Univerzitet u Tuzli

Fakultet elektrotehnike

ZBIRKA

zadataka sa prijemnih ispita iz Matematike na Fakultetu elektrotehnike u periodu od 2015-2019. godine (za studijski program "Tehnički odgoj i informatika")

Tuzla, maj 2021

UNIVERZITET U TUZLI
Fakultet elektrotehnike
TEHNIČKI ODGOJ I INFORMATIKA
Tuzla, 09.07.2015.godine

KVALIFIKACIONI ISPIT IZ MATEMATIKE

GRUPA   A

1.	Vrijednost izraza $\dfrac{\frac{9}{4}-\frac{4}{9}}{\frac{3}{2}-\frac{2}{3}}\cdot\frac{6}{13}$ je:
	a) 1 b) $\dfrac{6}{13}$ c) $-\dfrac{6}{13}$ d) $\dfrac{6}{5}$
2.	Vrijednost izraza $\left[\dfrac{2}{3}-\dfrac{4}{5}\left(2-\dfrac{1}{2}\right)\right]:\left[-\dfrac{4}{3}+\dfrac{8}{9}\left(2+\dfrac{2}{5}\right)\right]$ je:
	a) $\dfrac{2}{3}$ b) $-\dfrac{3}{2}$ c) $\dfrac{3}{2}$ d) $-\dfrac{2}{3}$
3.	Pojednostavljenjem izraza $\left(a+\dfrac{9}{a-6}\right)\cdot\left(\dfrac{12}{a^2-3a}-\dfrac{a}{9-6a+a^2}\right)$
	a) $\dfrac{a-6}{a}$ b) $-\dfrac{a-6}{a}$ c) $\dfrac{6+a}{a}$ d) $-\dfrac{6+a}{a}$
4.	Proizvod rješenja sistema $2x-y=4$ i $x+3y=-5$ je:
	a) -1 b) 1 c) -2 d) 2
5.	Vrijednost izraza $\left(\sqrt{\sqrt[4]{a^8}}\right)^3:\left(\sqrt[6]{\sqrt[3]{a^9}}\right)^4$ je:
	a) $a^{\frac{4}{3}}$ b) a c) $a^{\frac{2}{3}}$ d) $a^{\frac{1}{3}}$
6.	Proizvod realnih rješenja jednačine $2x^2-5x+2=0$ je:
	a) 1 b) $\dfrac{1}{4}$ c) -4 d) -1
7.	Skup realnih rješenja nejednačine $\dfrac{2x+1}{x-1}<0$ je:
	a) $\left(-1,-\dfrac{1}{2}\right)$ b) $\left(-\dfrac{1}{2},1\right)$ c) $\left(1,+\infty\right)$ d) $\left(-\infty,-1\right)$
8.	Modul kompleksnog broja $Z=\dfrac{-3+i}{2-i}$ je:
	a) $\sqrt{10}$ b) 10 c) $\sqrt{2}$ d) 2
9.	Ako je $\cos 3x=\dfrac{1}{2}$, odrediti x tako da $x\in\left[0,\dfrac{\pi}{2}\right]$:
	a) $\dfrac{\pi}{9}$ b) $\dfrac{\pi}{3}$ c) $\dfrac{\pi}{6}$ d) $\dfrac{\pi}{2}$
10.	Za pravougli trougao su poznate vrijednosti katete 3 i hipotenuze 5. Koliko iznosi druga kateta?
	a) 8 b) 2 c) 12 d) 4
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.

$$\frac{\frac{9}{4}-\frac{4}{9}}{\frac{3}{2}-\frac{2}{3}}\cdot\frac{6}{13}=\frac{\frac{81-16}{36}}{\frac{9-4}{6}}\cdot\frac{6}{13}=\frac{\frac{65}{36}}{\frac{5}{6}}\cdot\frac{6}{13}=\frac{65\cdot6}{36\cdot5}\cdot\frac{6}{13}=1$$

a) 1 b) $\dfrac{6}{13}$ c) $-\dfrac{6}{13}$ d) $\dfrac{6}{5}$

2.

$$\left[\frac{2}{3}-\frac{4}{5}\left(2-\frac{1}{2}\right)\right]:\left[-\frac{4}{3}+\frac{8}{9}\left(2+\frac{2}{5}\right)\right]=\left(\frac{2}{3}-\frac{4}{5}\cdot\frac{4-1}{2}\right):\left(-\frac{4}{3}+\frac{8}{9}\cdot\frac{12}{5}\right)=$$

$$\left(\frac{2}{3}-\frac{6}{5}\right):\left(-\frac{4}{3}+\frac{32}{15}\right)=\frac{10-18}{15}:\frac{-20+32}{15}=\frac{-8}{15}\cdot\frac{15}{-12}=\frac{2}{3}$$

a) $\dfrac{2}{3}$ b) $-\dfrac{3}{2}$ c) $\dfrac{3}{2}$ d) $-\dfrac{2}{3}$

3.

$$\left(a+\frac{9}{a-6}\right)\cdot\left(\frac{12}{a^2-3a}-\frac{a}{9-6a+a^2}\right)=\frac{a^2-6a+9}{a-6}\cdot\left[\frac{12}{a(a-3)}-\frac{a^2}{(a-3)^2}\right]=$$

$$\frac{(a-3)^2}{a-6}\cdot\frac{12a-36-a^2}{a\cdot(a-3)^2}=\frac{1}{a-6}\cdot\frac{-(a-6)^2}{a}=-\frac{a-6}{a}$$

a) $\dfrac{a-6}{a}$ **b)** $-\dfrac{a-6}{a}$ c) $\dfrac{6+a}{a}$ d) $-\dfrac{6+a}{a}$

4.

$2x-y=4 \quad /\cdot3$

$x+3y=-5$

$\overline{6x-3y=12}$

$\underline{x+3y=-5}$

$7x=7 \implies x=1$

$1+3y=-5 \implies y=-2$

$x\cdot y=-2$

a) -1 b) 1 **c)** -2 d) 2

5.

$$\left(\sqrt{\sqrt[4]{a^8}}\right)^3:\left(\sqrt[6]{\sqrt[3]{a^9}}\right)^4=\left(\sqrt[8]{a^8}\right)^3:\left(\sqrt[18]{a^9}\right)^4=a^3:\left(\sqrt{a}\right)^4=a^3:a^2=a$$

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

6.

$2x^2-5x+2=0$

Po Viete−ovim pravila proizvod rješenja kvadratne jednačine $ax^2+bx+c=0$ je :

$$x_1\cdot x_2=\frac{c}{a}=\frac{2}{2}=1$$

a) 1 b) $\dfrac{1}{4}$ c) -4 d) -1

| 7. | $\dfrac{2x+1}{x-1} < 0;$

 $2x+1 > 0 \;\Rightarrow\; x > -\dfrac{1}{2}$

 $x-1 > 0 \;\Rightarrow\; x > 1$

 $x \in \left(-\dfrac{1}{2}, 1\right)$ | |

	$-\infty$	$-1/2$	1	$+\infty$
2x+1	$-$	$+$	$+$	
x-1	$-$	$-$	$+$	
	$+$	$-$	$+$	

7.

a) $\left(-1, -\dfrac{1}{2}\right)$ **b)** $\left(-\dfrac{1}{2}, 1\right)$ c) $\left(1, +\infty\right)$ d) $\left(-\infty, -1\right)$

8.

$Z = \dfrac{-3+i}{2-i}$

$|Z| = \left|\dfrac{-3+i}{2-i}\right| = \dfrac{|-3+i|}{|2-i|} = \dfrac{\sqrt{(-3)^2 + 1^2}}{\sqrt{2^2 + (-1)^2}} = \dfrac{\sqrt{10}}{\sqrt{5}} = \sqrt{2}$

a) $\sqrt{10}$ b) 10 **c)** $\sqrt{2}$ d) 2

9.

