in (-\infty, -7] \cup \left[\frac{7}{3}, \infty\right)$
6.	Rješenje nejednacine $x^{\log_1 x} > x$ je: a) $\left(-\infty, \frac{1}{2}\right) \cup (1, \infty)$ b) $\left(-1, \frac{1}{2}\right) \cup (1, \infty)$ c) $(-\infty, 0) \cup (1, \infty)$
7.	Rješenje jednacine $2 \cdot 4^{\sin^2 x} - 3 \cdot 4^{\cos^2 x} + 2 = 0$ koje se nalazi u prvom kvadrantu zadovoljava jednacinu: a)      b)      c)
8.	Rješenje logaritamske jednacine $\log_{32} 2x - \log_8 4x + \log_2 x = 3$ je: a)      b)      c)
9.	Zbir svih neparnih prirodnih brojeva manjih od 2000 je: a)      b)      c)
10.	Ako je stranica romba dužine 9, a zbir dužina dijagonala romba 25, površina romba iznosi: a)      b)      c)

<b>NAPOMENA</b>	<b>Poslije svakog zadatka ponudena su tri odgovora.</b> <b>Zaokružite odgovor koji smatrate tacnim.</b> <b>Tacno zaokružen odgovor nosi 4 boda.</b> <b>Pogrešno zaokružen odgovor nosi -2 boda.</b> <b>Nezaokružen odgovor nosi 0 bodova.</b>
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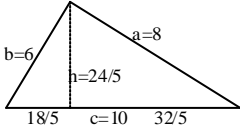
<b>UNIVERZITET U TUZLI</b> <b>Fakultet elektrotehnike</b> <b>Tuzla, 03.07.2006.godine</b>	<b>KVALIFIKACIONI ISPIT IZ</b> <b>MATEMATIKE</b>	<b>GRUPA B</b>
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1.	Vrijednost izraza $\frac{x-3}{x^2+3x+9} + \frac{1}{x-3} - \frac{3x+2x^2}{x^3-27}$ je: a) $\frac{-6}{x^2+3x+9}$ b) $\frac{-6(x-3)}{x^2+3x+9}$ c) $\frac{-6}{(x^2+3x+9)(x-3)}$
2.	Vrijednost parametra $m$ u jednacini $x^2+mx+3=0$ takav da je zbir kvadrata rješenja jednacine jednak 3 je: a) $\pm 2$ b) $\pm 3$ c) $\pm 4$
3.	Broj rješenja jednacine $\frac{1-x}{1-\sqrt{x}} - \frac{1+\sqrt{x}}{2} = 5$ je: a) jedno rješenje      b) dva rješenja      c) tri rješenja
4.	Ako je $z = \frac{-1+i}{2}$ vrijednost izraza $\frac{\bar{z}-z}{2z+3i}$ je: a) $\frac{4+i}{17}$ b) $\frac{4-i}{17}$ c) $\frac{i-4}{17}$
5.	Rješenje nejednacine $ 4x-5 -2x \leq 7$ je: a) $x \in \left(-\infty, \frac{5}{4}\right]$ b) $x \in \left[-\frac{1}{3}, 6\right]$ c) $x \in \left(-\infty, -\frac{1}{3}\right] \cup \left[\frac{5}{4}, 6\right]$
6.	Rješenje nejednacine $x^{\log_1 x} > x$ je: a) $\left(-\infty, \frac{1}{3}\right) \cup (1, \infty)$ b) $\left(-1, \frac{1}{3}\right) \cup (1, \infty)$ c) $(-\infty, 0) \cup (1, \infty)$
7.	Rješenje jednacine $4^{\sin^2 x} + 2 \cdot 4^{\cos^2 x+1} = 18$ koje se nalazi u prvom kvadrantu zadovoljava jednacinu: a)      b)      c)
8.	Rješenje logaritamske jednacine $\log_{16} x + \log_4 x + \log_2 x = 7$ je: a)      b)      c)
9.	Zbir svih neparanih prirodnih brojeva manjih od 1000 je: a) $\frac{384}{5}p$ b) $\frac{768}{5}p$ c) $\frac{1536}{5}p$
10.	Ako je stranica romba dužine 9, a jedna dijagonala romba za 2 duža od druge, površina romba iznosi: a)      b)      c)

<b>NAPOMENA</b>	<b>Poslije svakog zadatka ponudena su tri odgovora.</b> <b>Zaokružite odgovor koji smatrate tacnim.</b> <b>Tacno zaokružen odgovor nosi 4 boda.</b> <b>Pogrešno zaokružen odgovor nosi -2 boda.</b> <b>Nezaokružen odgovor nosi 0 bodova.</b>
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Fakultet elektrotehnike Tuzla, 03.07.2006.godine	RJEŠENJA ZADATAKA	GRUPA B
1.	$\frac{x-3}{x^2+3x+9} + \frac{1}{x-3} - \frac{3x+2x^2}{x^3-27} = \frac{x-3}{x^2+3x+9} + \frac{1}{x-3} - \frac{3x+2x^2}{(x-3)(x^2+3x+9)} =$ $= \frac{(x-3)^2 + (x^2+3x+9) - 3x - 2x^2}{(x-3)(x^2+3x+9)} = \frac{-6x+18}{(x-3)(x^2+3x+9)} = \frac{-6(x-3)}{(x-3)(x^2+3x+9)} = \frac{-6}{x^2+3x+9}$	
2.	$x^2 + bx + c = (x - x_1)(x - x_2) = x^2 - (x_1 + x_2)x + x_1x_2$ pa je: $x_1 + x_2 = -m$ i $x_1x_2 = 3$ . Kako mora biti: $x_1^2 + x_2^2 = 3 \Rightarrow x_1^2 + 2x_1x_2 + x_2^2 - 2x_1x_2 = 3 \Rightarrow m^2 - 6 = 3 \Rightarrow m^2 = 9 \Rightarrow m = \pm 3$	
3.	$\frac{1-x}{1-\sqrt{x}} - \frac{1+\sqrt{x}}{2} = 5 \Rightarrow \frac{(1+\sqrt{x})(1-\sqrt{x})}{1-\sqrt{x}} - \frac{1+\sqrt{x}}{2} = 5 \Rightarrow (1+\sqrt{x}) - \frac{1+\sqrt{x}}{2} = 5 \Rightarrow$ $\frac{1+\sqrt{x}}{2} = 5 \Rightarrow \sqrt{x} = 9 \Rightarrow x = 81$	
4.	$\frac{\bar{z} - z}{2z + 3i} = \frac{\frac{-1-i}{2} - \frac{-1+i}{2}}{2\frac{-1+i}{2} + 3i} = \frac{-2i}{-2+8i} = \frac{i(1+4i)}{(1-4i)(1+4i)} = \frac{i-4}{17}$	
5.	$ 4x-5  = \begin{cases} 4x-5, x \geq \frac{5}{4} \\ -4x+5, x < \frac{5}{4} \end{cases}$ pa je $\begin{cases} x \in \left(-\infty, \frac{5}{4}\right), -4x+5-2x \leq 7 \Rightarrow x \geq -\frac{1}{3} \\ x \in \left(\frac{5}{4}, \infty\right), 4x-5-2x \leq 7 \Rightarrow x \leq 6 \end{cases}$ pa je rješenje $x \in \left[-\frac{1}{3}, \frac{5}{4}\right] \cup \left[\frac{5}{4}, 6\right]$ , odnosno $x \in \left[-\frac{1}{3}, 6\right]$	
6.	$x^{\log x} > x \Rightarrow \log_{1/3} x \log_{1/3} x > \log_{1/3} x \Rightarrow t(t-1) > 0 \Rightarrow t \in (-\infty, 0) \cup (1, \infty) \Rightarrow x \in \left(0, \frac{1}{3}\right) \cup (1, \infty)$	
7.	$9^{\sin^2 x} + 9^{\cos^2 x} = 6 \Rightarrow 9^{\sin^2 x} + 9^{1-\sin^2 x} = 6 \Rightarrow 9^{\sin^2 x} + \frac{9}{9^{\sin^2 x}} = 6 \Rightarrow t + \frac{9}{t} - 6 = 0 \Rightarrow t^2 - 6t + 9 = 0 \Rightarrow (t-3)^2 = 0 \Rightarrow t = 3 \Rightarrow$ $9^{\sin^2 x} = 3 \Rightarrow 3^{2\sin^2 x} = 3^1 \Rightarrow 2\sin^2 x = 1 \Rightarrow \sin^2 x = \frac{1}{2} \Rightarrow \sin x = \pm \frac{\sqrt{2}}{2} \Rightarrow x = \frac{\pi}{4} + k\frac{\pi}{2}, k = 0, \pm 1, \pm 2, \dots$	
8.	$\frac{2\sin a - \sin 2a}{2\sin a + \sin 2a} = \frac{2\sin a - 2\sin a \cos a}{2\sin a + 2\sin a \cos a} = \frac{1 - \cos a}{1 + \cos a} = \frac{\sin^2 \frac{a}{2} + \cos^2 \frac{a}{2} - \cos^2 \frac{a}{2} + \sin^2 \frac{a}{2}}{\sin^2 \frac{a}{2} + \cos^2 \frac{a}{2} + \cos^2 \frac{a}{2} - \sin^2 \frac{a}{2}} = \frac{2\sin^2 \frac{a}{2}}{2\cos^2 \frac{a}{2}} = \operatorname{tg}^2 \frac{a}{2}$	
9.	 $V = h^2 pc - \frac{1}{3} h^2 pk_1 - \frac{1}{3} h^2 pk_2 = h^2 p \left( c - \frac{k_1 + k_2}{3} \right) = h^2 p \left( c - \frac{c}{3} \right) = \frac{2}{3} h^2 cp$ $V = \frac{2}{3} \frac{576}{25} 10p = \frac{768}{5} p$	
10.	$1 - \frac{60}{100} = 0.4, \quad 0.4 + x \cdot 0.4 = 1 \Rightarrow 0.4x = 0.6 \Rightarrow x = \frac{0.6}{0.4} = 1.5 = 150\%$	

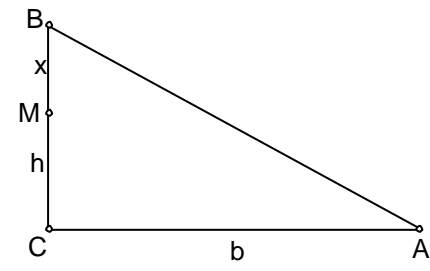




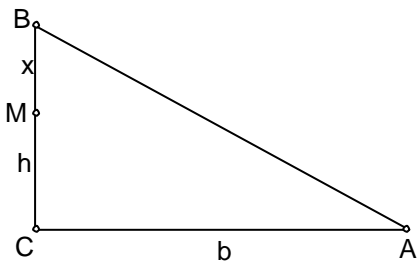
Fakultet elektrotehnike Tuzla, 01.09.2005.godine	RJEŠENJA ZADATAKA	GRUPA A
1.	$\frac{\frac{2a}{a^2+2ab} + \frac{4b}{a^2-4b^2} - \frac{b}{ab-2b^2}}{1 - \frac{a^2-4b^2-2}{a^2-4b^2}} = \frac{\frac{2ab(a-2b)+4ab^2-ab(a+2b)}{ab(a^2-4b^2)}}{\frac{a^2-4b^2-a^2+4b^2+2}{a^2-4b^2}} = \frac{ab(a-2b)}{2ab} = \frac{a-2b}{2}$	
2.	$\left  \frac{x+2}{x-1} \right  \geq 2 \Leftrightarrow \frac{x+2}{x-1} \leq -2 \vee \frac{x+2}{x-1} \geq 2 \Leftrightarrow \frac{x+2}{x-1} + 2 \leq 0 \vee \frac{x+2}{x-1} - 2 \geq 0 \Leftrightarrow \frac{3x}{x-1} \leq 0 \vee \frac{-x+4}{x-1} \geq 0 \Leftrightarrow$ $x \in [0,1) \vee x \in (1,4] \Leftrightarrow x \in [0,1) \cup (1,4]$	
3.	$3^{4x} + 3^{2x} = 20 \Rightarrow (3^{2x})^2 + 3^{2x} - 20 = 0 \Rightarrow t^2 + t - 20 = 0$ gdje je $t = 3^{2x}$ $t_{1,2} = \frac{-1 \pm \sqrt{1+80}}{2} \Rightarrow t_1 = 4, t_2 = -5 \Rightarrow 3^{2x_1} = 4 \Rightarrow \log_3 3^{2x_1} = \log_3 2^2 \Rightarrow$ $2x_1 \log_3 3 = 2 \log_3 2 \Rightarrow x_1 = \log_3 2$	
4.	$9^{ 3x-1 } = 3^{8x-2} \Rightarrow 3^{2 3x-1 } = 3^{8x-2} \Rightarrow 2 3x-1  = 8x-2 \Rightarrow  3x-1  = 4x-1$ Za $x \geq \frac{1}{3}$ je $ 3x-1  = 3x-1$ pa je: $3x-1 = 4x-1 \Rightarrow x = 0 \notin \left[ \frac{1}{3}, \infty \right)$ Za $x < \frac{1}{3}$ je $ 3x-1  = -3x+1$ pa je: $-3x+1 = 4x-1 \Rightarrow x = \frac{2}{7} \in \left( -\infty, \frac{1}{3} \right)$ , tj. postoji jedno rješenje.	
5.	$\sqrt{x \log \sqrt{x}} = 10 \Rightarrow x^{\log \sqrt{x}} = 100 \Rightarrow \log x^{\log \sqrt{x}} = \log 100 \Rightarrow \log \sqrt{x} \log x = 2 \Rightarrow$ $\log x^{\frac{1}{2}} \log x = 2 \Rightarrow \frac{1}{2} \log x \log x = 2 \Rightarrow \log^2 x = 4 \Rightarrow \log x = \pm 2 \Rightarrow x_1 = 100, x_2 = \frac{1}{100}$	
6.	$\frac{2x+1}{x-1} \geq 3 \Rightarrow \frac{2x+1}{x-1} - 3 \geq 0 \Rightarrow \frac{2x+1-3x+3}{x-1} \geq 0 \Rightarrow \frac{-x+4}{x-1} \geq 0 \Rightarrow$ $-x+4 \geq 0 \wedge x-1 > 0 \Rightarrow x \leq 4 \wedge x > 1 \vee -x+4 \leq 0 \wedge x-1 < 0 \Rightarrow x \geq 4 \wedge x < 0$	
7.	$x^4 - 2x^3 + ax^2 - x + 2 = x^4 - 3x^3 + 2x^2 + x^3 - 2x^2 + ax^2 - x + 2 =$ $= x^4 - 3x^3 + 2x^2 + x^3 - 3x^2 + 2x + x^2 - 2x + ax^2 - x + 2 =$ $= x^4 - 3x^3 + 2x^2 + x^3 - 3x^2 + 2x + (1+a)x^2 - 3x + 2 =$ $= x^2(x^2 - 3x + 2) + x(x^2 - 3x + 2) + (1+a)x^2 - 3x + 2$ pa je $a = 0$	
8.	$f(x) = -x^2 + 4x - k$ . Kvadratna funkcija $f(x)$ ne smije imati realne korijene, odnosno: $D = b^2 - 4ac < 0 \Rightarrow 16 - 4k < 0 \Rightarrow k > 4$ .	
9.	$\cos^2 \frac{x+y}{2} - \sin^2 \frac{x-y}{2} = \frac{1+\cos(x+y)}{2} - \frac{1-\cos(x-y)}{2} =$ $= \frac{\cos(x+y) + \cos(x-y)}{2} = \frac{2 \cos x \cos y}{2} = \cos x \cos y$	
10.	$\begin{cases} b+h = c+x \\ (h+x)^2 + b^2 = c^2 \end{cases} \Rightarrow c = b+h-x \Rightarrow (h+x)^2 + b^2 = (b+h-x)^2 \Rightarrow$ $h^2 + 2hx + x^2 + b^2 = (b+h)^2 - 2x(b+h) + x^2 \Rightarrow 2x(2h+b) = 2bh \Rightarrow x = \frac{bh}{(2h+b)} = \frac{5}{7}$	