$\cos 3x = \dfrac{1}{2}$

Za I kvadrant vrijedi: $3x = \dfrac{\pi}{3} \;\Rightarrow\; x = \dfrac{\pi}{9}.$

a) $\dfrac{\pi}{9}$ b) $\dfrac{\pi}{3}$ c) $\dfrac{\pi}{6}$ d) $\dfrac{\pi}{2}$

10.

Poznato je kateta $a = 3$ i hipotenuza $c = 5$.

Druga kateta se može izračunati po Pitagorinoj teoremi:

$b = \sqrt{c^2 - a^2} = \sqrt{5^2 - 3^2} = 4.$

a) 8 b) 2 c) 12 d) 4

1.	Vrijednost izraza $\sqrt{\dfrac{3}{16} : \left(8 + \dfrac{1}{3}\right) + \dfrac{1}{25}}$			
	a) 2	b) $\dfrac{1}{4}$	c) $\dfrac{1}{2}$	d) 1

2.	Vrijednost izraza $\left[\dfrac{2}{3} - \dfrac{4}{5}\left(2 + \dfrac{1}{2}\right)\right] : \left[\dfrac{4}{3} - \dfrac{8}{9}\left(2 + \dfrac{2}{5}\right)\right]$ je:			
	a) $-\dfrac{1}{2}$	b) $-\dfrac{5}{3}$	c) $\dfrac{1}{2}$	d) $\dfrac{5}{3}$

3.	Pojednostavljenjem izraza $\left[\dfrac{b}{b+c-a} \cdot \left(\dfrac{1}{a} - \dfrac{1}{b+c}\right)\right](b+c)$ se dobiva:			
	a) $\dfrac{b}{a}$	b) $\dfrac{a}{b+c-a}$	c) $\dfrac{b+c}{b+c-a}$	d) $b+c$

4.	Zbir rješenja sistema $2x + 4y = -2$ i $-3x + 5y = 3$ je:			
	a) -2	b) -1	c) 0	d) 1

5.	Vrijednost izraza $\sqrt{x^3} : \sqrt[3]{x^2}$ je:			
	a) $\sqrt[3]{x}$	b) x^2	c) $\sqrt[6]{x^5}$	d) $\sqrt[3]{x^2}$

6.	Zbir realnih rješenja jednačine $x^2 - 3x + 2 = 0$ je:			
	a) 2	b) -3	c) -2	d) 3

7.	Skup realnih rješenja nejednačine $\dfrac{3x+1}{4x+1} \geq 1$ je:			
	a) $(0,2]$	b) $(0, +\infty)$	c) $\left(-\dfrac{1}{4}, 0\right]$	d) $\left[-2, -\dfrac{1}{4}\right)$

8.	Modul kompleksnog broja $Z = \dfrac{-1+3i}{-2+i}$ je:			
	a) $\sqrt{2}$	b) $\sqrt{10}$	c) 2	d) 5

9.	Ako je $\cos 2x = \dfrac{\sqrt{2}}{2}$, odrediti x tako da $x \in \left[0, \dfrac{\pi}{2}\right]$:			
	a) $\dfrac{\pi}{2}$	b) $\dfrac{\pi}{4}$	c) $\dfrac{\pi}{8}$	d) $\dfrac{\pi}{12}$

10.	Stranice pravouganika su 6 i 8. Koliko iznosi dijagonala pravougaonika?			
	a) 14	b) 10	c) 7	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.	Ako je $a = \dfrac{\sqrt{5}+1}{2}$ i $b = \dfrac{1-\sqrt{5}}{2}$, onda je $a^2 + b^2$:
	a) $2\sqrt{5}$ b) $\sqrt{5}$ c) 3 d) 1
2.	Vrijednost izraza $\sqrt{\dfrac{16}{9} + \dfrac{3}{25} : \left(8 + \dfrac{1}{3}\right)}$ je:
	a) $\dfrac{5}{3}$ b) $\dfrac{3}{5}$ c) $\dfrac{4}{5}$ d) 1
3.	Vrijednost izraza $\dfrac{8}{23} + \left[\dfrac{1}{2} + \left(\dfrac{1}{8} - \dfrac{1}{4}\right)\right] \cdot \dfrac{40}{23}$ je:
	a) $\dfrac{1}{23}$ b) $\dfrac{16}{23}$ c) -1 d) 1
4.	Vrijednost izraza $\left(\sqrt{\sqrt[6]{a^4}}\right)^{12} : \left(\sqrt[3]{\sqrt[4]{a^6}}\right)^{8}$ je:
	a) a^2 b) a c) 1 d) $\dfrac{1}{a}$
5.	Zbir rješenja sistema $2x - 3y = 7$ i $3x + 2y = 4$ je:
	a) -1 b) 1 c) 2 d) -2
6.	Proizvod realnih rješenja jednačine $3x^2 - 5x - 2 = 0$ je:
	a) $-\dfrac{2}{3}$ b) $-\dfrac{5}{3}$ c) $\dfrac{5}{3}$ d) -1
7.	Skup realnih rješenja nejednačine $\dfrac{4x-1}{5x-1} \geq 1$ je:
	a) $\left(\dfrac{1}{5}, \dfrac{1}{4}\right]$ b) $\left(-\dfrac{1}{4}, -\dfrac{1}{5}\right]$ c) $\left(\dfrac{1}{5}, 1\right]$ d) $\left[0, \dfrac{1}{5}\right)$
8.	Modul kompleksnog broja $Z = \dfrac{3-4i}{-1+2i}$ je:
	a) $2\sqrt{5}$ b) $\sqrt{5}$ c) 5 d) 1
9.	Ako je $\sin 3x = \dfrac{\sqrt{3}}{2}$, odrediti x tako da $x \in \left[0, \dfrac{\pi}{2}\right]$:
	a) $\dfrac{\pi}{3}$ b) $\dfrac{\pi}{6}$ c) $\dfrac{\pi}{9}$ d) $\dfrac{\pi}{12}$
10.	Vrijednosti hipotenuze i jedne katete pravouglog trougla su 5 i 3. Koliko iznosi površina trougla?
	a) 6 b) 4 c) 12 d) 15
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.	Vrijednost izraza $\sqrt{\dfrac{9}{16}+\dfrac{5}{3}:\left(2-\dfrac{1}{3}\right)}$ je:			
	a) $\dfrac{5}{4}$	b) 1	c) $\dfrac{4}{5}$	d) 2

2.	Ako je $a=\dfrac{\sqrt{3}-1}{2}$ i $b=\dfrac{\sqrt{3}+1}{2}$, onda je a^2-b^2:			
	a) $-2\sqrt{3}$	b) $2\sqrt{3}$	c) 2	d) $-\sqrt{3}$

3.	Vrijednost izraza $\dfrac{13}{18}+\left[\dfrac{1}{3}-\left(\dfrac{1}{6}-\dfrac{1}{9}\right)\right]\cdot\dfrac{7}{5}$ je:			
	a) $\dfrac{7}{5}$	b) $\dfrac{7}{18}$	c) $\dfrac{1}{3}$	d) 1

4.	Vrijednost izraza $\left(\sqrt{\sqrt[12]{a^3}}\right)^{16}:\left(\sqrt[3]{\sqrt[4]{a^2}}\right)^9$ je:			
	a) a	b) $\sqrt{a}$	c) a^2	d) $\sqrt[6]{a}$

5.	Zbir rješenja sistema $x-3y=4$ i $3x+2y=1$ je:			
	a) -2	b) 2	c) 0	d) -1

6.	Zbir realnih rješenja jednačine $2x^2+4x-9=0$ je:			
	a) 2	b) $-\dfrac{7}{2}$	c) -2	d) $-\dfrac{9}{2}$

7.	Modul kompleksnog broja $Z=\dfrac{3+i}{2-i}$ je:			
	a) 1	b) 2	c) $\sqrt{2}$	d) $\sqrt{5}$

8.	Skup realnih rješenja nejednačine $\dfrac{x-2}{2x-1}\geq 1$ je:			
	a) $[-2,-1)$	b) $\left[-1,\dfrac{1}{2}\right)$	c) $\left[\dfrac{1}{2},1\right)$	d) $[1,+\infty)$

9.	Ako je $\cos 3x=\dfrac{\sqrt{2}}{2}$, odrediti x tako da $x\in\left[0,\dfrac{\pi}{2}\right]$:			
	a) $\dfrac{\pi}{12}$	b) $\dfrac{\pi}{4}$	c) $\dfrac{\pi}{2}$	d) $\dfrac{\pi}{6}$

10.	Stranice pravouganika su 4 i 3. Koliko iznosi dijagonala pravougaonika?			
	a) 7	b) 5	c) 6	d) 8

1.	Vrijednost izraza $\sqrt{\dfrac{25}{16} + \dfrac{5}{3} : \left(\dfrac{1}{3} - 2 \right)}$ je:
	a) $\dfrac{5}{4}$ b) $\dfrac{1}{4}$ c) $\dfrac{3}{4}$ d) 1
2.	Ako je $a = \dfrac{\sqrt{3} - 1}{3}$ i $b = \dfrac{\sqrt{3} + 1}{3}$, onda je $a^2 + b^2$:
	a) $\dfrac{8}{9}$ b) $\dfrac{4\sqrt{3}}{9}$ c) $\dfrac{4}{9}$ d) $\dfrac{2}{3}$
3.	Vrijednost izraza $\dfrac{13}{18} - \left[\dfrac{1}{9} - \left(\dfrac{1}{6} - \dfrac{2}{3} \right) \right] \cdot \dfrac{7}{11}$ je:
	a) $\dfrac{7}{11}$ b) $-\dfrac{1}{3}$ c) $\dfrac{2}{3}$ d) $\dfrac{1}{3}$
4.	Vrijednost izraza $\left(\sqrt{\sqrt[6]{a^3}} \right)^8 : \left(\sqrt[3]{\sqrt[4]{a^9}} \right)^2$ je:
	a) $\sqrt{a}$ b) a c) a^2 d) $\sqrt[6]{a}$
5.	Zbir rješenja sistema $7x + 3y = 4$ i $x - 2y = 3$ je:
	a) -2 b) 2 c) 3 d) 0
6.	Proizvod realnih rješenja jednačine $3x^2 - 7x - 6 = 0$ je:
	a) 3 b) -2 c) $\dfrac{7}{3}$ d) 2
7.	Modul kompleksnog broja $Z = \dfrac{3 + i}{2 + i}$ je:
	a) 2 b) 1 c) $\sqrt{2}$ d) $\sqrt{5}$
8.	Skup realnih rješenja nejednačine $\dfrac{x + 2}{2x - 1} \geq 1$ je:
	a) $\left(\dfrac{1}{2}, 3 \right]$ b) $\left(-\dfrac{1}{2}, \dfrac{1}{2} \right]$ c) $\left(-3, -\dfrac{1}{2} \right]$ d) $(-\infty, -3]$
9.	Ako je $\cos 2x = \dfrac{\sqrt{2}}{2}$, odrediti x tako da $x \in \left[0, \dfrac{\pi}{2} \right]$:
	a) $\dfrac{\pi}{12}$ b) $\dfrac{\pi}{8}$ c) $\dfrac{\pi}{4}$ d) $\dfrac{\pi}{6}$
10.	Stranice pravouganika su 16 i 12. Koliko iznosi dijagonala pravougaonika?
	a) 26 b) 24 c) 18 d) 20

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.

$$\sqrt{\frac{25}{16}+\frac{5}{3}:\left(\frac{1}{3}-2\right)}=\sqrt{\frac{25}{16}+\frac{5}{3}:\frac{1-6}{3}}=\sqrt{\frac{25}{16}+\frac{5}{3}:\frac{-5}{3}}=\sqrt{\frac{25}{16}-1}=\sqrt{\frac{25-16}{16}}=\sqrt{\frac{9}{16}}=\frac{3}{4}.$$

a) $\frac{5}{4}$ 　　　　 b) $\frac{1}{4}$ 　　　　 **c)** $\frac{3}{4}$ 　　　　 d) 1

2.

$$a^2+b^2=\left(\frac{\sqrt{3}-1}{3}\right)^2+\left(\frac{\sqrt{3}+1}{3}\right)^2=\frac{3-2\sqrt{3}+1}{9}+\frac{3+2\sqrt{3}+1}{9}=\frac{4-2\sqrt{3}+4+2\sqrt{3}}{9}=\frac{8}{9}.$$

a) $\frac{8}{9}$ 　　　　 b) $\frac{4\sqrt{3}}{9}$ 　　　　 c) $\frac{4}{9}$ 　　　　 d) $\frac{2}{3}$

3.

$$\frac{13}{18}-\left[\frac{1}{9}-\left(\frac{1}{6}-\frac{2}{3}\right)\right]\cdot\frac{7}{11}=\frac{13}{18}-\left[\frac{1}{9}-\frac{1-4}{6}\right]\cdot\frac{7}{11}=\frac{13}{18}-\left(\frac{1}{9}-\frac{-3}{6}\right)\cdot\frac{7}{11}=\frac{13}{18}-\left(\frac{1}{9}+\frac{3}{6}\right)\cdot\frac{7}{11}=$$

$$=\frac{13}{18}-\left(\frac{1}{9}+\frac{3}{6}\right)\cdot\frac{7}{11}=\frac{13}{18}-\frac{2+9}{18}\cdot\frac{7}{11}=\frac{13}{18}-\frac{11}{18}\cdot\frac{7}{11}=\frac{13}{18}-\frac{7}{18}=\frac{6}{18}==\frac{1}{3}.$$

a) $\frac{7}{11}$ 　　　　 b) $-\frac{1}{3}$ 　　　　 c) $\frac{2}{3}$ 　　　　 **d)** $\frac{1}{3}$

4.

$$\left(\sqrt{\sqrt[6]{a^3}}\right)^8:\left(\sqrt[3]{\sqrt[4]{a^9}}\right)^2=\left(\sqrt{\sqrt[6]{a^3}}\right)^8:\left(\sqrt[3]{\sqrt[4]{a^9}}\right)^2=\left[\left(\sqrt[6]{a^3}\right)^{\frac{1}{2}}\right]^8:\left[\left(\sqrt[4]{a^9}\right)^{\frac{1}{3}}\right]^2=\left(\sqrt[6]{a^3}\right)^4:\left(\sqrt[4]{a^9}\right)^{\frac{2}{3}}=$$

$$=\left(a^{\frac{3}{6}}\right)^4:\left(a^{\frac{9}{4}}\right)^{\frac{2}{3}}=a^{\frac{12}{6}}:a^{\frac{18}{12}}=a^2:a^{\frac{3}{2}}=a^{2-\frac{3}{2}}=a^{\frac{1}{2}}=\sqrt{a}.$$

a) $\sqrt{a}$ 　　　　 b) a 　　　　 c) a^2 　　　　 d) $\sqrt[6]{a}$

5.