Fakultet elektrotehnike Tuzla, 01.09.2005.godine	RJEŠENJA ZADATAKA	GRUPA B
1.	$\frac{1 - \frac{x-3y}{x+y}}{\frac{3x+y}{x-y} - 3} \cdot \left( \frac{1}{1 + \frac{y}{x}} - \frac{1}{1 - \frac{y}{x}} + \frac{\frac{x}{y} + \frac{y}{x}}{\frac{x}{y} \cdot \frac{y}{x}} \right) = \frac{x+y-x+3y}{x+y} : \left( \frac{x}{x+y} - \frac{x}{x-y} + \frac{x^2+y^2}{x^2-y^2} \right) =$ $= \frac{4y(x-y)}{4y(x+y)} : \frac{x(x-y) - x(x+y) + x^2 + y^2}{x^2 - y^2} = \frac{x-y}{x+y} : \frac{x^2 - 2xy + y^2}{(x+y)(x-y)} = \frac{x-y}{x+y} : \frac{(x-y)^2}{(x+y)(x-y)} = 1$	<p>a)                      b)                      c)</p>
2.	$\left  \frac{x-3}{x+1} \right  \leq \frac{1}{2} \Leftrightarrow \frac{x-3}{x+1} \geq -\frac{1}{2} \wedge \frac{x-3}{x+1} \leq \frac{1}{2} \Leftrightarrow \frac{x-3}{x+1} + \frac{1}{2} \geq 0 \wedge \frac{x-3}{x+1} - \frac{1}{2} \leq 0 \Leftrightarrow \frac{3x-5}{2(x+1)} \geq 0 \wedge \frac{x-7}{2(x+1)} \leq 0$ $x \in (-\infty, -1) \cup \left[ \frac{5}{3}, \infty \right) \wedge x \in (-1, 7] \Leftrightarrow x \in \left[ \frac{5}{3}, 7 \right]$	<p>a)                      b)                      c)</p>
3.	$2^{4x} + 2^{2x} = 90 \Rightarrow (2^{2x})^2 + 2^{2x} - 90 = 0 \Rightarrow t^2 + t - 90 = 0 \text{ gdje je } t = 2^{2x}$ $t_{1,2} = \frac{-1 \pm \sqrt{1+360}}{2} \Rightarrow t_1 = 9, t_2 = -10 \Rightarrow 2^{2x_1} = 9 \Rightarrow \log_2 2^{2x_1} = \log_2 3^2 \Rightarrow$ $2x_1 \log_2 2 = 2 \log_2 3 \Rightarrow x_1 = \log_2 3$	<p>a) <b>log<sub>2</sub> 3</b>                      b) <b>log<sub>3</sub> 2</b>                      c) <b>√3</b></p>
4.	$9^{ 3x+1 } = 3^{8x+2} \Rightarrow 3^{2 3x+1 } = 3^{8x+2} \Rightarrow 2 3x+1  = 8x+2 \Rightarrow  3x+1  = 4x+1$ <p>Za <math>x \geq -\frac{1}{3}</math> je <math> 3x+1  = 3x+1</math> pa je: <math>3x+1 = 4x+1 \Rightarrow x = 0 \in \left[ -\frac{1}{3}, \infty \right)</math></p> <p>Za <math>x &lt; -\frac{1}{3}</math> je <math> 3x+1  = -3x-1</math> pa je: <math>-3x-1 = 4x+1 \Rightarrow x = -\frac{2}{7} \notin \left( -\infty, -\frac{1}{3} \right)</math> tj. ima jedno rješenje.</p>	<p>a) nijedno                      b) jedno                      c) dva</p>
5.	$\sqrt{x^{\log \sqrt{x}}} = \sqrt{\sqrt{10}} \Rightarrow x^{\log \sqrt{x}} = \sqrt{10} \Rightarrow \log x^{\log \sqrt{x}} = \log 10^{\frac{1}{2}} \Rightarrow \log \sqrt{x} \log x = \frac{1}{2} \Rightarrow$ $\log x \cdot \frac{1}{2} \log x = \frac{1}{2} \Rightarrow \frac{1}{2} \log x \log x = \frac{1}{2} \Rightarrow \log^2 x = 1 \Rightarrow \log x = \pm 1 \Rightarrow x_1 = 10, x_2 = \frac{1}{10}$	<p>a) -1                      b) 0                      c) 1</p>
6.	$\frac{2x+1}{-x+1} \geq 1 \Rightarrow \frac{2x+1}{-x+1} - 1 \geq 0 \Rightarrow \frac{2x+1+x-1}{-x+1} \geq 0 \Rightarrow \frac{3x}{-x+1} \geq 0 \Rightarrow$ $x \geq 0 \wedge -x+1 > 0 \Rightarrow x \geq 0 \wedge x < 1 \vee x \leq 0 \wedge -x+1 < 0 \Rightarrow x \leq 0 \wedge x > 1$	<p>a) [-1,1)                      b) [0,1)                      c) [0,2)</p>
7.	$x^4 + ax^3 - 6x^2 + 3x + 2 = x^4 - 3x^3 + 2x^2 + 3x^3 + ax^3 - 8x^2 + 3x + 2 =$ $= x^4 - 3x^3 + 2x^2 + (a+3)x^3 - 3(a+3)x^2 + 2(a+3)x + 3(a+3)x^2 - 2(a+3)x - 8x^2 + 3x + 2 =$ $= x^2(x^2 - 3x + 2) + (a+3)x(x^2 - 3x + 2) + (3a+1)x^2 - (2a+3)x + 2 =$ $= x^2(x^2 - 3x + 2) + x(a+3)(x^2 - 3x + 2) + (3a+1)x^2 - 3(3a+1)x + 2(3a+1) + 7ax - 6a \text{ pa je } a = 0$	<p>a) -1                      b) 0                      c) 1</p>
8.	$f(x) = x^2 + 4x - k. \text{ Kvadratna funkcija } f(x) \text{ ne smije imati realne korijene, odnosno:}$ $D = b^2 - 4ac < 0 \Rightarrow 16 + 4k < 0 \Rightarrow k < -4.$	<p>a) <b>(-∞, -4)</b>                      b) <b>(-∞, -2)</b>                      c) <b>(-∞, 0)</b></p>
9.	$\sin^2 \frac{x+y}{2} - \sin^2 \frac{x-y}{2} = \frac{1 - \cos(x+y)}{2} - \frac{1 - \cos(x-y)}{2} =$ $= \frac{-\cos(x+y) + \cos(x-y)}{2} = \frac{-2 \sin x \sin(-y)}{2} = \sin x \sin y$	<p>a) <b>cos x cos y</b>                      b) <b>sin x cos y</b>                      c) <b>sin x sin y</b></p>
10.	$\begin{cases} b+h=c+x \\ (h+x)^2 + b^2 = c^2 \end{cases} \Rightarrow c = b+h-x \Rightarrow (h+x)^2 + b^2 = (b+h-x)^2 \Rightarrow$ $h^2 + 2hx + x^2 + b^2 = (b+h)^2 - 2x(b+h) + x^2 \Rightarrow 2x(2h+b) = 2bh \Rightarrow x = \frac{bh}{(2h+b)} = \frac{6}{7}$	<p>a) 5/7                      b) 6/7                      c) 1</p>

<b>JU UNIVERZITET U TUZLI</b> <b>Fakultet elektrotehnike</b> <b>Tuzla, 01.09.2004.godine</b>	<b>KVALIFIKACIONI ISPIT IZ</b> <b>MATEMATIKE</b>	<b>GRUPA A</b>
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1.	Ako je $a = \frac{\sqrt{5}+1}{2}$ i $b = \frac{\sqrt{5}-1}{2}$ onda je $a^2 - b^2$ jednako: a) $\sqrt{5}-1$ b) $\sqrt{5}$ c) 3
2.	Vrijednost izraza $\sqrt{7+\sqrt{48}} + \sqrt{7-\sqrt{48}}$ je: a) $\sqrt{3}$ b) $2\sqrt{3}$ c) 4
3.	Rješenje jednacine $3^{4x} + 3^{2x} = 20$ je: a) $\log_2 3$ b) $\log_3 2$ c) $\sqrt{3}$
4.	Broj rješenja jednacine $9^{ 3x-1 } = 3^{8x-2}$ je: a) nijedno      b) jedno      c) dva
5.	Proizvod rješenja jednacine $\sqrt{x^{\log \sqrt{x}}} = 10$ iznosi: a) -1      b) 0      c) 1
6.	Rješenje nejednacine $\frac{2x+1}{x-1} \geq 3$ je skup: a) (1,2]      b) (1,3]      c) (1,4]
7.	Odrediti parametar a tako da je polinom $x^4 - 2x^3 + ax^2 - x + 2$ djeljiv sa $x^2 - 3x + 2$ . a) -1      b) 0      c) 1
8.	Funkcija $f(x) = -x^2 + 4x - k$ prima samo negativne vrijednosti ako je k iz intervala: a) (0,∞)      b) (2,∞)      c) (4,∞)
9.	Izraz $\cos^2 \frac{x+y}{2} - \sin^2 \frac{x-y}{2}$ jednak je: a) $\cos x \cos y$ b) $\sin x \cos y$ c) $\sin x \sin y$
10.	<div style="display: flex; align-items: flex-start;"> <div style="flex: 1;">  </div> <div style="flex: 2; padding-left: 20px;"> <p>Za pravougli trougao na slici poznate su dužine <math>b = AC = 5</math> i <math>h = CM = 1</math>. Ako je <math>AB + BM = AC + CM</math> koliko iznosi dužina <math>x = BM</math>.</p> </div> </div> <p>a) <math>\frac{5}{7}</math>      b) <math>\frac{6}{7}</math>      c) 1</p>

<b>NAPOMENA</b>	<b>Poslije svakog zadatka ponudena su tri odgovora.</b> <b>Zaokružite odgovor koji smatrate tacnim.</b> <b>Tacno zaokružen odgovor nosi 4 boda.</b> <b>Pogrešno zaokružen odgovor nosi -2 boda.</b> <b>Nezaokružen odgovor nosi 0 bodova.</b>
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1.	Ako je $a = \frac{\sqrt{5}+1}{2}$ i $b = \frac{\sqrt{5}-1}{2}$ onda je $a^2 + b^2$ jednako: a) $\sqrt{5}-1$ b) $\sqrt{5}$ c) 3
2.	Vrijednost izraza $\sqrt{7+\sqrt{48}} - \sqrt{7-\sqrt{48}}$ je: a) $\sqrt{3}$ b) $2\sqrt{3}$ c) 4
3.	Rješenje jednacine $2^{4x} + 2^{2x} = 90$ je: a) $\log_2 3$ b) $\log_3 2$ c) $\sqrt{3}$
4.	Broj rješenja jednacine $9^{ 3x+1 } = 3^{8x+2}$ je: a) nijedno      b) jedno      c) dva
5.	Proizvod rješenja jednacine $\sqrt{x^{\log \sqrt{x}}} = \sqrt{\sqrt{10}}$ iznosi: a) -1      b) 0      c) 1
6.	Rješenje nejednacine $\frac{2x+1}{-x+1} \geq 1$ je skup: a) $[-1,1)$ b) $[0,1)$ c) $[0,2)$
7.	Odrediti parametar a tako da je polinom $x^4 + ax^3 - 6x^2 + 3x + 2$ djeljiv sa $x^2 - 3x + 2$ . a) -1      b) 0      c) 1
8.	Funkcija $f(x) = x^2 + 4x - k$ prima samo pozitivne vrijednosti ako je k iz intervala: a) $(-\infty, -4)$ b) $(-\infty, -2)$ c) $(-\infty, 0)$
9.	Izraz $\sin^2 \frac{x+y}{2} - \sin^2 \frac{x-y}{2}$ jednak je: a) $\cos x \cos y$ b) $\sin x \cos y$ c) $\sin x \sin y$
10.	 <p>Za pravougli trougao na slici poznate su dužine <math>b = AC = 3</math> i <math>h = CM = 2</math>. Ako je <math>AB + BM = AC + CM</math> koliko iznosi dužina <math>x = BM</math>.</p> <p>a) <math>\frac{5}{7}</math>      b) <math>\frac{6}{7}</math>      c) 1</p>

**NAPOMENA**

Poslije svakog zadatka ponudena su tri odgovora.  
Zaokružite odgovor koji smatrate tačnim.  
Tačno zaokružen odgovor nosi 4 boda.  
Pogrešno zaokružen odgovor nosi -2 boda.  
Nezaokružen odgovor nosi 0 bodova.