$7x+3y=4 \quad /\cdot2$

$\underline{x-2y=3 \quad /\cdot3}$

$14x+6y=8$

$\underline{3x-6y=9}$

$17x=17 \Rightarrow x=1$

$1-2y=3 \Rightarrow -2y=2 \ y=-1$

$x+y=0.$

a) -2 　　　　 b) 2 　　　　 c) 3 　　　　 **d)** 0

6.

$3x^2-7x-6=0$

Za rješenja kvadratne jednačine $ax^2+bx+c=0$ *vrijedi da je njihov proizvod :* $x_1\cdot x_2=\frac{c}{a}.$

$x_1\cdot x_2=\frac{-6}{3}=-2.$

a) 3 　　　　 **b)** -2 　　　　 c) $\frac{7}{3}$ 　　　　 d) 2

7.

$$|Z|=\left|\frac{3+i}{2+i}\right|=\frac{|3+i|}{|2+i|}=\frac{\sqrt{3^2+1^2}}{\sqrt{2^2+1^2}}=\frac{\sqrt{9+1}}{\sqrt{4+1}}=\frac{\sqrt{10}}{\sqrt{5}}=\sqrt{2}.$$

a) 2 　　　　 b) 1 　　　　 **c)** $\sqrt{2}$ 　　　　 d) $\sqrt{5}$

8.

$$\frac{x+2}{2x-1} \geq 1$$

$$D.p.: \; 2x-1 \neq 0 \; \Rightarrow \; x \neq \frac{1}{2}$$

$$\frac{x+2}{2x-1} - 1 \geq 0$$

$$\frac{x+2-2x+1}{2x-1} \geq 0$$

$$\frac{-x+3}{2x-1} \geq 0 \quad / \cdot(-1)$$

$$\frac{x-3}{2x-1} \leq 0$$

$$x \in \left(\frac{1}{2}, 3\right].$$

	$-\infty$	$\dfrac{1}{2}$	3	$+\infty$
$x-3$		$-$	$-$	$+$
$2x-1$		$-$	$+$	$+$
R		$+$	$-$	$+$

a) $\left(\dfrac{1}{2}, 3\right]$ b) $\left(-\dfrac{1}{2}, \dfrac{1}{2}\right]$ c) $\left(-3, -\dfrac{1}{2}\right]$ d) $\left(-\infty, -3\right]$

9.

$$\cos 2x = \frac{\sqrt{2}}{2}$$

$$2x_1 = \frac{\pi}{4} + 2k\pi \; \Rightarrow \; x_1 = \frac{\pi}{8} + k\pi$$

$$x_1 = \frac{\pi}{8} \in \left[0, \frac{\pi}{2}\right]$$

$$2x_2 = \frac{7\pi}{4} + 2k\pi \; \Rightarrow \; x_2 = \frac{7\pi}{8} + k\pi$$

$$x_2 = \frac{7\pi}{8} \notin \left[0, \frac{\pi}{2}\right]$$

Rješenje jednačine : $\dfrac{\pi}{8}$.

a) $\dfrac{\pi}{12}$ **b)** $\dfrac{\pi}{8}$ c) $\dfrac{\pi}{4}$ d) $\dfrac{\pi}{6}$

10.

Dijagonala pravougaonika je :

$$d = \sqrt{a^2 + b^2} = \sqrt{12^2 + 16^2} = \sqrt{144 + 256} = \sqrt{400} = 20.$$

a) 26 b) 24 c) 18 **d) 20**

1.	Ako je $a = \dfrac{\sqrt{3}+1}{3}$ i $b = \dfrac{\sqrt{3}-1}{3}$, onda je $a^2 + b^2$:

a) $\dfrac{4}{9}$ b) $\dfrac{8}{9}$ c) $\dfrac{20}{9}$ d) $\dfrac{8}{3}$

2.	Vrijednost izraza $\sqrt{\dfrac{25}{16} - \dfrac{5}{3} : \left(2 - \dfrac{1}{3}\right)}$ je:

a) $\dfrac{5}{12}$ b) $\dfrac{1}{4}$ c) $\dfrac{5}{4}$ d) $\dfrac{3}{4}$

3.	Vrijednost izraza $\dfrac{13}{18} + \left[\dfrac{1}{6} + \left(\dfrac{1}{9} - \dfrac{2}{3}\right)\right] \cdot \dfrac{4}{7}$ je:

a) 1 b) $\dfrac{1}{7}$ c) $\dfrac{1}{2}$ d) $\dfrac{4}{7}$

4.	Vrijednost izraza $\left(\sqrt{\sqrt[6]{a^8}}\right)^3 : \left(\sqrt[3]{\sqrt[4]{a^9}}\right)^2$ je:

a) $\sqrt{a}$ b) a c) a^2 d) $\sqrt[6]{a}$

5.	Zbir rješenja sistema $7x + 3y = 4$ i $2x - 3y = 5$ je:

a) 2 b) 3 c) 0 d) −2

6.	Zbir realnih rješenja jednačine $3x^2 - 7x - 11 = 0$ je:

a) 2 b) −3 c) $-\dfrac{11}{3}$ d) $\dfrac{7}{3}$

7.	Modul kompleksnog broja $Z = \dfrac{1-3i}{1+2i}$ je:

a) $\sqrt{2}$ b) 2 c) $\sqrt{5}$ d) 1

8.	Skup realnih rješenja nejednačine $\dfrac{x-3}{2x-3} \geq 1$ je:

a) $\left[-3, -\dfrac{3}{2}\right)$ b) $\left[0, \dfrac{3}{2}\right)$ c) $\left[\dfrac{3}{2}, 3\right)$ d) $\left[1, 2\right)$

9.	Ako je $\cos 2x = \dfrac{1}{2}$, odrediti x tako da $x \in \left[0, \dfrac{\pi}{2}\right]$:

a) $\dfrac{\pi}{6}$ b) $\dfrac{\pi}{3}$ c) $\dfrac{\pi}{12}$ d) $\dfrac{\pi}{4}$

10.	Stranice pravouganika su 12 i 16. Koliko iznosi dijagonala pravougaonika?

a) 28 b) 24 c) 18 d) 20

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.

$$a^2 + b^2 = \left(\frac{\sqrt{3}+1}{3}\right)^2 + \left(\frac{\sqrt{3}-1}{3}\right)^2 = \frac{3+2\sqrt{3}+1}{9} + \frac{3-2\sqrt{3}+1}{9} = \frac{4+2\sqrt{3}+4-2\sqrt{3}}{9} = \frac{8}{9}.$$

a) $\dfrac{4}{9}$ **b)** $\dfrac{8}{9}$ c) $\dfrac{20}{9}$ d) $\dfrac{8}{3}$

2.

$$\sqrt{\frac{25}{16} - \frac{5}{3} : \left(2 - \frac{1}{3}\right)} = \sqrt{\frac{25}{16} - \frac{5}{3} : \frac{6-1}{3}} = \sqrt{\frac{25}{16} - \frac{5}{3} : \frac{5}{3}} = \sqrt{\frac{25}{16} - 1} = \sqrt{\frac{25-16}{16}} = \sqrt{\frac{9}{16}} = \frac{3}{4}.$$

a) $\dfrac{5}{12}$ b) $\dfrac{1}{4}$ c) $\dfrac{5}{4}$ **d)** $\dfrac{3}{4}$

3.