Fakultet elektrotehnike Tuzla, 01.09.2004.godine	RJEŠENJA ZADATAKA	GRUPA A
1.	$a^2 = \left(\frac{\sqrt{5}+1}{2}\right)^2 = \frac{3+\sqrt{5}}{2}, \quad b^2 = \left(\frac{\sqrt{5}-1}{2}\right)^2 = \frac{3-\sqrt{5}}{2} \Rightarrow a^2 - b^2 = \frac{3+\sqrt{5}}{2} - \frac{3-\sqrt{5}}{2} = \sqrt{5}$	
	<p>a) <math>\sqrt{5}-1</math>                      b) <math>\sqrt{5}</math>                      c) 3</p>	
2.	$\sqrt{7+\sqrt{48}} + \sqrt{7-\sqrt{48}} = \sqrt{7+4\sqrt{3}} + \sqrt{7-4\sqrt{3}} = \sqrt{(2+\sqrt{3})^2} + \sqrt{(2-\sqrt{3})^2} = (2+\sqrt{3}) + (2-\sqrt{3}) = 4$	
	<p>a) <math>\sqrt{3}</math>                              b) <math>2\sqrt{3}</math>                      c) 4</p>	
3.	$3^{4x} + 3^{2x} = 20 \Rightarrow (3^{2x})^2 + 3^{2x} - 20 = 0 \Rightarrow t^2 + t - 20 = 0 \text{ gdje je } t = 3^{2x}$ $t_{1,2} = \frac{-1 \pm \sqrt{1+80}}{2} \Rightarrow t_1 = 4, t_2 = -5 \Rightarrow 3^{2x_1} = 4 \Rightarrow \log_3 3^{2x_1} = \log_3 2^2 \Rightarrow$ $2x_1 \log_3 3 = 2 \log_3 2 \Rightarrow x_1 = \log_3 2$	
	<p>a) <math>\log_2 3</math>                      b) <math>\log_3 2</math>                      c) <math>\sqrt{3}</math></p>	
4.	$9^{ 3x-1 } = 3^{8x-2} \Rightarrow 3^{2 3x-1 } = 3^{8x-2} \Rightarrow 2 3x-1  = 8x-2 \Rightarrow  3x-1  = 4x-1$ <p>Za <math>x \geq \frac{1}{3}</math> je <math> 3x-1  = 3x-1</math> pa je: <math>3x-1 = 4x-1 \Rightarrow x = 0 \notin \left[\frac{1}{3}, \infty\right)</math></p> <p>Za <math>x &lt; \frac{1}{3}</math> je <math> 3x-1  = -3x+1</math> pa je: <math>-3x+1 = 4x-1 \Rightarrow x = \frac{2}{7} \in \left(-\infty, \frac{1}{3}\right)</math>, tj. postoji jedno rješenje.</p>	
	<p>a) nijedno                      b) jedno                      c) dva</p>	
5.	$\sqrt{x} \log \sqrt{x} = 10 \Rightarrow x^{\log \sqrt{x}} = 100 \Rightarrow \log x^{\log \sqrt{x}} = \log 100 \Rightarrow \log \sqrt{x} \log x = 2 \Rightarrow$ $\log x^{\frac{1}{2}} \log x = 2 \Rightarrow \frac{1}{2} \log x \log x = 2 \Rightarrow \log^2 x = 4 \Rightarrow \log x = \pm 2 \Rightarrow x_1 = 100, x_2 = \frac{1}{100}$	
	<p>a) -1                              b) 0                              c) 1</p>	
6.	$\frac{2x+1}{x-1} \geq 3 \Rightarrow \frac{2x+1}{x-1} - 3 \geq 0 \Rightarrow \frac{2x+1-3x+3}{x-1} \geq 0 \Rightarrow \frac{-x+4}{x-1} \geq 0 \Rightarrow$ $-x+4 \geq 0 \wedge x-1 > 0 \Rightarrow x \leq 4 \wedge x > 1 \quad \vee \quad -x+4 \leq 0 \wedge x-1 < 0 \Rightarrow x \geq 4 \wedge x < 0$	
	<p>a) (1,2]                      b) (1,3]                      c) (1,4]</p>	
7.	$x^4 - 2x^3 + ax^2 - x + 2 = x^4 - 3x^3 + 2x^2 + x^3 - 2x^2 + ax^2 - x + 2 =$ $= x^4 - 3x^3 + 2x^2 + x^3 - 3x^2 + 2x + x^2 - 2x + ax^2 - x + 2 =$ $= x^4 - 3x^3 + 2x^2 + x^3 - 3x^2 + 2x + (1+a)x^2 - 3x + 2 =$ $= x^2(x^2 - 3x + 2) + x(x^2 - 3x + 2) + (1+a)x^2 - 3x + 2 \text{ pa je } a = 0$	
	<p>a) -1                              b) 0                              c) 1</p>	
8.	<p><math>f(x) = -x^2 + 4x - k</math>. Kvadratna funkcija <math>f(x)</math> ne smije imati realne korijene, odnosno:</p> $D = b^2 - 4ac < 0 \Rightarrow 16 - 4k < 0 \Rightarrow k > 4.$	
	<p>a) <math>(0, \infty)</math>                      b) <math>(2, \infty)</math>                      c) <math>(4, \infty)</math></p>	
9.	$\cos^2 \frac{x+y}{2} - \sin^2 \frac{x-y}{2} = \frac{1 + \cos(x+y)}{2} - \frac{1 - \cos(x-y)}{2} =$ $= \frac{\cos(x+y) + \cos(x-y)}{2} = \frac{2 \cos x \cos y}{2} = \cos x \cos y$	
	<p>a) <math>\cos x \cos y</math>                      b) <math>\sin x \cos y</math>                      c) <math>\sin x \sin y</math></p>	
10.	$\begin{cases} b+h=c+x \\ (h+x)^2 + b^2 = c^2 \end{cases} \Rightarrow c = b+h-x \Rightarrow (h+x)^2 + b^2 = (b+h-x)^2 \Rightarrow$ $h^2 + 2hx + x^2 + b^2 = (b+h)^2 - 2x(b+h) + x^2 \Rightarrow 2x(2h+b) = 2bh \Rightarrow x = \frac{bh}{(2h+b)} = \frac{5}{7}$	
	<p>a) 5/7                              b) 6/7                              c) 1</p>	

Fakultet elektrotehnike Tuzla, 01.09.2004.godine	RJEŠENJA ZADATAKA	GRUPA B
1.	$a^2 = \left(\frac{\sqrt{5}+1}{2}\right)^2 = \frac{3+\sqrt{5}}{2}, b^2 = \left(\frac{\sqrt{5}-1}{2}\right)^2 = \frac{3-\sqrt{5}}{2} \Rightarrow a^2 + b^2 = \frac{3+\sqrt{5}}{2} + \frac{3-\sqrt{5}}{2} = 3$	
	<p>a) <math>\sqrt{5}-1</math>                      b) <math>\sqrt{5}</math>                      c) <b>3</b></p>	
2.	$\sqrt{7+\sqrt{48}} - \sqrt{7-\sqrt{48}} = \sqrt{7+4\sqrt{3}} - \sqrt{7-4\sqrt{3}} = \sqrt{(2+\sqrt{3})^2} - \sqrt{(2-\sqrt{3})^2} = (2+\sqrt{3}) - (2-\sqrt{3}) = 2\sqrt{3}$	
	<p>a) <math>\sqrt{3}</math>                              b) <b><math>2\sqrt{3}</math></b>                              c) 4</p>	
3.	$2^{4x} + 2^{2x} = 90 \Rightarrow (2^{2x})^2 + 2^{2x} - 90 = 0 \Rightarrow t^2 + t - 90 = 0 \text{ gdje je } t = 2^{2x}$ $t_{1,2} = \frac{-1 \pm \sqrt{1+360}}{2} \Rightarrow t_1 = 9, t_2 = -10 \Rightarrow 2^{2x_1} = 9 \Rightarrow \log_2 2^{2x_1} = \log_2 3^2 \Rightarrow$ $2x_1 \log_2 2 = 2 \log_2 3 \Rightarrow x_1 = \log_2 3$	
	<p>a) <b><math>\log_2 3</math></b>                      b) <math>\log_3 2</math>                      c) <math>\sqrt{3}</math></p>	
4.	$9^{ 3x+1 } = 3^{8x+2} \Rightarrow 3^{2 3x+1 } = 3^{8x+2} \Rightarrow 2 3x+1  = 8x+2 \Rightarrow  3x+1  = 4x+1$ <p>Za <math>x \geq -\frac{1}{3}</math> je <math> 3x+1  = 3x+1</math> pa je: <math>3x+1 = 4x+1 \Rightarrow x = 0 \in \left[-\frac{1}{3}, \infty\right)</math></p> <p>Za <math>x &lt; -\frac{1}{3}</math> je <math> 3x+1  = -3x-1</math> pa je: <math>-3x-1 = 4x+1 \Rightarrow x = -\frac{2}{7} \notin \left(-\infty, -\frac{1}{3}\right)</math> tj. ima jedno rješenje.</p>	
	<p>a) nijedno                      b) <b>jedno</b>                      c) dva</p>	
5.	$\sqrt{x \log \sqrt{x}} = \sqrt{\sqrt{10}} \Rightarrow x^{\log \sqrt{x}} = \sqrt{10} \Rightarrow \log x^{\log \sqrt{x}} = \log 10^{\frac{1}{2}} \Rightarrow \log \sqrt{x} \log x = \frac{1}{2} \Rightarrow$ $\log x^{\frac{1}{2}} \log x = \frac{1}{2} \Rightarrow \frac{1}{2} \log x \log x = \frac{1}{2} \Rightarrow \log^2 x = 1 \Rightarrow \log x = \pm 1 \Rightarrow x_1 = 10, x_2 = \frac{1}{10}$	
	<p>a) -1                              b) 0                              c) <b>1</b></p>	
6.	$\frac{2x+1}{-x+1} \geq 1 \Rightarrow \frac{2x+1}{-x+1} - 1 \geq 0 \Rightarrow \frac{2x+1+x-1}{-x+1} \geq 0 \Rightarrow \frac{3x}{-x+1} \geq 0 \Rightarrow$ $x \geq 0 \wedge -x+1 > 0 \Rightarrow x \geq 0 \wedge x < 1 \vee x \leq 0 \wedge -x+1 < 0 \Rightarrow x \leq 0 \wedge x > 1$	
	<p>a) <math>[-1, 1)</math>                      b) <b><math>[0, 1)</math></b>                      c) <math>[0, 2)</math></p>	
7.	$x^4 + ax^3 - 6x^2 + 3x + 2 = x^4 - 3x^3 + 2x^2 + 3x^3 + ax^3 - 8x^2 + 3x + 2 =$ $= x^4 - 3x^3 + 2x^2 + (a+3)x^3 - 3(a+3)x^2 + 2(a+3)x + 3(a+3)x^2 - 2(a+3)x - 8x^2 + 3x + 2 =$ $= x^2(x^2 - 3x + 2) + (a+3)x(x^2 - 3x + 2) + (3a+1)x^2 - (2a+3)x + 2 =$ $= x^2(x^2 - 3x + 2) + x(a+3)(x^2 - 3x + 2) + (3a+1)x^2 - 3(3a+1)x + 2(3a+1) + 7ax - 6a \text{ pa je } a = 0$	
	<p>a) -1                              b) <b>0</b>                              c) 1</p>	
8.	<p><math>f(x) = x^2 + 4x - k</math>. Kvadratna funkcija <math>f(x)</math> ne smije imati realne korijene, odnosno:</p> $D = b^2 - 4ac < 0 \Rightarrow 16 + 4k < 0 \Rightarrow k < -4.$	
	<p>a) <math>(-\infty, -4)</math>                      b) <math>(-\infty, -2)</math>                      c) <math>(-\infty, 0)</math></p>	
9.	$\frac{\sin^2 \frac{x+y}{2} - \sin^2 \frac{x-y}{2}}{2} = \frac{1 - \cos(x+y)}{2} - \frac{1 - \cos(x-y)}{2} =$ $= \frac{-\cos(x+y) + \cos(x-y)}{2} = \frac{-2 \sin x \sin(-y)}{2} = \sin x \sin y$	
	<p>a) <math>\cos x \cos y</math>                      b) <math>\sin x \cos y</math>                      c) <b><math>\sin x \sin y</math></b></p>	
10.	$\begin{cases} b+h=c+x \\ (h+x)^2 + b^2 = c^2 \end{cases} \Rightarrow c = b+h-x \Rightarrow (h+x)^2 + b^2 = (b+h-x)^2 \Rightarrow$ $h^2 + 2hx + x^2 + b^2 = (b+h)^2 - 2x(b+h) + x^2 \Rightarrow 2x(2h+b) = 2bh \Rightarrow x = \frac{bh}{(2h+b)} = \frac{6}{7}$	
	<p>a) <math>5/7</math>                              b) <b><math>6/7</math></b>                              c) 1</p>	

JU UNIVERZITET U TUZLI Fakultet elektrotehnike Tuzla, 03.07.2003.godine	<b>KVALIFIKACIONI ISPIT IZ          MATEMATIKE</b>	<b>GRUPA A</b>
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1.	Skratiti razlomak: $\frac{(x^{-1}y^2 + x^3y^{-4})^2}{x^{-4}y^3 + 2y^{-3} + x^4y^{-9}}$ . a) $x^2y$ b) $x^3y^2$ c) $xy^4$
2.	Date su funkcije: $f(x)=2x-1$ i $g(x)=2-x$ . Izracunati: $f[g^{-1}(2)]$ . a) $-1$ b) $0$ c) $1$
3.	Dvije vrste celika imaju: prva 5%, a druga 40% nikla. Koliko treba spojiti prve i druge vrste celika da bi se dobilo 140 tona celika sa 30% nikla. a) $40t_{5\%}$ i $100t_{40\%}$ b) $35t_{5\%}$ i $105t_{40\%}$ c) $30t_{5\%}$ i $110t_{40\%}$
4.	Odrediti parametre $p$ i $q$ tako da funkcija: $y=x^2+px+q$ ima minimum $-4$ za $x=-1$ . a) $p=2, q=3$ b) $p=2, q=-3$ c) $p=-2, q=-3$
5.	Skup rješenja nejednacine $ x^2 - 4x + 3  < 1$ je: a) $x \in (1,3)$ b) $x \in (2 - \sqrt{2}, 2 + \sqrt{2})$ c) $x \in (2 - \sqrt{2}, 2) \cup (2, 2 + \sqrt{2})$
6.	Skup rješenja nejednacine: $\sqrt{2x+14} > x+3$ je: a) $[-7,1)$ b) $(-7,1)$ c) $[-7,1]$
7.	Skup rješenja nejednacine: $\log(x+2) \leq 1 - \log(x-1)$ je: a) $x \in (1,3]$ b) $x \in (1,3)$ c) $x \in (0,3)$
8.	Data je prava uspravna kupa cija je izvodnica $s=10$ i visina $h=8$ . Izracunati površinu i zapreminu date kupe. a) $P = 76p, V = 96p.$ b) $P = 96p, V = 66p.$ c) $P = 96p, V = 96p.$
9.	Rješenje trigonometrijske nejednacine: $2 \cos x - \sqrt{2} \sin 2x \leq 0$ na $x \in [0, 2p]$ je: a) $x \in \left[\frac{p}{4}, \frac{p}{2}\right] \cup \left[\frac{3p}{4}, 2p\right]$ b) $x \in \left[\frac{p}{4}, \frac{p}{2}\right] \cup \left[p, \frac{3p}{2}\right]$ c) $x \in \left[\frac{p}{4}, \frac{p}{2}\right] \cup \left[\frac{3p}{4}, \frac{3p}{2}\right]$
10.	Odrediti parametar $a$ tako da imaginarni dio kompleksnog broja $z = \frac{a-2i}{2+i} + \frac{2-i}{3+i}$ iznosi $-\frac{11}{10}$ . a) $a=-1$ b) $a=0$ c) $a=1$