$$\frac{13}{18} + \left[\frac{1}{6} + \left(\frac{1}{9} - \frac{2}{3}\right)\right] \cdot \frac{4}{7} = \frac{13}{18} + \left[\frac{1}{6} + \frac{1-6}{9}\right] \cdot \frac{4}{7} = \frac{13}{18} + \left(\frac{1}{6} + \frac{-5}{9}\right) \cdot \frac{4}{7} = \frac{13}{18} + \left(\frac{1}{6} - \frac{5}{9}\right) \cdot \frac{4}{7} =$$

$$= \frac{13}{18} + \frac{3-10}{18} \cdot \frac{4}{7} = \frac{13}{18} - \frac{7}{18} \cdot \frac{4}{7} = \frac{13}{18} - \frac{4}{18} = \frac{9}{18} = \frac{1}{2}.$$

a) 1 b) $\dfrac{1}{7}$ **c)** $\dfrac{1}{2}$ d) $\dfrac{4}{7}$

4.

$$\left(\sqrt{\sqrt[6]{a^8}}\right)^3 : \left(\sqrt[3]{\sqrt[4]{a^9}}\right)^2 = \left[\left(\sqrt[6]{a^8}\right)^{\frac{1}{2}}\right]^3 : \left[\left(\sqrt[4]{a^9}\right)^{\frac{1}{3}}\right]^2 = \left(\sqrt[6]{a^8}\right)^{\frac{3}{2}} : \left(\sqrt[4]{a^9}\right)^{\frac{2}{3}} =$$

$$= \left(a^{\frac{8}{6}}\right)^{\frac{3}{2}} : \left(a^{\frac{9}{4}}\right)^{\frac{2}{3}} = a^{\frac{24}{12}} : a^{\frac{18}{12}} = a^2 : a^{\frac{3}{2}} = a^{2-\frac{3}{2}} = a^{\frac{1}{2}} = \sqrt{a}.$$

a) $\sqrt{a}$ b) a c) a^2 d) $\sqrt[6]{a}$

5.

$$7x + 3y = 4$$
$$\underline{2x - 3y = 5}$$
$$9x = 9 \implies x = 1$$
$$2 - 3y = 5 \implies -3y = 3 \ \ y = -1$$
$$x + y = 0.$$

a) 2 b) 3 **c)** 0 d) -2

6.

$$3x^2 - 7x - 11 = 0$$

Za rješenja kvadratne jednačine $ax^2 + bx + c = 0$ *vrijedi da je njihov zbir:* $x_1 + x_2 = -\dfrac{b}{a}$.

$$x_1 + x_2 = -\frac{-7}{3} = \frac{7}{3}.$$

a) 2 b) -3 c) $-\dfrac{11}{3}$ **d)** $\dfrac{7}{3}$

7.

$$|Z| = \left|\frac{1-3i}{1+2i}\right| = \frac{|1-3i|}{|1+2i|} = \frac{\sqrt{1^2 + (-3)^2}}{\sqrt{1^2 + (-2)^2}} = \frac{\sqrt{1+9}}{\sqrt{1+4}} = \frac{\sqrt{10}}{\sqrt{5}} = \sqrt{2}.$$

a) $\sqrt{2}$ b) 2 c) $\sqrt{5}$ d) 1

8.	$\dfrac{x-3}{2x-3} \geq 1$ $D.p.: \ 2x-3 \neq 0 \ \Rightarrow \ x \neq \dfrac{1}{3}$ $\dfrac{x-3}{2x-3} - 1 \geq 0$ $\dfrac{x-3-2x+3}{2x-3} \geq 0$ $\dfrac{-x}{2x-3} \geq 0 \ / \cdot (-1)$ $\dfrac{x}{2x-3} \leq 0$ $x \in \left(0, \dfrac{3}{2}\right].$	$-\infty \qquad\qquad 0 \qquad\qquad \dfrac{3}{2} \qquad\qquad +\infty$ 	x	$-$	$+$	$+$	 	$2x-3$	$-$	$-$	$+$	 	R	$+$	$-$	$+$	

a) $\left[-3, -\dfrac{3}{2}\right)$ **b)** $\left[0, \dfrac{3}{2}\right)$ c) $\left[\dfrac{3}{2}, 3\right)$ d) $[1, 2)$

9.	$\cos 2x = \dfrac{1}{2}$ $2x_1 = \dfrac{\pi}{3} + 2k\pi \ \Rightarrow \ x_1 = \dfrac{\pi}{6} + k\pi$ $x_1 = \dfrac{\pi}{6} \in \left[0, \dfrac{\pi}{2}\right]$ $2x_2 = \dfrac{5\pi}{3} + 2k\pi \ \Rightarrow \ x_2 = \dfrac{5\pi}{6} + k\pi$ $x_2 = \dfrac{5\pi}{6} \notin \left[0, \dfrac{\pi}{2}\right]$ $Rje\check{s}enje \ jedna\check{c}ine: \dfrac{\pi}{6}.$

a) $\dfrac{\pi}{6}$ b) $\dfrac{\pi}{3}$ c) $\dfrac{\pi}{12}$ d) $\dfrac{\pi}{4}$

10.	$Dijagonala \ pravougaonika \ je:$ $d = \sqrt{a^2 + b^2} = \sqrt{12^2 + 16^2} = \sqrt{144 + 256} = \sqrt{400} = 20.$

a) 28   b) 24   c) 18   **d) 20**

1.	Ako je $a = \dfrac{\sqrt{2}+\sqrt{3}}{2}$ i $b = \dfrac{\sqrt{2}-\sqrt{3}}{2}$, onda je $a^2 - b^2$:
	a) $\sqrt{6}$ b) $\dfrac{5}{2}$ c) $-\sqrt{6}$ d) 1
2.	Vrijednost izraza $\sqrt{\dfrac{3}{4}+\dfrac{4}{3}:\left(1-\dfrac{1}{9}\right)}$ je:
	a) $\dfrac{5}{4}$ b) $\dfrac{3}{2}$ c) $\dfrac{2}{3}$ d) 1
3.	Vrijednost izraza $\dfrac{5}{12}+\left[\dfrac{1}{5}-\left(\dfrac{1}{9}+\dfrac{2}{3}\right)\right]\cdot\dfrac{5}{13}$ je:
	a) $\dfrac{23}{36}$ b) $\dfrac{7}{36}$ c) $\dfrac{1}{9}$ d) 1
4.	Vrijednost izraza $\left(\sqrt[6]{\sqrt[3]{a^3}}\right)^{12}:\left(\sqrt[6]{\sqrt{a^3}}\right)^{12}$ je:
	a) a^2 b) a c) $\dfrac{1}{a}$ d) 1
5.	Proizvod rješenja sistema $7x-2y=13$ i $2x+3y=-7$ je:
	a) -1 b) 1 c) 3 d) -3
6.	Zbir realnih rješenja jednačine $2x^2+4x+8=0$ je:
	a) 2 b) $\dfrac{\sqrt{3}}{2}$ c) -2 d) $\dfrac{17}{4}$
7.	Skup realnih rješenja nejednačine $\dfrac{2x-3}{3x+2}\le 0$ je:
	a) $\left(\dfrac{1}{2},\dfrac{2}{3}\right]$ b) $\left(-\dfrac{2}{3},\dfrac{3}{2}\right]$ c) $\left(\dfrac{1}{2},1\right]$ d) $\left[-\dfrac{1}{2},\dfrac{2}{3}\right)$
8.	Modul kompleksnog broja $Z=\dfrac{3+4i}{1-2i}$ je:
	a) $2\sqrt{5}$ b) $\sqrt{5}$ c) 5 d) 1
9.	Ako je $\sin x = \dfrac{\sqrt{2}}{2}$, odrediti x tako da $x\in\left[\dfrac{\pi}{2},\pi\right]$:
	a) $\dfrac{\pi}{4}$ b) $\dfrac{2\pi}{3}$ c) $\dfrac{3\pi}{4}$ d) $\dfrac{4\pi}{5}$
10.	Dijagonala kvadrata je $d=6\sqrt{2}$. Koliko iznosi površina kvadrata?
	a) 36 b) 9 c) 18 d) 12

1.

$$a^2 - b^2 = \left(\frac{\sqrt{2}+\sqrt{3}}{2}\right)^2 - \left(\frac{\sqrt{2}-\sqrt{3}}{2}\right)^2 = \frac{2+2\sqrt{6}+3}{4} - \frac{2-2\sqrt{6}+3}{4} = \frac{5+2\sqrt{6}-5+2\sqrt{6}}{4} = \frac{4\sqrt{6}}{4} = \sqrt{6}.$$

a) $\sqrt{6}$ b) $\frac{5}{2}$ c) $-\sqrt{6}$ d) 1

2.

$$\sqrt{\frac{3}{4}+\frac{4}{3}:\left(1-\frac{1}{9}\right)} = \sqrt{\frac{3}{4}+\frac{4}{3}:\frac{9-1}{9}} = \sqrt{\frac{3}{4}+\frac{4}{3}\cdot\frac{8}{9}} = \sqrt{\frac{3}{4}+\frac{3}{2}} = \sqrt{\frac{3+6}{4}} = \sqrt{\frac{9}{4}} = \frac{3}{2}.$$

a) $\frac{5}{4}$ **b)** $\frac{3}{2}$ c) $\frac{2}{3}$ d) 1

3.

$$\frac{5}{12}+\left[\frac{1}{5}-\left(\frac{1}{9}+\frac{2}{3}\right)\right]\cdot\frac{5}{13} = \frac{5}{12}+\left[\frac{1}{5}-\frac{1+6}{9}\right]\cdot\frac{5}{13} = \frac{5}{12}+\left(\frac{1}{5}-\frac{7}{9}\right)\cdot\frac{5}{13} = \frac{5}{12}+\frac{9-35}{45}\cdot\frac{5}{13} =$$

$$= \frac{5}{12}-\frac{26}{45}\cdot\frac{5}{13} = \frac{5}{12}-\frac{2}{9} = \frac{15-8}{36} = \frac{7}{36}.$$

a) $\frac{23}{36}$ **b)** $\frac{7}{36}$ c) $\frac{1}{9}$ d) 1

4.

$$\left(\sqrt[6]{\sqrt[3]{a^3}}\right)^{12} : \left(\sqrt[6]{\sqrt{a^2}}\right)^{12} = \left(\sqrt[6]{a}\right)^{12} : \left(\sqrt[6]{a}\right)^{12} = 1.$$

a) a^2 b) a c) $\frac{1}{a}$ **d)** 1

5.

$7x-2y=13 \ /\cdot 3$

$2x+3y=-7 \ /\cdot 2$

$21x-6y=39$

$4x+6y=-14$

$25x=25 \implies x=1$

$2+3y=-7 \implies 3y=-9 \ \ y=-3$

$x\cdot y=-3$

a) -1 b) 1 c) 3 **d)** -3

6.

$2x^2+4x+8=0$

Za rješenja kvadratne jednačine $ax^2+bx+c=0$ *vrijedi da je njihov zbir:* $x_1+x_2=-\frac{b}{a}$.

$$x_1+x_2 = -\frac{-4}{2} = -2.$$

a) 2 b) $\frac{\sqrt{3}}{2}$ **c)** -2 d) $\frac{17}{4}$

7.

$$\frac{2x-3}{3x+2} \le 0$$

$D.p.:\ 3x+2 \neq 0 \implies x \neq -\frac{2}{3}$

$$\frac{2x-3}{3x+2} \le 0$$

$x \in \left(-\frac{2}{3}, \frac{3}{2}\right].$

	$-\infty$	$-\frac{2}{3}$	$\frac{3}{2}$	$+\infty$
$2x-3$		$-$	$-$	$+$
$3x+2$		$-$	$+$	$+$
R		$+$	$-$	$+$

a) $\left(\frac{1}{2}, \frac{2}{3}\right]$ **b)** $\left(-\frac{2}{3}, \frac{3}{2}\right]$ c) $\left(\frac{1}{2}, 1\right]$ d) $\left[-\frac{1}{2}, \frac{2}{3}\right)$

8.

$|Z| = \left|\frac{3+4i}{1-2i}\right| = \frac{|3+4i|}{|1-2i|} = \frac{\sqrt{(3)^2+(4)^2}}{\sqrt{1^2+(-2)^2}} = \frac{\sqrt{9+16}}{\sqrt{1+4}} = \frac{\sqrt{25}}{\sqrt{5}} = \frac{5}{\sqrt{5}} = \sqrt{5}.$

a) $2\sqrt{5}$ **b)** $\sqrt{5}$ c) 5 d) 1

9.

$\sin x = \frac{\sqrt{2}}{2}$

$x_1 = \frac{\pi}{4} + 2k\pi \implies x_1 = \frac{\pi}{4} + 2k\pi$

$x_1 = \frac{\pi}{4} \notin \left[\frac{\pi}{2}, \pi\right]$

$x_2 = \frac{3\pi}{4} + 2k\pi \implies x_2 = \frac{2\pi}{3} + 2k\pi$

$x_2 = \frac{3\pi}{4} \in \left[\frac{\pi}{2}, \pi\right]$

Rješenje jednačine : $\frac{3\pi}{4}$.

a) $\frac{\pi}{4}$ b) $\frac{2\pi}{3}$ **c)** $\frac{3\pi}{4}$ d) $\frac{4\pi}{5}$

10.

Dijagonala d kvadrata stranice a je :

$d = a\sqrt{2} \implies a = 6.$

Površina kvadrata je :

$P = a^2 = 36.$

a) 36 b) 9 c) 18 d) 12

1. Ako je $a = \dfrac{\sqrt{2}+3}{2}$ i $b = \dfrac{\sqrt{2}-3}{2}$, onda je $a^2 - b^2$:

a) $3\sqrt{2}$ b) $\dfrac{5}{2}$ c) $-\sqrt{2}$ d) 1

2. Vrijednost izraza $\sqrt{\dfrac{3}{4} + \dfrac{4}{3} : \left(1 - \dfrac{1}{3}\right)}$ je:

a) $\dfrac{\sqrt{3}}{2}$ b) $\dfrac{3}{2}$ c) $\dfrac{\sqrt{11}}{2}$ d) 1

3. Vrijednost izraza $\dfrac{5}{4} + \left[\dfrac{1}{5} - \left(\dfrac{1}{9} + \dfrac{2}{3}\right)\right] \cdot \dfrac{5}{2}$ je:

a) $\dfrac{13}{36}$ b) $-\dfrac{7}{36}$ c) $\dfrac{1}{9}$ d) 1

4. Koliko iznosi parametar a ako pravac $y = 5x - a$ prolazi kroz tačku (1,2)?

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

5. Proizvod rješenja sistema $3x - 2y = 9$ i $2x + 3y = -7$ je:

a) -1 b) 1 c) 3 d) -3

6. Zbir rješenja jednačine $2x^2 - 8x + 8 = 0$ je:

a) 4 b) $\dfrac{\sqrt{3}}{2}$ c) -2 d) $\dfrac{17}{4}$

7. Skup rješenja nejednačine $\dfrac{2x-3}{3x-2} \leq 0$ je:

a) $\left(\dfrac{1}{2}, \dfrac{2}{3}\right]$ b) $\left(\dfrac{2}{3}, \dfrac{3}{2}\right]$ c) $\left(\dfrac{1}{2}, 1\right]$ d) $\left[-\dfrac{1}{2}, \dfrac{2}{3}\right)$