<b>NAPOMENA</b>	Poslije svakog zadatka ponudena su tri odgovora. Zaokružite odgovor koji smatrate tacnim. <b>Tacno</b> zaokružen odgovor nosi <b>4 boda</b> . <b>Pogrešno</b> zaokružen odgovor nosi <b>-2 boda</b> . <b>Nezaokružen</b> odgovor nosi <b>0 bodova</b> .
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JU UNIVERZITET U TUZLI Fakultet elektrotehnike Tuzla, 03.07.2003.godine	<b>KVALIFIKACIONI ISPIT IZ          MATEMATIKE</b>	<b>GRUPA B</b>
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1.	Skratiti razlomak: $\frac{(y^3 + x^4 y - 2)^2}{x^{-2} y^5 + 2x^2 + x^6 y^{-5}}$ . a) $x^2 y$ b) $x^3 y^2$ c) $xy^4$
2.	Date su funkcije: $f(x)=2x-1$ i $g(x)=2-x$ . Izracunati: $f[g^{-1}(1)]$ . a) $-1$ b) $0$ c) $1$
3.	Dvije vrste celika imaju: prva 5%, a druga 25% nikla. Koliko treba spojiti prve i druge vrste celika da bi se dobilo 140 tona celika sa 20% nikla. a) $40t_{5\%}$ i $100t_{25\%}$ b) $35t_{5\%}$ i $105t_{25\%}$ c) $30t_{5\%}$ i $110t_{25\%}$
4.	Odrediti parametre $p$ i $q$ tako da funkcija: $y=x^2+px+q$ ima minimum $0$ za $x=1$ . a) $p=2, q=1$ b) $p=-2, q=1$ c) $p=-2, q=-1$
5.	Skup rješenja nejednacine $ x^2 + 2x - 3  < 4$ je: a) $x \in (-3,1)$ b) $x \in (-1-2\sqrt{2}, -1+2\sqrt{2})$ c) $x \in (-1-2\sqrt{2}, -1) \cup (-1, -1+2\sqrt{2})$
6.	Skup rješenja nejednacine: $\sqrt{2x-1} < x+2$ je: a) $x \in \left[\frac{1}{2}, \infty\right)$ b) $x \in \left(\frac{1}{2}, \infty\right)$ c) $x \in (-2, \infty)$
7.	Skup rješenja nejednacine: $\log(x-1) - \log(x+2) \leq \log \frac{1}{2}$ je: a) $x \in (1,4]$ b) $x \in (1,4)$ c) $x \in (0,4)$
8.	Data je prava uspravna kupa cija je izvodnica $s=10$ i visina $h=6$ . Izracunati površinu i zapreminu date kupe. a) $P=128p, V=144p$ .              b) $P=144p, V=128p$ .              c) $P=144p, V=144p$ .
9.	Rješenje trigonometrijske nejednacine: $2 \sin x + \sqrt{2} \sin 2x \leq 0$ na $x \in [0, 2\pi]$ je: a) $x \in \left[\frac{p}{4}, \frac{3p}{4}\right] \cup \left[\frac{5p}{4}, 2p\right]$ b) $x \in \left[\frac{3p}{4}, p\right] \cup \left[\frac{5p}{4}, \frac{3p}{2}\right]$ c) $x \in \left[\frac{3p}{4}, p\right] \cup \left[\frac{5p}{4}, 2p\right]$
10.	Odrediti parametar $a$ tako da realni dio kompleksnog broja $z = \frac{1-ai}{1+i} + \frac{i-1}{i-2}$ iznosi $\frac{11}{10}$ . a) $a=-1$ b) $a=0$ c) $a=1$

<b>NAPOMENA</b>	Poslije svakog zadatka ponudena su tri odgovora. Zaokružite odgovor koji smatrate tacnim. <b>Tacno</b> zaokružen odgovor nosi <b>4 boda</b> . <b>Pogrešno</b> zaokružen odgovor nosi <b>-2 boda</b> . <b>Nezaokružen</b> odgovor nosi <b>0 bodova</b> .
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Fakultet elektrotehnike Tuzla, 03.07.2003.godine	RJEŠENJA ZADATAKA	GRUPA A
1.	$\frac{(x^{-1}y^2 + x^3y^{-4})^2}{x^{-4}y^3 + 2y^{-3} + x^4y^{-9}} = \frac{\left[x(x^{-2}y^2 + x^2y^{-4})^2\right]}{y^{-1}(x^{-4}y^4 + 2y^{-2} + x^4y^{-8})} = \frac{x^2(x^{-2}y^2 + x^2y^{-4})^2}{y^{-1}(x^{-2}y^2 + x^2y^{-4})^2} = x^2y$ <p>a) <math>x^2y</math>                      b) <math>x^3y^2</math>                      c) <math>xy^4</math></p>	
2.	$g(x) = 2 - x \Rightarrow x = 2 - g(x) \Rightarrow g^{-1}(x) = 2 - x \Rightarrow g^{-1}(2) = 2 - 2 = 0$ , pa je $f(0) = 2 \cdot 0 - 1 = -1$ a) $-1$ b) $0$ c) $1$	
3.	$\begin{cases} 0,05x + 0,40y = 0,30 \cdot 140 \\ x + y = 140 \Rightarrow y = 140 - x \end{cases} \Rightarrow 0,05x + 0,40(140 - x) = 0,30 \cdot 140 \Rightarrow 0,05x + 56 - 0,40x = 42 \Rightarrow$ $\Rightarrow 56 - 42 = (0,40 - 0,05)x \Rightarrow 0,35x = 14 \Rightarrow x = \frac{14}{0,35} = 40 \Rightarrow y = 140 - x = 140 - 40 = 100$ <p>a) 40t<sub>5%</sub> i 100t<sub>40%</sub>                      b) 35t<sub>5%</sub> i 105t<sub>40%</sub>                      c) 30t<sub>5%</sub> i 110t<sub>40%</sub></p>	
4.	Minimum u $x = -\frac{p}{2}$ , pa je $p = -2x = (-2)(-1) = 2$ . Vrijednost mu je $y(-1) = (-1)^2 - 2 + q = q - 1 = -4$ pa je $q = -3$ . a) $p=2, q=3$ b) $p=2, q=-3$ c) $p=-2, q=-3$	
5.	$ x^2 - 4x + 3  < 1,  x^2 - 4x + 3  = \begin{cases} x^2 - 4x + 3, & x \in (-\infty, 1] \cup [3, \infty) \\ -x^2 + 4x - 3, & x \in (1, 3) \end{cases} \Rightarrow$ Za $x \in (-\infty, 1] \cup [3, \infty)$ je $x^2 - 4x + 3 < 1 \Rightarrow x^2 - 4x + 2 < 0 \Rightarrow x \in (2 - \sqrt{2}, 2 + \sqrt{2}) \Rightarrow x \in (2 - \sqrt{2}, 1] \cup [3, 2 + \sqrt{2})$ Za $x \in (1, 3)$ je $-x^2 + 4x - 3 < 1 \Rightarrow x^2 - 4x + 4 > 0 \Rightarrow (x - 2)^2 > 0 \Rightarrow x \neq 2 \Rightarrow x \in (1, 2) \cup (2, 3)$ pa je rješenje $x \in (2 - \sqrt{2}, 2) \cup (2, 2 + \sqrt{2})$ a) $x \in (1, 3)$ b) $x \in (2 - \sqrt{2}, 2 + \sqrt{2})$ c) $x \in (2 - \sqrt{2}, 2) \cup (2, 2 + \sqrt{2})$	
6.	$\sqrt{2x+14} > x+3$ . Definirano za $2x+14 \geq 0 \Rightarrow x \geq -7$ . Za $x \in [-7, -3)$ desna je strana negativna pa je nejednacina zadovoljena. Za $x \in [-3, \infty)$ , nakon kvadriranja je: $2x+14 > x^2+6x+9 \Rightarrow x^2+4x-5 < 0 \Rightarrow (x+5)(x-1) < 0 \Rightarrow x \in (-5, 1)$ pa je rješenje $x \in [-7, 1)$ . a) $[-7, 1)$ b) $(-7, 1)$ c) $[-7, 1]$	
7.	$\log(x+2) \leq 1 - \log(x-1)$ je definisano za $x > 1$ . Slijedi: $\log(x+2) + \log(x-1) \leq 1 \Rightarrow \log(x^2+x-2) \leq 1 \Rightarrow$ $x^2+x-2 \leq 10 \Rightarrow x^2+x-12 \leq 0 \Rightarrow x \in [-4, 3]$ , pa je rješenje $x \in (1, 3]$ a) $x \in (1, 3]$ b) $x \in (1, 3)$ c) $x \in (0, 3)$	
8.	Poluprecnik $r = \sqrt{s^2 - h^2} = \sqrt{36} = 6$ . Površina je $P = rs\mathbf{p} + r^2\mathbf{p} = 96\mathbf{p}$ . Zapremina je $V = \frac{r^2\mathbf{p}h}{3} = 96\mathbf{p}$ . a) $P = 76\mathbf{p}, V = 96\mathbf{p}$ .                      b) $P = 96\mathbf{p}, V = 66\mathbf{p}$ .                      c) $P = 96\mathbf{p}, V = 96\mathbf{p}$ .	
9.	$2 \cos x - \sqrt{2} \sin 2x \leq 0 \Rightarrow 2 \cos x - 2\sqrt{2} \sin x \cos x \leq 0 \Rightarrow \cos x(1 - \sqrt{2} \sin x) \leq 0 \Rightarrow \cos x \left( \frac{\sqrt{2}}{2} - \sin x \right) \leq 0 \Rightarrow$ $\begin{cases} \cos x \geq 0 \\ \sin x \geq \frac{\sqrt{2}}{2} \end{cases} \Rightarrow \begin{cases} x \in \left[ 0, \frac{\mathbf{p}}{2} \right] \cup \left[ \frac{3\mathbf{p}}{2}, 2\mathbf{p} \right] \\ x \in \left[ \frac{\mathbf{p}}{4}, \frac{3\mathbf{p}}{4} \right] \end{cases} \Rightarrow x \in \left[ \frac{\mathbf{p}}{4}, \frac{\mathbf{p}}{2} \right] \vee \begin{cases} \cos x \leq 0 \\ \sin x \leq \frac{\sqrt{2}}{2} \end{cases} \Rightarrow \begin{cases} x \in \left[ \frac{\mathbf{p}}{2}, \frac{3\mathbf{p}}{2} \right] \\ x \in \left[ 0, \frac{\mathbf{p}}{4} \right] \cup \left[ \frac{3\mathbf{p}}{4}, 2\mathbf{p} \right] \end{cases} \Rightarrow x \in \left[ \frac{3\mathbf{p}}{4}, \frac{3\mathbf{p}}{2} \right]$ a) $x \in \left[ \frac{\mathbf{p}}{4}, \frac{\mathbf{p}}{2} \right] \cup \left[ \frac{3\mathbf{p}}{4}, 2\mathbf{p} \right]$ b) $x \in \left[ \frac{\mathbf{p}}{4}, \frac{\mathbf{p}}{2} \right] \cup \left[ \mathbf{p}, \frac{3\mathbf{p}}{2} \right]$ c) $x \in \left[ \frac{\mathbf{p}}{4}, \frac{\mathbf{p}}{2} \right] \cup \left[ \frac{3\mathbf{p}}{4}, \frac{3\mathbf{p}}{2} \right]$	
10.	$z = \frac{a-2i}{2+i} + \frac{2-i}{3+i} = \frac{a-2i}{2+i} \frac{2-i}{2-i} + \frac{2-i}{3+i} \frac{3-i}{3-i} = \frac{2a-2-4i-ai}{5} + \frac{6-1-3i-2i}{10} = \frac{4a-4-8i-2ai+5-5i}{10}$ $\text{Im}\{z\} = \frac{-8-2a-5}{10} = \frac{-13-2a}{10} = -\frac{11}{10}$ , pa je $a = -1$ . a) $a = -1$ b) $a = 0$ c) $a = 1$	