8. Modul kompleksnog broja $Z = 1 + 5i$ je:

a) $2\sqrt{5}$ b) $\sqrt{26}$ c) 2 d) 1

9. Ako je $\sin x = \dfrac{\sqrt{2}}{2}$, odrediti x tako da $x \in \left[0, \dfrac{\pi}{2}\right]$:

a) $\dfrac{\pi}{4}$ b) $\dfrac{2\pi}{3}$ c) $\dfrac{3\pi}{4}$ d) $\dfrac{4\pi}{5}$

10. Dijagonala kvadrata je $d = 3\sqrt{2}$. Koliko iznosi površina kvadrata?

a) 4 b) 9 c) 6 d) 12

1.

$$a^2 - b^2 = \left(\frac{\sqrt{2}+3}{2}\right)^2 - \left(\frac{\sqrt{2}-3}{2}\right)^2 = \frac{2+6\sqrt{2}+9}{4} - \frac{2-6\sqrt{2}+9}{4} = \frac{2+6\sqrt{2}-2+6\sqrt{2}}{4} = \frac{12\sqrt{2}}{4} =$$

$$= 3\sqrt{2}.$$

a) $3\sqrt{2}$ b) $\frac{5}{2}$ c) $-\sqrt{5}$ d) 1

2.

$$\sqrt{\frac{3}{4} + \frac{4}{3} : \left(1 - \frac{1}{3}\right)} = \sqrt{\frac{3}{4} + \frac{4}{3} : \frac{3-1}{3}} = \sqrt{\frac{3}{4} + \frac{4}{3} : \frac{2}{3}} = \sqrt{\frac{3}{4} + 2} = \sqrt{\frac{3+8}{4}} = \sqrt{\frac{11}{4}} = \frac{\sqrt{11}}{2}.$$

a) $\frac{\sqrt{3}}{2}$ b) $\frac{3}{2}$ **c)** $\frac{\sqrt{11}}{2}$ d) 1

3.

$$\frac{5}{4} + \left[\frac{1}{5} - \left(\frac{1}{9} + \frac{2}{3}\right)\right] \cdot \frac{5}{2} = \frac{5}{4} + \left[\frac{1}{5} - \frac{1+6}{9}\right] \cdot \frac{5}{2} = \frac{5}{4} + \left(\frac{1}{5} - \frac{7}{9}\right) \cdot \frac{5}{2} = \frac{5}{4} + \frac{9-35}{45} \cdot \frac{5}{2} =$$

$$= \frac{5}{4} - \frac{26}{45} \cdot \frac{5}{2} = \frac{5}{4} - \frac{13}{9} = \frac{45-52}{36} = -\frac{7}{36}.$$

a) $\frac{13}{36}$ **b)** $-\frac{7}{36}$ c) $\frac{1}{9}$ d) 1

4.

Nakon uvrštavanja koordinata tačke (1,2) u jednačinu pravca, dobija se:

$$y = 5x - a \Rightarrow 2 = 5 - a \Rightarrow a = 3$$

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

5.

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

$$2x + 3y = -7 \quad / \cdot 2$$

$$\overline{9x - 6y = 27}$$

$$\underline{4x + 6y = -14}$$

$$13x = 13 \Rightarrow x = 1$$

$$2 + 3y = -7 \Rightarrow 3y = -9 \quad y = -3$$

$$x \cdot y = -3$$

a) -1 b) 1   c) 3   **d)** -3

6.

$$2x^2 - 8x + 8 = 0$$

Za rješenja kvadratne jednačine $ax^2 + bx + c = 0$ *vrijedi da je njihov zbir :* $x_1 + x_2 = -\frac{b}{a}.$

$$x_1 + x_2 = -\frac{-8}{2} = 4.$$

a) 4   b) $\frac{\sqrt{3}}{2}$ c) -2 d) $\frac{17}{4}$

7.

$$\frac{2x-3}{3x-2} \leq 0$$

$D.p.:\ 3x-2 \neq 0 \Rightarrow x \neq \frac{2}{3}$

$$\frac{2x-3}{3x-2} \leq 0$$

$$x \in \left(\frac{2}{3}, \frac{3}{2} \right].$$

	$-\infty$	$\frac{2}{3}$	$\frac{3}{2}$	$+\infty$
2x-3	-	-	+	
3x-2	-	+	+	
R	+	-	+	

a) $\left(\frac{1}{2}, \frac{2}{3} \right]$ **b)** $\left(\frac{2}{3}, \frac{3}{2} \right]$ c) $\left(\frac{1}{2}, 1 \right]$ d) $\left[-\frac{1}{2}, \frac{2}{3} \right)$

8.

$$|Z| = |1 + 5i| = \sqrt{(1)^2 + (5)^2} = \sqrt{1 + 25} = \sqrt{26}.$$

a) $2\sqrt{5}$ **b)** $\sqrt{26}$ c) 2 d) 1

9.

$$\sin x = \frac{\sqrt{2}}{2}$$

$$x_1 = \frac{\pi}{4} + 2k\pi \Rightarrow x_1 = \frac{\pi}{4} + 2k\pi$$

$$x_1 = \frac{\pi}{4} \in \left[0, \frac{\pi}{2} \right]$$

$Rješenje\ jednačine : \frac{\pi}{4}.$

a) $\frac{\pi}{4}$ b) $\frac{2\pi}{3}$ c) $\frac{3\pi}{4}$ d) $\frac{4\pi}{5}$

10.

$Dijagonala\ d\ kvadrata\ stranice\ a\ je :$

$$d = a\sqrt{2} \Rightarrow a = 3.$$

$Površina\ kvadrata\ je :$

$$P = a^2 = 9.$$

a) 4 **b)** 9 c) 6 d) 12

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. Vrijednost izraza $\sqrt{\dfrac{25}{16} - \dfrac{5}{3} : \left(2 - \dfrac{1}{3}\right)}$ je:

a) $\dfrac{5}{3}$ b) $\dfrac{5}{4}$ c) $\dfrac{5}{2}$ d) 1

2. Ako je $a = \dfrac{\sqrt{2} - 1}{2}$ i $b = \dfrac{\sqrt{2} + 1}{2}$, onda je $a^2 + b^2$:

a) $\sqrt{2}$ b) $\dfrac{3}{4}$ c) $\dfrac{3}{2}$ d) $2\sqrt{2}$

3. Vrijednost izraza $\dfrac{13}{18} - \left[\dfrac{1}{9} - \left(\dfrac{1}{6} - \dfrac{2}{3}\right)\right] \cdot \dfrac{7}{11}$ je:

a) $\dfrac{1}{3}$ b) $\dfrac{2}{3}$ c) $\dfrac{1}{6}$ d) 1

4. Vrijednost izraza $\left(\sqrt{\sqrt[6]{a^3}}\right)^8 : \left(\sqrt[6]{\sqrt[3]{a^9}}\right)^2$ je:

a) a^2 b) $\sqrt{a}$ c) a d) a^3

5. Zbir rješenja sistema $5x - 2y = 1$ i $4x - y = 2$ je:

a) -3 b) 3   c) 2   d) 1

6. Proizvod realnih rješenja jednačine $x^2 - 6x + 5 = 0$ je:

a) 5   b) $\dfrac{5}{6}$ c) 6   d) $-\dfrac{5}{6}$

7. Modul kompleksnog broja $Z = \dfrac{1 + 3i}{2 + i}$ je:

a) 1   b) $\sqrt{10}$ c) $\sqrt{2}$ d) $2\sqrt{2}$

8. Skup realnih rješenja nejednačine $\dfrac{x - 3}{2x - 3} \geq 1$ je:

a) $\left[-\dfrac{3}{2}, 0\right)$ b) $\left[-3, -\dfrac{3}{2}\right)$ c) $\left[\dfrac{3}{2}, 3\right)$ d) $\left[0, \dfrac{3}{2}\right)$