Fakultet elektrotehnike Tuzla, 03.07.2003.godine	RJEŠENJA ZADATAKA	GRUPA B
1.	$\frac{(y^3 + x^4 y^{-2})^2}{x^{-2} y^5 + 2x^2 + x^6 y^{-5}} = \frac{\left[ x(x^{-1} y^3 + x^3 y^{-2}) \right]^2}{y^{-1} (x^{-2} y^6 + 2x^2 y + x^6 y^{-4})} = \frac{x^2 (x^{-1} y^3 + x^3 y^{-2})^2}{y^{-1} (x^{-1} y^3 + x^3 y^{-2})^2} = x^2 y$ <p>a) <math>x^2 y</math>                      b) <math>x^3 y^2</math>                      c) <math>xy^4</math></p>	
2.	$g(x) = 2 - x \Rightarrow x = 2 - g(x) \Rightarrow g^{-1}(x) = 2 - x \Rightarrow g^{-1}(1) = 2 - 1 = 1$ , pa je $f(1) = 2 \cdot 1 - 1 = 1$ a) $-1$ b) $0$ c) $1$	
3.	$\begin{cases} 0,05x + 0,25y = 0,20 \cdot 140 \\ x + y = 140 \end{cases} \Rightarrow 0,05x + 0,25(140 - x) = 0,20 \cdot 140 \Rightarrow 0,05x + 35 - 0,25x = 28 \Rightarrow$ $\Rightarrow 35 - 28 = (0,25 - 0,05)x \Rightarrow 0,20x = 7 \Rightarrow x = \frac{7}{0,20} = 35 \Rightarrow y = 140 - x = 140 - 35 = 105$ <p>a) <math>40t_{5\%}</math> i <math>100t_{25\%}</math>      b) <math>35t_{5\%}</math> i <math>105t_{25\%}</math>      c) <math>30t_{5\%}</math> i <math>110t_{25\%}</math></p>	
4.	Minimum je u $x = -\frac{p}{2}$ , pa je $p = -2x = (-2)1 = -2$ . Vrijednost mu je $y(1) = (1)^2 - 2(1) + q = q - 1 = 0$ pa je $q = 1$ . a) $p=2, q=1$ b) $p=-2, q=1$ c) $p=-2, q=-1$	
5.	$\left  x^2 + 2x - 3 \right  < 4, \quad \left  x^2 + 2x - 3 \right  = \begin{cases} x^2 + 2x - 3, & x \in (-\infty, -3] \cup [1, \infty) \\ -x^2 - 2x + 3, & x \in (-3, 1) \end{cases} \Rightarrow$ Za $x \in (-\infty, -3] \cup [1, \infty)$ je $x^2 + 2x - 3 < 4 \Rightarrow x^2 + 2x - 7 < 0 \Rightarrow x \in (-1 - 2\sqrt{2}, -1 + 2\sqrt{2}) \Rightarrow x \in (-1 - 2\sqrt{2}, -3] \cup [1, -1 + 2\sqrt{2})$ Za $x \in (-3, 1)$ je $-x^2 - 2x + 3 < 4 \Rightarrow x^2 + 2x + 1 > 0 \Rightarrow (x+1)^2 > 0 \Rightarrow x \neq -1 \Rightarrow x \in (-3, -1) \cup (-1, 1)$ pa je rješenje $x \in (-1 - 2\sqrt{2}, -1) \cup (-1, -1 + 2\sqrt{2})$ a) $x \in (-3, 1)$ b) $x \in (-1 - 2\sqrt{2}, -1 + 2\sqrt{2})$ c) $x \in (-1 - 2\sqrt{2}, -1) \cup (-1, -1 + 2\sqrt{2})$	
6.	$\sqrt{2x-1} < x+2$ . Definisano za $2x-1 \geq 0 \Rightarrow x \geq \frac{1}{2}$ . Za $x \geq \frac{1}{2}$ desna je strana pozitivna pa je nakon kvadriranja: $2x-1 < x^2 + 4x + 4 \Rightarrow x^2 + 2x + 5 > 0$ što je zadovoljeno $\forall x$ pa je rješenje $x \in \left[ \frac{1}{2}, \infty \right)$ . a) $x \in \left[ \frac{1}{2}, \infty \right)$ b) $x \in \left( \frac{1}{2}, \infty \right)$ c) $x \in (-2, \infty)$	
7.	$\log(x-1) - \log(x+2) \leq \log \frac{1}{2}$ je definisano za $x > 1$ . Slijedi: $\log(x-1) - \log \frac{1}{2} \leq \log(x+2) \Rightarrow \log(2x-2) \leq \log(x+2) \Rightarrow 2x-2 \leq x+2 \Rightarrow x \leq 4$ , pa je rješenje $x \in (1, 4]$ . a) $x \in (1, 4]$ b) $x \in (1, 4)$ c) $x \in (0, 4)$	
8.	Poluprecnik $r = \sqrt{s^2 - h^2} = \sqrt{64} = 8$ . Površina: $P = rs\mathbf{p} + r^2\mathbf{p} = 144\mathbf{p}$ . Zapremina: $V = \frac{r^2\mathbf{p}h}{3} = 128\mathbf{p}$ . a) $P=144\mathbf{p}, V=144\mathbf{p}$ .                      b) $P=128\mathbf{p}, V=144\mathbf{p}$ .                      c) $P=144\mathbf{p}, V=128\mathbf{p}$ .	
9.	$2 \sin x + \sqrt{2} \sin 2x \leq 0 \Rightarrow 2 \sin x + 2\sqrt{2} \sin x \cos x \leq 0 \Rightarrow \sin x (1 + \sqrt{2} \cos x) \leq 0 \Rightarrow \sin x \left( \frac{\sqrt{2}}{2} + \cos x \right) \leq 0 \Rightarrow$ $\begin{cases} \sin x \geq 0 \\ \cos x \leq -\frac{\sqrt{2}}{2} \end{cases} \Rightarrow \begin{cases} x \in [0, \mathbf{p}] \\ x \in \left[ \frac{3\mathbf{p}}{4}, \frac{5\mathbf{p}}{4} \right] \end{cases} \Rightarrow x \in \left[ \frac{3\mathbf{p}}{4}, \mathbf{p} \right] \vee \begin{cases} \sin x \leq 0 \\ \cos x \geq -\frac{\sqrt{2}}{2} \end{cases} \Rightarrow \begin{cases} x \in [\mathbf{p}, 2\mathbf{p}] \\ x \in \left[ 0, \frac{3\mathbf{p}}{4} \right] \cup \left[ \frac{5\mathbf{p}}{4}, 2\mathbf{p} \right] \end{cases} \Rightarrow x \in \left[ \frac{5\mathbf{p}}{4}, 2\mathbf{p} \right]$ a) $x \in \left[ \frac{\mathbf{p}}{4}, \frac{3\mathbf{p}}{4} \right] \cup \left[ \frac{5\mathbf{p}}{4}, 2\mathbf{p} \right]$ b) $x \in \left[ \frac{3\mathbf{p}}{4}, \mathbf{p} \right] \cup \left[ \frac{5\mathbf{p}}{4}, \frac{3\mathbf{p}}{2} \right]$ c) $x \in \left[ \frac{3\mathbf{p}}{4}, \mathbf{p} \right] \cup \left[ \frac{5\mathbf{p}}{4}, 2\mathbf{p} \right]$	
10.	$z = \frac{1-ai}{1+i} + \frac{i-1}{i-2} = \frac{1-ai}{1+i} \frac{1-i}{1-i} + \frac{1-i}{2-i} \frac{2+i}{2+i} = \frac{1-i-ai-a}{2} + \frac{2+i-2i+1}{5} = \frac{5-5i-5ai-5a+6-2i}{10} = \frac{11-5a-7i-5a}{10}$ $\text{Re}\{z\} = \frac{11-5a}{10} = \frac{11}{10} \Rightarrow a = 0$ a) $a=-1$ b) $a=0$ c) $a=1$	

JU UNIVERZITET U TUZLI Fakultet elektrotehnike Tuzla, 03.09.2003.godine	<b>KVALIFIKACIONI ISPIT IZ          MATEMATIKE</b>	<b>GRUPA A</b>
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1.	Uprostiti izraz: $\left[ \frac{b}{a+b+c} \cdot \left( \frac{1}{a} + \frac{1}{b+c} \right) \right] : b$ . a) $\frac{1}{a(b+c)}$ b) $\frac{1}{b(a+c)}$ c) $\frac{1}{c(a+b)}$
2.	Izracunati: $\sqrt[3]{20+14\sqrt{2}} + \sqrt[3]{20-14\sqrt{2}}$ . a) 3      b) 4      c) 5
3.	Skup rješenja nejednacine: $2 x+2  -  x^2 - x - 6  \geq 0$ je: a) $x \in [0,5]$ b) $x \in [1,5]$ c) $x \in [2,5]$
4.	Rješenje jednacine $2 \cdot 3^{x+1} - 4 \cdot 3^{x-2} = 45$ je: a) veće od 3      b) jednako 3      c) manje od 3
5.	Četiri pozitivna broja čine geometrijski niz. Ako je prvi veći od drugog za 200, a treći od četvrtog za 8, odrediti drugi broj u nizu. a) 100      b) 75      c) 50
6.	Skup rješenja nejednacine: $\sqrt{2x+1} > x-1$ je: a) $x \in \left[-\frac{1}{2}, \infty\right)$ b) $x \in \left[-\frac{1}{2}, 8\right)$ c) $x \in \left[-\frac{1}{2}, 4\right)$
7.	Riješiti nejednacinu $\log_{1/2}(3x-1) > 0$ . a) $\left[-\frac{3}{2}, \frac{1}{2}\right)$ b) $\left(\frac{1}{3}, \frac{2}{3}\right)$ c) $\left(\frac{1}{3}, \frac{4}{3}\right)$
8.	Rješenje sistema $\begin{cases} x+2y-1=0 \\ 4x+7y=0 \end{cases}$ leži na pravoj: a) $y = -x-3$ b) $y = -x+3$ c) $y = x-3$
9.	Ako je $\frac{\cos 2x}{\cos x + \sin x} = 2 \sin x$ onda je $\operatorname{tg} 2x$ jednak: a) 1      b) $\frac{4}{3}$ c) $\frac{3}{4}$
10.	Tri kružnice koje se dodiruju imaju središta u vrhovima pravougloug trougla dužine kateta 3 i 4. Najveći poluprecnik jedne od kružnica iznosi: a) 2      b) 3      c) 4

<b>NAPOMENA</b>	Poslije svakog zadatka ponudena su tri odgovora. Zaokružite odgovor koji smatrate tačnim. <b>Tačno</b> zaokružen odgovor nosi <b>4 boda</b> . <b>Pogrešno</b> zaokružen odgovor nosi <b>-2 boda</b> . <b>Nezaokružen</b> odgovor nosi <b>0 bodova</b> .
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JU UNIVERZITET U TUZLI Fakultet elektrotehnike Tuzla, 03.09.2003.godine	<b>KVALIFIKACIONI ISPIT IZ          MATEMATIKE</b>	<b>GRUPA B</b>
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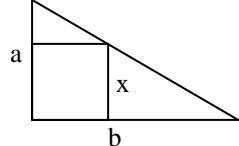
1.	Uprostiti izraz: $\left[ \frac{a}{b+c-a} \cdot \left( \frac{1}{a} - \frac{1}{b+c} \right) \right] : (a+b)$ . a) $\frac{1}{(a+b)(b+c)}$ b) $\frac{1}{(a+c)(b+c)}$ c) $\frac{1}{(a+b)(a+c)}$
2.	Izracunati: $\sqrt[3]{\sqrt{5}+2} - \sqrt[3]{\sqrt{5}-2}$ . a) 1                                      b) 2                                      c) 3
3.	Skup rješenja nejednacine: $ x^2 - x - 6  - 2 x+2  \leq 0$ je: a) $x \in [0,5]$ b) $x \in [1,5]$ c) $x \in [2,5]$
4.	Kub rješenja jednacine $\frac{3^x \cdot \sqrt[3]{9}}{3^{x+1}} = \frac{3^{x+1}}{9}$ je: a) veci od 3                      b) jednak 3                      c) manji od 3
5.	Cetiri pozitivna broja cine geometrijski niz. Ako je prvi veci od drugog za 200, a treci od cetvrtog za 8, odrediti treci broj u nizu. a) 10                                      b) 50                                      c) 100
6.	Skup rješenja nejednacine: $\sqrt{2x-1} > x-8$ je: a) $x \in \left[ \frac{1}{2}, \infty \right)$ b) $x \in \left[ \frac{1}{2}, 13 \right)$ c) $x \in \left[ \frac{1}{2}, 8 \right)$
7.	Riješiti nejednacinu $\log_{1/4} \frac{1-2x}{4} \geq 0$ . a) $\left[ -\frac{3}{2}, \frac{1}{2} \right)$ b) $\left( \frac{1}{3}, \frac{2}{3} \right)$ b) $\left( \frac{1}{3}, \frac{4}{3} \right)$
8.	Rješenje sistema $\begin{cases} 2x+y-1=0 \\ 7x+4y=0 \end{cases}$ leži na pravoj: a) $y = -x-3$ b) $y = -x+3$ c) $y = x-3$
9.	Ako je $\frac{\cos 2x}{\cos x + \sin x} = \sin x$ onda je $\operatorname{tg} 2x$ jednak: a) 1                                      b) $\frac{4}{3}$ c) $\frac{3}{4}$
10.	Tri kružnice koje se dodiruju imaju središta u vrhovima pravouglog trougla dužine kateta 6 i 8. Najveci poluprecnik jedne od kružnica iznosi: a) 5                                      b) 6                                      c) 7

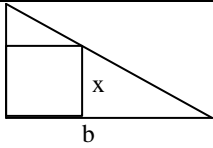
<b>NAPOMENA</b>	Poslije svakog zadatka ponudena su tri odgovora. Zaokružite odgovor koji smatrate tacnim. <b>Tacno</b> zaokružen odgovor nosi <b>4 boda</b> . <b>Pogrešno</b> zaokružen odgovor nosi <b>-2 boda</b> . <b>Nezaokružen</b> odgovor nosi <b>0 bodova</b> .
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Fakultet elektrotehnike Tuzla, 04.07.2002.godine	RJEŠENJA ZADATAKA	GRUPA A
1.	$\left\{ \left[ \frac{3}{16} : \left( 8 + \frac{1}{3} \right) + \frac{1}{25} \right]^{\frac{1}{2}} - \frac{1}{2} \right\}^{-2} = \left\{ \left[ \frac{3}{16} : \frac{25}{3} + \frac{1}{25} \right]^{\frac{1}{2}} - \frac{1}{2} \right\}^{-2} = \left\{ \left[ \frac{9}{16 \cdot 25} + \frac{1}{25} \right]^{\frac{1}{2}} - \frac{1}{2} \right\}^{-2} =$ $\left\{ \left[ \frac{9}{16 \cdot 25} + \frac{16}{16 \cdot 25} \right]^{\frac{1}{2}} - \frac{1}{2} \right\}^{-2} = \left\{ \left[ \frac{1}{16} \right]^{\frac{1}{2}} - \frac{1}{2} \right\}^{-2} = \left\{ \frac{1}{4} - \frac{1}{2} \right\}^{-2} = \left\{ -\frac{1}{4} \right\}^{-2} = \frac{1}{\left( -\frac{1}{4} \right)^2} = \frac{1}{\frac{1}{16}} = 16$	<p>a) 8    b) <b>16</b>    c) 32</p>
2.	$\sqrt{\frac{3b+10}{b+5} - 2} : \sqrt{1 - \frac{5}{b+5}} = \sqrt{\frac{3b+10-2b-10}{b+5}} : \sqrt{\frac{b+5-5}{b+5}} = \sqrt{\frac{b}{b+5}} : \sqrt{\frac{b}{b+5}} = 1$	<p>a) <b>1</b>    b) b    c) -b</p>
3.	$\left[ \frac{(a-b)^2}{ab} + 1 \right] \cdot \left[ \frac{a}{b} - \frac{b}{a} \right] : \frac{a^3 + b^3}{ab} = \left[ \frac{a^2 - 2ab + b^2 + ab}{ab} \right] \cdot \left[ \frac{a^2 - b^2}{ab} \right] : \frac{(a+b)(a^2 - ab + b^2)}{ab} =$ $= \left[ \frac{a^2 - ab + b^2}{ab} \right] \cdot \left[ \frac{(a-b)(a+b)}{ab} \right] : \frac{(a+b)(a^2 - ab + b^2)}{ab} = \frac{a-b}{ab} = \frac{1}{b} - \frac{1}{a}$	<p>a) <math>\frac{1}{a} - \frac{1}{b}</math>    b) <math>\frac{1}{a} + \frac{1}{b}</math>    c) <math>-\frac{1}{a} + \frac{1}{b}</math></p>
4.	$3^{\frac{x+1}{x}} \cdot \left( \frac{1}{3} \right)^{x+1} = 1 \Leftrightarrow 3^{\frac{x+1}{x}} \cdot 3^{-(x+1)} = 3^0 \Leftrightarrow 3^{\frac{x+1}{x} - (x+1)} = 3^0 \Leftrightarrow \frac{x+1}{x} - (x+1) = 0$ $\Leftrightarrow \frac{(x+1) - x(x+1)}{x} = 0 \Leftrightarrow \frac{-x^2 - x + x + 1}{x} = 0 \Leftrightarrow \frac{(1-x)(1+x)}{x} = 0 \Leftrightarrow x = \pm 1$	<p>a) <b>x = ±1</b>    b) x = ±2    c) x = ±3</p>
5.	<p>Za <math>x \geq 2 \Rightarrow \frac{x-2}{x^2+2x-8} - \frac{x^2+2x-8}{x^2+2x-8} \geq 0 \Rightarrow \frac{-x^2-x+6}{x^2+2x-8} \geq 0 \Rightarrow \frac{x_1=-3, x_2=2}{x_1=-4, x_2=2} \Rightarrow</math> nema r.</p> <p>Za <math>x &lt; 2 \Rightarrow \frac{-x+2}{x^2+2x-8} - \frac{x^2+2x-8}{x^2+2x-8} \geq 0 \Rightarrow \frac{-x^2-3x+10}{x^2+2x-8} \Rightarrow \frac{x_1=-5, x_2=2}{x_1=-4, x_2=2} \Rightarrow x \in [-5, -4)</math></p>	<p>a) [-4,5)    b) [-6,-5)    c) <b>[-5,-4)</b></p>
6.	$0.1 \cdot x + 0.5 \cdot y = 0.25(x+y) \Rightarrow 0.1 \cdot \frac{x}{y} + 0.5 = 0.25 \left( \frac{x}{y} + 1 \right) \Rightarrow 0.15 \frac{x}{y} = 0.25 \Rightarrow \frac{x}{y} = \frac{0.25}{0.15} = \frac{5}{3}$	<p>a) 5:2    b) <b>5:3</b>    c) 5:4</p>
7.	$2 \sin x \cos x = \frac{1}{2} \Rightarrow \sin 2x = \frac{1}{2} \Rightarrow 2x = \frac{p}{6} + 2kp \vee 2x = \frac{5p}{6} + 2kp \Rightarrow x = \frac{p}{12} + kp \vee x = \frac{5p}{12} + kp$	<p>a) <math>\frac{p}{12}</math> i <math>\frac{7p}{12}</math>    b) <math>\frac{p}{12}</math> i <math>\frac{5p}{12}</math>    c) <math>\frac{5p}{12}</math> i <math>\frac{7p}{12}</math></p>
8.	$(x-x_1)(x-x_2) = x^2 - (x_1+x_2)x + x_1x_2$ pa je za $x^2 - 2ax + a^5 - 5 = 0$ zbir $(x_1+x_2) = 2a$	<p>a) -2a    b) 0    c) <b>2a</b></p>
9.	 <p>Iz slicnosti trouglova je:</p> $\frac{b-x}{x} = \frac{b}{a} \Rightarrow ab - ax = bx \Rightarrow (a+b)x = ab \Rightarrow x = \frac{ab}{a+b} = \frac{6}{5}$	<p>a) 4/5    b) 1    c) <b>6/5</b></p>
10.	<p>Sabiranjem jednačina je <math>2x=16 \Rightarrow x=8</math>, a oduzimanjem je <math>2y=12 \Rightarrow y=6</math>, pa je <math>\sqrt{8^2 + 6^2} = 10</math></p>	<p>a) 8    b) 9    c) <b>10</b></p>

Fakultet elektrotehnike Tuzla, 04.07.2002.godine	RJEŠENJA ZADATAKA	GRUPA B
1.	$\left\{ \left[ \frac{3}{16} : \left( 8 + \frac{1}{3} \right) + \frac{1}{25} \right]^{\frac{1}{4}} - 1 \right\}^{-4} = \left\{ \left[ \frac{3}{16} : \frac{25}{3} + \frac{1}{25} \right]^{\frac{1}{4}} - 1 \right\}^{-4} = \left\{ \left[ \frac{9}{16 \cdot 25} + \frac{1}{25} \right]^{\frac{1}{4}} - 1 \right\}^{-4} =$ $\left\{ \left[ \frac{9}{16 \cdot 25} + \frac{16}{16 \cdot 25} \right]^{\frac{1}{4}} - 1 \right\}^{-4} = \left\{ \left[ \frac{1}{16} \right]^{\frac{1}{4}} - 1 \right\}^{-4} = \left\{ \frac{1}{2} - \frac{2}{2} \right\}^{-4} = \left\{ -\frac{1}{2} \right\}^{-4} = \frac{1}{\left\{ -\frac{1}{2} \right\}^4} = \frac{1}{\frac{1}{16}} = 16$	
2.	$\sqrt{\frac{2a+3}{a+3}} - 1 : \sqrt{1 - \frac{3}{a+3}} = \sqrt{\frac{2a+3-a-3}{a+3}} : \sqrt{\frac{a+3-3}{a+3}} = \sqrt{\frac{a}{a+3}} : \sqrt{\frac{a}{a+3}} = 1$	
3.	$\left[ \frac{(a-b)^2}{ab} + 3 \right] \cdot \left[ \frac{a}{b} - \frac{b}{a} \right] : \frac{a^3 - b^3}{ab} = \left[ \frac{a^2 - 2ab + b^2 + 3ab}{ab} \right] \cdot \left[ \frac{a^2 - b^2}{ab} \right] : \frac{(a-b)(a^2 + ab + b^2)}{ab} =$ $= \left[ \frac{a^2 + ab + b^2}{ab} \right] \cdot \left[ \frac{(a-b)(a+b)}{ab} \right] : \frac{(a-b)(a^2 + ab + b^2)}{ab} = \frac{a+b}{ab} = \frac{1}{a} + \frac{1}{b}$	
4.	$2^{\frac{x+1}{x}} \cdot \left( \frac{1}{2} \right)^{x+1} = 1 \Leftrightarrow 2^{\frac{x+1}{x}} \cdot 2^{-(x+1)} = 2^0 \Leftrightarrow 2^{\frac{x+1}{x} - (x+1)} = 2^0 \Leftrightarrow \frac{x+1}{x} - (x+1) = 0$ $\Leftrightarrow \frac{(x+1) - x(x+1)}{x} = 0 \Leftrightarrow \frac{-x^2 - x + x + 1}{x} = 0 \Leftrightarrow \frac{(1-x)(1+x)}{x} = 0 \Leftrightarrow x = \pm 1$	
5.	<p>Za <math>x \geq 2 \Rightarrow \frac{x-2}{x^2+3x-10} - \frac{x^2+3x-10}{x^2+3x-10} \geq 0 \Rightarrow \frac{-x^2-2x+8}{x^2+3x-10} \geq 0 \Rightarrow \frac{x_1=-4, x_2=2}{x_1=-5, x_2=2} \Rightarrow</math> nema rj.</p> <p>Za <math>x &lt; 2 \Rightarrow \frac{-x+2}{x^2+3x-10} - \frac{x^2+3x-10}{x^2+3x-10} \geq 0 \Rightarrow \frac{-x^2-4x+12}{x^2+3x-10} \geq 0 \Rightarrow \frac{x_1=-6, x_2=2}{x_1=-5, x_2=2} \Rightarrow x \in [-6, -5)</math></p>	
6.	$0.05 \cdot x + 0.5 \cdot y = 0.25(x+y) \Rightarrow 0.05 \cdot \frac{x}{y} + 0.5 = 0.25 \left( \frac{x}{y} + 1 \right) \Rightarrow 0.20 \frac{x}{y} = 0.25 \Rightarrow \frac{x}{y} = \frac{0.25}{0.20} = \frac{5}{4}$	
7.	$2 \sin x \cos x = -\frac{1}{2} \Rightarrow \sin 2x = -\frac{1}{2} \Rightarrow 2x = \frac{7p}{6} + 2kp, 2x = \frac{11p}{6} + 2kp \Rightarrow x = \frac{7p}{12} + kp, x = \frac{11p}{12} + kp$	
8.	$(x-x_1)(x-x_2) = x^2 - (x_1+x_2)x + x_1x_2$ pa je za $x^2 - 2ax - a^5 + 5 = 0$ zbir $(x_1+x_2) = 2a$	
9.		<p>Iz slicnosti trouglova je:</p> $\frac{b-x}{x} = \frac{b}{a} \Rightarrow ab - ax = bx \Rightarrow (a+b)x = ab \Rightarrow x = \frac{ab}{a+b} = \frac{4}{3}$
10.	<p>Sabiranjem jednačina je <math>2x=8 \Rightarrow x=4</math>, a oduzimanjem je <math>2y=6 \Rightarrow y=3</math>, pa je <math>\sqrt{4^2+3^2} = 5</math></p>	

JU UNIVERZITET U TUZLI Fakultet elektrotehnike Tuzla, 04.09.2002.godine	<b>KVALIFIKACIONI ISPIT IZ          MATEMATIKE</b>	<b>GRUPA A</b>
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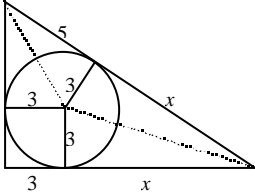
1.	Skracivanjem izraza $\frac{a^3b^{-1} - a^{-1}b^3}{ab^{-1} + a^{-1}b} \left( \frac{a^2 - b^2}{ab} \right)^{-1}$ dobija se: a) 1                                      b) a                                      c) ab
2.	Vrijednost izraza $(\sqrt{6} - \sqrt{2})\sqrt{2 + \sqrt{3}}$ je: a) 1                                      b) 2                                      c) 3
3.	Rješenje jednacine $2^{4x} - 18 \cdot 2^{2x} = -81$ je: a) $\log_3 2$ b) $\log_2 3$ c) 1
4.	Rješenje nejednacine $\frac{2x+1}{x-1} \geq 3$ je skup: a) (1,2]                                      b) (1,3]                                      c) (1,4]
5.	Broj rješenja jednacine $ x  -  1-x  = 10$ je: a) 0                                      b) 2                                      c) $\infty$
6.	Funkcija $f(x) = -x^2 + 5x - 3$ prima vrijednosti veće od 1 ukoliko je $x$ iz intervala: a) [-3,3]                                      b) (0,1)                                      c) (1,4)
7.	Ako je $\frac{\cos 2x}{\cos x + \sin x} = 2 \sin x$ onda je $\operatorname{tg} 2x$ jednak: a) 1                                      b) $\frac{4}{3}$ c) $\frac{3}{4}$
8.	Tjeme parabole $f(x) = ax^2 + bx + c$ je u tacki (-1,0). Ako parabola prolazi tackom (2,18), tada je koeficijent $c$ jednak: a) 2                                      b) 3                                      c) 4
9.	Baza kvadra je kvadrat. Zapremina kvadra jednaka je 8, a visina 4. Površina kvadra iznosi: a) $8 + 16\sqrt{2}$ b) $8 + 8\sqrt{2}$ c) $4 + 16\sqrt{2}$
10.	Tacka dodira kružnice upisane u pravougli trougao dijeli jednu katetu na dijelove dužine 3 i 5. Dužina hipotenuze trougla iznosi: a) 17                                      b) 21                                      c) 25

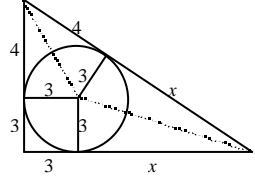
<b>NAPOMENA</b>	Poslije svakog zadatka ponudena su tri odgovora. Zaokružite odgovor koji smatrate tacnim. <b>Tacno</b> zaokružen odgovor nosi <b>4 boda</b> . <b>Pogrešno</b> zaokružen odgovor nosi <b>-2 boda</b> . <b>Nezaokružen</b> odgovor nosi <b>0 bodova</b> .
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JU UNIVERZITET U TUZLI Fakultet elektrotehnike Tuzla, 04.09.2002.godine	<b>KVALIFIKACIONI ISPIT IZ          MATEMATIKE</b>	<b>GRUPA B</b>
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1.	Pojednostavljenjem izraza $\left(a + \frac{9}{a-6}\right) \left(\frac{12}{a^2-3a} - \frac{a}{9-6a+a^2}\right)$ dobija se: a) $\frac{6-a}{a}$ b) $-\frac{6-a}{a}$ c) $\frac{6+a}{a}$
2.	Vrijednost izraza $(\sqrt{2} + \sqrt{6})\sqrt{2-\sqrt{3}}$ je: a) 1                                  b) 2                                  c) 3
3.	Rješenje jednacine $3^{6x} - 16 \cdot 3^{3x} = -64$ je: a) $\log_3 2$ b) $\log_2 3$ c) 1
4.	Rješenje nejednacine $\frac{2x+1}{-x+1} \geq 1$ je skup: a) $[-1,1)$ b) $[0,1)$ c) $[0,2)$
5.	Broj rješenja jednacine $ x  +  1-x  = 10$ je: a) 0                                  b) 2                                  c) $\infty$
6.	Funkcija $f(x) = -x^2 + 4x - 2$ prima vrijednosti veće od 1 ukoliko je $x$ iz intervala: a) $[-3,3]$ b) $(0,1)$ c) $(1,3)$
7.	Ako je $\frac{\cos 2x}{\cos x + \sin x} = \sin x$ onda je $\operatorname{tg} 2x$ jednak: a) 1                                  b) $\frac{4}{3}$ c) $\frac{3}{4}$
8.	Tjeme parabole $f(x) = ax^2 + bx + c$ je u tacki $(-2,0)$ . Ako parabola prolazi tackom $(2,16)$ , tada je koeficijent $c$ jednak: a) 2                                  b) 3                                  c) 4
9.	Baza kvadra je kvadrat. Zapremina kvadra jednaka je 12, a visina 4. Površina kvadra iznosi: a) $8 + 16\sqrt{3}$ b) $6 + 16\sqrt{3}$ c) $6 + 8\sqrt{3}$
10.	Tacka dodira kružnice upisane u pravougli trougao dijeli jednu katetu na dijelove dužine 3 i 4. Dužina hipotenuze trougla iznosi: a) 17                                  b) 21                                  c) 25

<b>NAPOMENA</b>	Poslije svakog zadatka ponudena su tri odgovora. Zaokružite odgovor koji smatrate tačnim. <b>Tačno</b> zaokružen odgovor nosi <b>4 boda</b> . <b>Pogrešno</b> zaokružen odgovor nosi <b>-2 boda</b> . <b>Nezaokružen</b> odgovor nosi <b>0 bodova</b> .
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Fakultet elektrotehnike Tuzla, 04.09.2002.godine	RJEŠENJA ZADATAKA SA KVALIFIKACIONOG ISPITA	GRUPA A
1.	$\frac{a^3 b^{-1} - a^{-1} b^3}{ab^{-1} + a^{-1} b} \left( \frac{a^2 - b^2}{ab} \right)^{-1} = \frac{\frac{a^3}{b} - \frac{b^3}{a}}{\frac{a}{b} + \frac{b}{a}} \frac{ab}{a^2 - b^2} = \frac{a^4 - b^4}{a^2 + b^2} \frac{ab}{a^2 - b^2} = \frac{a^4 - b^4}{a^4 - b^4} ab = ab$	
2.	$\begin{aligned} (\sqrt{6} - \sqrt{2})\sqrt{2 + \sqrt{3}} &= \sqrt{(\sqrt{6} - \sqrt{2})^2 (2 + \sqrt{3})} = \sqrt{(8 - 2\sqrt{12})(2 + \sqrt{3})} = \sqrt{(8 - 4\sqrt{3})(2 + \sqrt{3})} = \\ &= \sqrt{16 + 8\sqrt{3} - 8\sqrt{3} - 4 \cdot 3} = \sqrt{4} = 2 \end{aligned}$	
3.	$2^{4x} - 18 \cdot 2^{2x} = -81 \Rightarrow (2^{2x})^2 - 18 \cdot 2^{2x} + 81 = 0 \Rightarrow (2^{2x})_{1,2} = \frac{18 \pm \sqrt{324 - 324}}{2} = 9 \Rightarrow$ $2^{2x} = 9 \Rightarrow 2x \log 2 = \log 9 \Rightarrow x = \frac{(1/2) \log 9}{\log 2} = \frac{\log 9^{\frac{1}{2}}}{\log 2} = \frac{\log 3}{\log 2} = \log_2 3$	
4.	$\frac{2x+1}{x-1} \geq 3 \Rightarrow \frac{2x+1}{x-1} - 3 \geq 0 \Rightarrow \frac{2x+1}{x-1} - \frac{3x-3}{x-1} \geq 0 \Rightarrow \frac{-x+4}{x-1} \geq 0 \Rightarrow$ $\begin{cases} -x+4 \geq 0 \\ x-1 > 0 \end{cases} \Rightarrow \begin{cases} x \leq 4 \\ x > 1 \end{cases} \vee \begin{cases} -x+4 \leq 0 \\ x-1 < 0 \end{cases} \Rightarrow \begin{cases} x \geq 4 \\ x < 1 \end{cases} \Rightarrow R: x \in (1, 4]$	
5.	$ x  -  1-x  = 10 \Rightarrow  x  = \begin{cases} x, & x \geq 0 \\ -x, & x < 0 \end{cases}, \quad  1-x  = \begin{cases} 1-x, & x \leq 1 \\ x-1, & x > 1 \end{cases} \Rightarrow$ <p><math>x \in (-\infty, 0)</math>: <math>-x - (1-x) = 10 \Rightarrow -x - 1 + x = 10 \Rightarrow -1 = 10</math> <i>netac.</i></p> <p><math>x \in [0, 1]</math>: <math>x - (1-x) = 10 \Rightarrow x - 1 + x = 10 \Rightarrow 2x = 11 \Rightarrow x = 5,5 \notin [0, 1]</math></p> <p><math>x \in (1, \infty)</math>: <math>x - (x-1) = 10 \Rightarrow x - x + 1 = 10 \Rightarrow 1 = 10</math> <i>netac.</i></p>	
6.	$-x^2 + 5x - 3 > 1 \Rightarrow -x^2 + 5x - 4 > 0, \quad x_{1,2} = \frac{-5 \pm \sqrt{25 - 16}}{-2} = \frac{-5 \pm 3}{-2} \Rightarrow x_1 = 1, x_2 = 4$ <p>Kako je <math>a = -1 &lt; 0</math> parabola je konkavna pa je rješenje <math>x \in (1, 4)</math>.</p>	
7.	$\frac{\cos 2x}{\cos x + \sin x} = 2 \sin x \Rightarrow \frac{\cos^2 x - \sin^2 x}{\cos x + \sin x} = 2 \sin x \Rightarrow \frac{(\cos x - \sin x)(\cos x + \sin x)}{\cos x + \sin x} = 2 \sin x$ $\Rightarrow \cos x - \sin x = 2 \sin x \quad (\cos x + \sin x \neq 0) \Rightarrow \cos x = 3 \sin x \Rightarrow \operatorname{tg} x = \frac{1}{3} \quad (\cos x \neq 0)$ $\operatorname{tg} 2x = \frac{\sin 2x}{\cos 2x} = \frac{2 \sin x \cos x}{\cos^2 x - \sin^2 x} = \frac{2 \operatorname{tg} x}{1 - \operatorname{tg}^2 x} = \frac{2(1/3)}{1 - (1/3)^2} = \frac{2/3}{8/9} = \frac{2 \cdot 9}{3 \cdot 8} = \frac{3}{4}$	
8.	<p>Tjeme je u tacki <math>x = -\frac{b}{2a} = -1 \Rightarrow b = 2a</math>. Kako parabola prolazi tackama <math>(-1, 0)</math> i <math>(2, 18)</math> to je:</p> $\begin{cases} 0 = a - b + c \\ 18 = 4a + 2b + c \end{cases} \Rightarrow \begin{cases} 0 = a - 2a + c \\ 18 = 4a + 4a + c \end{cases} \Rightarrow \begin{cases} a = c \\ 18 = 8a + c \end{cases} \Rightarrow 18 = 9c \Rightarrow c = 2$	
9.	$V = h \cdot a^2 = 4a^2 = 8 \Rightarrow a^2 = 2 \Rightarrow a = \sqrt{2}. \quad P = 2a^2 + 4ah = 2 \cdot 2 + 4\sqrt{2} \cdot 4 = 4 + 16\sqrt{2}$	
10.		$(5+x)^2 = (3+x)^2 + (5+3)^2 \Rightarrow$ $25 + 10x + x^2 = 9 + 6x + x^2 + 64 \Rightarrow 4x = 48 \Rightarrow x = 12$ $c = 5 + x = 17$

Fakultet elektrotehnike Tuzla, 04.09.2002.godine	RJEŠENJA ZADATAKA SA KVALIFIKACIONOG ISPITA	GRUPA B
1.	$\left(a + \frac{9}{a-6}\right) \left(\frac{12}{a^2-3a} - \frac{a}{9-6a+a^2}\right) = \frac{a(a-6)+9}{a-6} \left[\frac{12}{a(a-3)} - \frac{a}{(a-3)^2}\right] = \frac{(a-3)^2}{a-6} \frac{12(a-3)-a^2}{a(a-3)^2}$ $= \frac{-a^2+12a-36}{a(a-6)} = -\frac{(a-6)^2}{a(a-6)} = -\frac{a-6}{a} = \frac{6-a}{a}$	
2.	$(\sqrt{2} + \sqrt{6})\sqrt{2-\sqrt{3}} = \sqrt{(\sqrt{2} + \sqrt{6})^2(2-\sqrt{3})} = \sqrt{(8+2\sqrt{12})(2-\sqrt{3})} = \sqrt{(8+4\sqrt{3})(2-\sqrt{3})} =$ $= \sqrt{16-8\sqrt{3}+8\sqrt{3}-4\cdot 3} = \sqrt{4} = 2$	
3.	$3^{6x} - 16 \cdot 3^{3x} = -64 \Rightarrow (3^{3x})^2 - 16 \cdot 3^{3x} + 64 = 0 \Rightarrow (3^{3x})_{1,2} = \frac{16 \pm \sqrt{256-256}}{2} = 8 \Rightarrow$ $3^{3x} = 8 \Rightarrow 3x \log 3 = \log 8 \Rightarrow x = \frac{(1/3) \log 8}{\log 3} = \frac{\log 8^{1/3}}{\log 3} = \frac{\log 2}{\log 3} = \log_3 2$	
4.	$\frac{2x+1}{-x+1} \geq 1 \Rightarrow \frac{2x+1}{-x+1} - 1 \geq 0 \Rightarrow \frac{2x+1}{-x+1} - \frac{-x+1}{-x+1} \geq 0 \Rightarrow \frac{3x}{-x+1} \geq 0 \Rightarrow$ $\begin{cases} 3x \geq 0 \\ -x+1 > 0 \end{cases} \Rightarrow \begin{cases} x \geq 0 \\ x < 1 \end{cases} \vee \begin{cases} 3x \leq 0 \\ -x+1 < 0 \end{cases} \Rightarrow \begin{cases} x \leq 0 \\ x > 1 \end{cases} \Rightarrow R: x \in [0,1]$	
5.	<p>Broj rješenja jednacine <math> x  +  1-x  = 10</math> je:</p> $ x  +  1-x  = 10 \Rightarrow  x  = \begin{cases} x, & x \geq 0 \\ -x, & x < 0 \end{cases}, \quad  1-x  = \begin{cases} 1-x, & x \leq 1 \\ x-1, & x > 1 \end{cases} \Rightarrow$ <p><math>x \in (-\infty, 0)</math>: <math>-x + (1-x) = 10 \Rightarrow -x + 1 - x = 10 \Rightarrow -2x = 9 \Rightarrow x_1 = -4,5 \in (-\infty, 0)</math></p> <p><math>x \in [0, 1]</math>: <math>x + (1-x) = 10 \Rightarrow x + 1 - x = 10 \Rightarrow 1 = 10</math> <i>netac.</i></p> <p><math>x \in (1, \infty)</math>: <math>x + (x-1) = 10 \Rightarrow x + x - 1 = 10 \Rightarrow 2x = 11 \Rightarrow x_2 = 5,5 \in (1, \infty)</math></p>	
6.	$-x^2 + 4x - 2 > 1 \Rightarrow -x^2 + 4x - 3 > 0, \quad x_{1,2} = \frac{-4 \pm \sqrt{16-12}}{-2} = \frac{-4 \pm 2}{-2} \Rightarrow x_1 = 1, x_2 = 3$ <p>Kako je <math>a = -1 &lt; 0</math> parabola je konkavna pa je rješenje <math>x \in (1, 3)</math>.</p>	
7.	$\frac{\cos 2x}{\cos x + \sin x} = \sin x \Rightarrow \frac{\cos^2 x - \sin^2 x}{\cos x + \sin x} = \sin x \Rightarrow \frac{(\cos x - \sin x)(\cos x + \sin x)}{\cos x + \sin x} = \sin x$ $\Rightarrow \cos x - \sin x = \sin x \quad (\cos x + \sin x \neq 0) \Rightarrow \cos x = 2 \sin x \Rightarrow \operatorname{tg} x = \frac{1}{2} \quad (\cos x \neq 0)$ $\operatorname{tg} 2x = \frac{\sin 2x}{\cos 2x} = \frac{2 \sin x \cos x}{\cos^2 x - \sin^2 x} = \frac{2 \operatorname{tg} x}{1 - \operatorname{tg}^2 x} = \frac{2(1/2)}{1 - (1/2)^2} = \frac{1}{3/4} = \frac{4}{3}$	
8.	<p>Tjeme je u tacki <math>x = -\frac{b}{2a} = -2 \Rightarrow b = 4a</math>. Kako parabola prolazi tackama <math>(-2, 0)</math> i <math>(2, 16)</math> to je:</p> $\begin{cases} 0 = 4a - 2b + c \\ 16 = 4a + 2b + c \end{cases} \Rightarrow \begin{cases} 0 = 4a - 8a + c \\ 16 = 4a + 8a + c \end{cases} \Rightarrow \begin{cases} 4a = c \\ 16 = 12a + c \end{cases} \Rightarrow 16 = 4c \Rightarrow c = 4$	
9.	$V = h \cdot a^2 = 4a^2 = 12 \Rightarrow a^2 = 3 \Rightarrow a = \sqrt{3}. \quad P = 2a^2 + 4ah = 2 \cdot 3 + 4\sqrt{3} \cdot 4 = 6 + 16\sqrt{3}$	
10.		$(4+x)^2 = (3+x)^2 + (4+3)^2 \Rightarrow$ $16 + 8x + x^2 = 9 + 6x + x^2 + 49 \Rightarrow 2x = 42 \Rightarrow x = 21$ $c = 4 + x = 25$



JU UNIVERZITET U TUZLI Fakultet elektrotehnike Tuzla, 04.07.2001.godine	<b>KVALIFIKACIONI ISPIT IZ          MATEMATIKE</b>	<b>GRUPA A</b>
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1.	Izracunati: $\left[\frac{2}{3} - \frac{4}{5}\left(2 - \frac{1}{2}\right)\right] : \left[-\frac{4}{3} + \frac{8}{9}\left(2 + \frac{2}{5}\right)\right]$ . a) $-2/3$ b) $-4/5$ c) $-6/7$
2.	Vrijednost izraza $\left(\sqrt[3]{6\sqrt{a^9}}\right)^4 \left(\sqrt[6]{3\sqrt{a^9}}\right)^4$ je: a) $a^{16}$ b) $a^8$ c) $a^4$
3.	Uprostiti izraz: $\frac{x^2 - y^2}{xy} - \frac{xy - y^2}{xy - x^2}$ . a) $\frac{x}{y}$ b) $\frac{x^2 - 2y^2}{xy}$ c) $\frac{x^2}{xy - y^2}$
4.	Rješenje jednacine $2 \cdot 3^{x+1} - 4 \cdot 3^{x-2} = 45$ je: a) veće od 3                      b) jednako 3                      c) manje od 3
5.	Riješiti nejednacinu $\log_{1/2}(3x - 1) > 0$ . a) $\left[-\frac{3}{2}, \frac{1}{2}\right)$ b) $\left(\frac{1}{3}, \frac{2}{3}\right)$ c) $\left(\frac{1}{3}, \frac{4}{3}\right]$
6.	Rješenje sistema $\begin{cases} x + y = 1 \\ 2x + y = -1 \end{cases}$ leži na pravoj: a) $y = 2x + 1$ b) $y = -2x + 1$ c) $y = -2x - 1$
7.	Ako je $\cos x = 0$ i $2\pi < x < 3\pi$ , tada je: a) $x = \frac{3\pi}{2}$ b) $x = \frac{5\pi}{2}$ c) $x = \frac{7\pi}{2}$
8.	Dijeljenjem polinoma $x^4 + 2x^3 - 8x^2 - 17x - 10$ sa polinomom $x^2 + 2x + 1$ dobije se kolicnik $Q(x)$ i ostatak $R(x)$ . Zbir kvadrata korijena polinoma $Q(x)$ i $R(x)$ iznosi: a) 9                      b) 19                      c) 29
9.	Riješiti nejednacinu $ x + 2  +  x  < 4$ . a) $x \in (-3, 2)$ b) $x \in (-3, 1)$ c) $x \in (-1, 3)$
10.	Kvadratu, kojem je dužina stranice $a=25$ , upisana je i opisana kružnica. Kako se odnosi obim upisane prema obimu opisane kružnice? a) $1/\sqrt{2}$ b) $1/2$ c) $1/4$

<b>NAPOMENA</b>	Poslije svakog zadatka ponudena su tri odgovora. Zaokružite odgovor koji smatrate tačnim. <b>Tačno</b> zaokružen odgovor nosi <b>4 boda</b> . <b>Pogrešno</b> zaokružen odgovor nosi <b>-2 boda</b> . <b>Nezaokružen</b> odgovor nosi <b>0 bodova</b> .
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JU UNIVERZITET U TUZLI Fakultet elektrotehnike Tuzla, 04.07.2001.godine	<b>KVALIFIKACIONI ISPIT IZ          MATEMATIKE</b>	<b>GRUPA B</b>
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1.	Izracunati: $\frac{\frac{9}{4} - \frac{4}{9}}{\frac{3}{2} - \frac{2}{3}} \cdot \frac{6}{13}$ . a) 2/3                      b) 1                      c) 4/3
2.	Vrijednost izraza $\sqrt[3]{x^2} \cdot \sqrt[4]{x^3}$ je: a) $x^2$ b) $x^{\frac{7}{8}}$ c) $x^{\frac{11}{12}}$
3.	Uprostiti izraz: $\left[ \frac{a}{b+c-a} \cdot \left( \frac{1}{a} - \frac{1}{b+c} \right) \right] : (a+b)$ . a) $\frac{1}{(a+b)(b+c)}$ b) $\frac{1}{(a+c)(b+c)}$ c) $\frac{1}{(a+b)(a+c)}$
4.	Kub rješenja jednacine $\frac{3^x \cdot \sqrt[3]{9}}{3^{x+1}} = \frac{3^{x+1}}{9}$ je: a) veci od 3              b) jednak 3              c) manji od 3
5.	Riješiti nejednacinu $\log_{1/4} \frac{1-2x}{4} \geq 0$ . a) $\left[ -\frac{3}{2}, \frac{1}{2} \right)$ b) $\left( \frac{1}{3}, \frac{2}{3} \right)$ b) $\left( \frac{1}{3}, \frac{4}{3} \right]$
6.	Rješenje sistema $\begin{cases} x+y=5 \\ x-2y=1 \end{cases}$ leži na pravoj: a) $y = -x-5$ b) $y = -x+5$ c) $y = x-5$
7.	Ako je $\sin x = -1$ i $3\pi < x < 4\pi$ , tada je: a) $x = \frac{3\pi}{2}$ b) $x = \frac{5\pi}{2}$ c) $x = \frac{7\pi}{2}$
8.	Dijeljenjem polinoma $x^4+2x^3-3x^2+5x-17$ sa polinomom $x^2+2x+1$ dobije se kolicnik $Q(x)$ i ostatak $R(x)$ . Zbir kvadrata korijena polinoma $Q(x)$ i $R(x)$ iznosi: a) 9                      b) 19                      c) 29
9.	Riješiti nejednacinu $ x-2  +  x  < 4$ . a) $x \in (-3, 2)$ b) $x \in (-3, 1)$ c) $x \in (-1, 3)$
10.	Kvadratu, kojem je dužina stranice $a=25$ , upisana je i opisana kružnica. Kako se odnosi površina upisane prema površini opisane kružnice? a) $1/\sqrt{2}$ b) 1/2                      c) 1/4

<b>NAPOMENA</b>	Poslije svakog zadatka ponudena su tri odgovora. Zaokružite odgovor koji smatrate tacnim. <b>Tacno</b> zaokružen odgovor nosi <b>4 boda</b> . <b>Pogrešno</b> zaokružen odgovor nosi <b>-2 boda</b> . <b>Nezaokružen</b> odgovor nosi <b>0 bodova</b> .
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JU UNIVERZITET U TUZLI Fakultet elektrotehnike Tuzla, 04.09.2001.godine	<b>KVALIFIKACIONI ISPIT IZ          MATEMATIKE</b>	<b>GRUPA A</b>
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1.	Izracunati: $\left[\frac{2}{3} - \frac{4}{5}\left(2 - \frac{1}{2}\right)\right] \times \left[-\frac{3}{4} + \frac{9}{8}\left(1 + \frac{1}{4}\right)\right]$ . a) $-7/20$ b) $-9/20$ c) $-11/20$
2.	Vrijednost izraza $\left(\sqrt[3]{\sqrt[6]{a^9}}\right)^4 : \left(\sqrt[6]{\sqrt[3]{a^9}}\right)^2$ je: a) $a^2$ b) $a$ c) $a^{1/2}$
3.	Uprostiti izraz: $\left(\frac{x^2 - y^2}{xy} - \frac{xy - y^2}{xy - x^2}\right) : \frac{x}{y}$ a) $\frac{x}{y}$ b) $1$ c) $\frac{y}{x}$
4.	Rješenje jednacine $3^{x+1} - 6 \cdot 3^{x-1} = 1$ je: a) veće od 1                      b) jednako 1                      c) manje od 1
5.	Riješiti nejednacinu $\log_{\frac{1}{2}}(3x - 1) \geq 1$ . a) $\left[\frac{1}{2}, \frac{3}{4}\right]$ b) $\left[\frac{1}{3}, \frac{3}{4}\right]$ c) $\left[\frac{1}{3}, \frac{1}{2}\right]$
6.	Rješenje sistema $\begin{cases} x + y = 1 \\ 2x + y = -1 \end{cases}$ leži na pravoj: a) $y = -\frac{3}{2}x$ b) $y = -\frac{3}{4}x$ c) $y = -\frac{5}{4}x$
7.	Ako je $\cos x = \frac{\sqrt{2}}{2}$ i $\sin x = -\frac{\sqrt{2}}{2}$ , tada je: a) $x = -\frac{\pi}{4}$ b) $x = \frac{\pi}{4}$ c) $x = -\frac{3\pi}{4}$
8.	Odrediti parametar a, tako da je polinom $x^4 - x^3 - 3x^2 + x + a$ djeljiv polinomom $x^2 - 3x + 2$ . a) $a=1$ b) $a=2$ c) $a=3$
9.	Pozitivna rješenja nejednacine $ x + 2  +  x  \geq 4$ su: a) $x \in [1, \infty)$ b) $x \in [2, \infty)$ c) $x \in [3, \infty)$
10.	Ako se obim kvadrata poveća 4 puta, tada se njegova površina poveća: a) 2 puta                              b) 4 puta                              c) 16 puta

<b>NAPOMENA</b>	Poslije svakog zadatka ponudena su tri odgovora. Zaokružite odgovor koji smatrate tačnim. <b>Tačno</b> zaokružen odgovor nosi <b>4 boda</b> . <b>Pogrešno</b> zaokružen odgovor nosi <b>-2 boda</b> . <b>Nezaokružen</b> odgovor nosi <b>0 bodova</b> .
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JU UNIVERZITET U TUZLI Fakultet elektrotehnike Tuzla, 04.09.2001.godine	<b>KVALIFIKACIONI ISPIT IZ          MATEMATIKE</b>	<b>GRUPA B</b>
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1.	Izračunati: $\frac{\frac{3}{2} - \frac{2}{3}}{\frac{9}{4} - \frac{4}{9}} \cdot \frac{13}{6}$ . a) 0                              b) 1                              c) 2
2.	Vrijednost izraza $\sqrt[3]{x^2 \cdot \sqrt{x^3}}$ je: a) $x^{\frac{7}{4}}$ b) $x^{\frac{7}{5}}$ c) $x^{\frac{7}{6}}$
3.	Uprostiti izraz: $\left[ \frac{b}{b+c-a} \cdot \left( \frac{1}{a} - \frac{1}{b+c} \right) \right] (b+c)$ . a) $\frac{a}{b}$ b) 1                              c) $\frac{b}{a}$
4.	Rješenje jednacine $\frac{2^x \cdot \sqrt[3]{4}}{2^{x+1}} = \frac{2^{x+1}}{2}$ je: a) negativno                      b) jednako nuli                  c) pozitivno
5.	Riješiti nejednacinu $\log_{\frac{1}{3}} \frac{1-2x}{4} \leq 0$ . a) $\left(-\infty, -\frac{3}{2}\right]$ b) $\left(-\infty, -\frac{1}{2}\right]$ c) $\left(-\infty, \frac{3}{2}\right]$
6.	Rješenje sistema $\begin{cases} x + 2y = 1 \\ -x + y = 0 \end{cases}$ leži na pravoj: a) $y = -x$ b) $y = 0$ c) $y = x$
7.	Ako je $\cos x = \frac{\sqrt{3}}{2}$ i $\sin x = -\frac{1}{2}$ , tada je: a) $x = -\frac{\pi}{3}$ b) $x = -\frac{\pi}{4}$ c) $x = -\frac{\pi}{6}$
8.	Odrediti parametar a, tako da je polinom $x^4 - x^3 - 3x^2 + x + a$ djeljiv polinomom $x^2 + 2x + 1$ . a) a=1                              b) a=2                              c) a=3
9.	Pozitivna rješenja nejednacine $ x - 2  +  x  \geq 4$ su: a) $x \in [1, \infty)$ b) $x \in [2, \infty)$ c) $x \in [3, \infty)$
10.	Ako se površina kvadrata poveća 4 puta, tada se njegov obim poveća: a) 2 puta                              b) 4 puta                              c) 16 puta

<b>NAPOMENA</b>	Poslije svakog zadatka ponudena su tri odgovora. Zaokružite odgovor koji smatrate tačnim. <b>Tačno</b> zaokružen odgovor nosi <b>4 boda</b> . <b>Pogrešno</b> zaokružen odgovor nosi <b>-2 boda</b> . <b>Nezaokružen</b> odgovor nosi <b>0 bodova</b> .
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**KVALIFIKACIONI ISPIT IZ MATEMATIKE**

**Zadaci za grupu A**

1. Date su funkcije  $f(x) = 2x - 1$  i  $g(x) = \frac{x+1}{2x+1}$ . Naći  $(g \circ f)(1)$ .

- a) 1                      b)  $\frac{1}{3}$                       c)  $\frac{2}{3}$                       d)  $\frac{4}{3}$

2. Izračunati:  $\sqrt[3]{20+14\sqrt{2}} + \sqrt[3]{20-14\sqrt{2}}$ .

- a) 1                      b) 4                      c) 8                      d) 16

3. Riješiti nejednačinu:

$$|x+1| > 2x^2.$$

- a)  $x \in \left(-1, \frac{1}{2}\right)$                       b)  $x \in (-1, 0)$                       c)  $x \in (0, 1)$                       d)  $x \in \left(-\frac{1}{2}, 1\right)$

4. Odrediti modul kompleksnog broja:

$$z = \frac{5 - i\sqrt{2}}{1 + i\sqrt{2}}.$$

- a)  $2\sqrt{2}$                       b)  $\frac{1}{3}$                       c) 1                      d) 3

5. Odrediti vrijednost parametara  $p$  i  $q$  tako da funkcija:

$$y(x) = x^2 + px + q$$

ima minimum jednak  $-4$  za  $x = -1$ .

- a)  $p=2, q=-3$                       b)  $p=-2, q=3$                       c)  $p=1, q=-3$                       d)  $p=-3, q=1$

6. Poredati po veličini:  $a=0.1$ ,  $b=\log 0.1$ ,  $c=\sqrt{0.1}$ ,  $d=0.1^{-1}$ ,  $e=\sqrt[3]{0.1}$ .

- a)  $a < b < e < c < d$       b)  $b < c < a < d < e$       c)  $b < a < c < e < d$       d)  $d < b < e < c < a$

7. Riješiti jednačinu:

$$\log_{\frac{1}{2}} x = \frac{2}{3} \log_{\frac{1}{2}} 27 - \log_{\frac{1}{2}} 18.$$

- a)  $\frac{2}{3}$       b)  $\frac{1}{2}$       c) 3      d) 9

8. Izračunati  $\cos 15^\circ$ .

- a)  $\frac{\sqrt{6} + \sqrt{2}}{4}$       b)  $\frac{\sqrt{6} + \sqrt{2}}{2}$       c)  $\frac{\sqrt{6} - \sqrt{2}}{2}$       d)  $\frac{\sqrt{6} - \sqrt{2}}{4}$

9. Hipotenuza pravougaonog trougla podijeljena je na 3 jednaka dijela. Djelištima su povučene paralele s jednom katetom. Kako se odnose površine nastalih dijelova trougla?

- a) 1 : 3 : 4      b) 1 : 3 : 5      c) 1 : 4 : 5      d) 2 : 3 : 4

10. Četiri pozitivna broja čine geometrijski niz. Ako je prvi veći od drugog za 200, a treći od četvrtog za 8, odrediti drugi broj u nizu.

- a) 100      b) 75      c) 50      d) 500

**NAPOMENA**

Poslije svakog zadatka ponuđena su četiri odgovora.

Zaokružite odgovor koji smatrate tačnim.

**Tačno** zaokružen odgovor nosi **4 boda**.

**Pogrešno** zaokružen odgovor nosi **-2 boda**.

**Nezaokružen** odgovor nosi **0 bodova**.

**KVALIFIKACIONI ISPIT IZ MATEMATIKE**

**Zadaci za grupu B**

1. Date su funkcije  $f(x) = 2x - 1$  i  $g(x) = \frac{x+1}{2x+1}$ . Naći  $(f \circ g)(1)$ .

- a) 1                      b)  $\frac{1}{3}$                       c)  $\frac{2}{3}$                       d)  $\frac{4}{3}$

2. Izračunati:  $\sqrt[3]{\sqrt{5} + 2} - \sqrt[3]{\sqrt{5} - 2}$ .

- a) 1                      b) 4                      c) 8                      d) 16

3. Riješiti nejednačinu:

$$|x - 1| > 2x^2.$$

- a)  $x \in \left(-1, \frac{1}{2}\right)$                       b)  $x \in (-1, 0)$                       c)  $x \in (0, 1)$                       d)  $x \in \left(-\frac{1}{2}, 1\right)$

4. Odrediti modul kompleksnog broja:

$$z = \frac{1 + i\sqrt{2}}{5 - i\sqrt{2}}.$$

- a)  $2\sqrt{2}$                       b)  $\frac{1}{3}$                       c) 1                      d) 3

5. Odrediti vrijednost parametara  $p$  i  $q$  tako da funkcija:

$$y(x) = -x^2 + px + q$$

ima maksimum jednak 4 za  $x = -1$ .

- a)  $p=2, q=-3$                       b)  $p=-2, q=3$                       c)  $p=1, q=-3$                       d)  $p=-3, q=1$

6. Poredati po veličini:  $a=10$ ,  $b=\log 10$ ,  $c=\sqrt{10}$ ,  $d=10^{-1}$ ,  $e=\sqrt[3]{10}$ .

- a)  $a < b < e < c < d$       b)  $b < c < a < d < e$       c)  $b < a < c < e < d$       d)  $d < b < e < c < a$

7. Riješiti jednačinu:

$$\log_{\frac{1}{3}} x = \frac{2}{3} \log_{\frac{1}{3}} 27 - \log_{\frac{1}{3}} 18.$$

- a)  $\frac{2}{3}$       b)  $\frac{1}{2}$       c) 3      d) 9

8. Izračunati  $\sin 15^\circ$ .

- a)  $\frac{\sqrt{6} + \sqrt{2}}{4}$       b)  $\frac{\sqrt{6} + \sqrt{2}}{2}$       c)  $\frac{\sqrt{6} - \sqrt{2}}{2}$       d)  $\frac{\sqrt{6} - \sqrt{2}}{4}$

9. Kateta pravougaonog trougla podijeljena je na 3 jednaka dijela. Djelištima su povučene paralele s hipotenuzom. Kako se odnose površine nastalih dijelova trougla?

- a) 1 : 3 : 4      b) 1 : 3 : 5      c) 1 : 4 : 5      d) 2 : 3 : 4

10. Četiri pozitivna broja čine geometrijski niz. Ako je prvi veći od drugog za 200, a treći od četvrtog za 8, odrediti treći broj u nizu.

- a) 10      b) 50      c) 100      d) 8

#### NAPOMENA

Poslije svakog zadatka ponuđena su četiri odgovora.

Zaokružite odgovor koji smatrate tačnim.

**Tačno** zaokružen odgovor nosi **4 boda**.

**Pogrešno** zaokružen odgovor nosi **-2 boda**.

**Nezaokružen** odgovor nosi **0 bodova**.