9. Koliko iznosi $\sin x$ ako je $\cos x = \dfrac{\sqrt{3}}{2}$ i $x \in \left[0, \dfrac{\pi}{2}\right]$?

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

10. Koliko iznosi površina pravougaonika stranice a=3 i dijagonale d=5?

a) 12   b) 8   c) 16   d) 24

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
TEHNIČKI ODGOJ I INFORMATIKA
Tuzla, 02.07.2019.godine

KVALIFIKACIONI ISPIT IZ MATEMATIKE
Rješenje

1.

$$\sqrt{\frac{25}{16} - \frac{5}{3} : \left(2 - \frac{1}{3}\right)} = \sqrt{\frac{25}{16} - \frac{5}{3} : \frac{6-1}{3}} = \sqrt{\frac{25}{16} - \frac{5}{3} : \frac{5}{3}} = \sqrt{\frac{25}{16} - 1} = \sqrt{\frac{25-16}{16}} = \sqrt{\frac{9}{16}} = \frac{3}{4}$$

a) $\frac{5}{3}$ b) $\frac{5}{4}$ c) $\frac{5}{2}$ **d) $\frac{3}{4}$**

2.

$$a^2 + b^2 = \left(\frac{\sqrt{2}-1}{2}\right)^2 + \left(\frac{\sqrt{2}+1}{2}\right)^2 = \frac{2-2\sqrt{2}+1}{4} + \frac{2+2\sqrt{2}+1}{4} = \frac{6}{4} = \frac{3}{2}$$

a) $\sqrt{2}$ b) $\frac{3}{4}$ **c) $\frac{3}{2}$**   d) $2\sqrt{2}$

3.

$$\frac{13}{18} - \left[\frac{1}{9} - \left(\frac{1}{6} - \frac{2}{3}\right)\right] \cdot \frac{7}{11} = \frac{13}{18} - \left(\frac{1}{9} - \frac{1-4}{6}\right) \cdot \frac{7}{11} = \frac{13}{18} - \left(\frac{1}{9} + \frac{3}{6}\right) \cdot \frac{7}{11} =$$

$$\frac{13}{18} - \frac{2+9}{18} \cdot \frac{7}{11} = \frac{13}{18} - \frac{7}{18} = \frac{6}{18} = \frac{1}{3}$$

a) $\frac{1}{3}$ b) $\frac{2}{3}$ c) $\frac{1}{6}$ d) 1

4.

$$\left(\sqrt{\sqrt[6]{a^3}}\right)^8 : \left(\sqrt[6]{\sqrt[3]{a^9}}\right)^2 = \left(a^{3\cdot8}\right)^{\frac{1}{6\cdot2}} : \left(a^{9\cdot2}\right)^{\frac{1}{6\cdot3}} = a^2 : a = a$$

a) a^2 b) $\sqrt{a}$ **c) a**   d) a^3

5.

$5x - 2y = 1$

$\underline{4x - y = 2 \quad / \cdot (-2)}$

$5x - 2y = 1$

$\underline{-8x + 2y = -4}$

$-3x = -3$

$x = 1$

$5 \cdot 1 - 2y = 1$

$-2y = 1 - 5$

$-2y = -4$

$y = 2$

$x + y = 1 + 2 = 3$

a) -3 **b) 3**   c) 2   d) 1

6.

$x^2 - 6x + 5 = 0$

Za kvadratnu jednačinu $ax^2 + bx + c = 0$ *po Viettovim pravilima proizvod rješenja* :

$x_1 \cdot x_2 = \frac{c}{a} \implies x_1 \cdot x_2 = \frac{5}{1} = 5$

a) 5   b) $\frac{5}{6}$ c) 6   d) $-\frac{5}{6}$

7.

$$|Z| = \left|\frac{1+3i}{2+i}\right| = \frac{\sqrt{1^2 + 3^2}}{\sqrt{2^2 + 1^2}} = \frac{\sqrt{10}}{\sqrt{5}} = \sqrt{2}$$

a) 1   b) $\sqrt{10}$ **c) $\sqrt{2}$**   d) $2\sqrt{2}$

8.	$\dfrac{x-3}{2x-3} \geq 1; \quad DP : 2x-3 \neq 0 \;\Rightarrow\; x \neq \dfrac{3}{2}$ $\dfrac{x-3}{2x-3} - 1 \geq 0$ $\dfrac{x-3-2x+3}{2x-3} \geq 0$ $\dfrac{-x}{2x-3} \geq 0$ $\dfrac{x}{2x-3} \leq 0$ $x \in \left[0, \dfrac{3}{2} \right)$	<table><tr><td></td><td>$-\infty$</td><td>0</td><td>$\dfrac{3}{2}$</td><td>$+\infty$</td></tr><tr><td>x</td><td>$-$</td><td>$+$</td><td>$+$</td></tr><tr><td>$2x-3$</td><td>$-$</td><td>$-$</td><td>$+$</td></tr><tr><td></td><td>$+$</td><td>$-$</td><td>$+$</td></tr></table>

a) $\left[-\dfrac{3}{2}, 0 \right)$　　　　b) $\left[-3, -\dfrac{3}{2} \right)$　　　　c) $\left[\dfrac{3}{2}, 3 \right)$　　　　**d)** $\left[0, \dfrac{3}{2} \right)$

9.	$\sin^2 x + \cos^2 x = 1$ $\sin x = \pm\sqrt{1-\cos^2 x} = \pm\sqrt{1-\left(\dfrac{\sqrt{3}}{2}\right)^2} = \pm\sqrt{1-\dfrac{3}{4}} = \pm\sqrt{\dfrac{1}{4}} = \pm\dfrac{1}{2}$ i $x \in \left[0, \dfrac{\pi}{2}\right]$? $U\ I\ kvadrantu\ \sin x \geq 0, te\ slijedi :$ $\sin x = \dfrac{1}{2}$

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

10.	$a^2 + b^2 = d^2$ $b = \sqrt{d^2 - a^2} = 4$ $P = a \cdot b = 12$

a) 12　　　　b) 8　　　　c) 16　　　　d) 24

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.	Vrijednost izraza $\sqrt{\dfrac{9}{16}+\dfrac{11}{3}:\left(3+\dfrac{2}{3}\right)}$ je:			
	a) 1	b) $\dfrac{3}{4}$	c) 2	d) $\dfrac{5}{4}$

2.	Ako je $a=\dfrac{\sqrt{3}-\sqrt{2}}{2}$ i $b=\dfrac{\sqrt{3}+\sqrt{2}}{2}$, onda je a^2+b^2:			
	a) $\dfrac{5}{2}$	b) $\sqrt{6}$	c) $2\sqrt{6}$	d) $-2\sqrt{6}$

3.	Vrijednost izraza $\dfrac{11}{18}+\left[\dfrac{1}{3}+\left(\dfrac{1}{9}-\dfrac{1}{6}\right)\right]\cdot\dfrac{7}{5}$ je:			
	a) $\dfrac{1}{2}$	b) 1	c) $\dfrac{17}{18}$	d) $\dfrac{1}{3}$

4.	Vrijednost izraza $\left(\sqrt[3]{a^4}\right)^3:\left(\sqrt[4]{a^3}\right)^4$ je:			
	a) $\sqrt{a}$	b) $\sqrt{a^3}$	c) a	d) $\sqrt[3]{a^2}$

5.	Zbir rješenja sistema $2x+y=1$ i $x-2y=3$ je:			
	a) 0	b) -1	c) 2	d) 1

6.	Proizvod realnih rješenja jednačine $2x^2+3x-2=0$ je:			
	a) 1	b) $-\dfrac{3}{2}$	c) $\dfrac{3}{2}$	d) -1

7.	Skup realnih rješenja nejednačine $x^2-3x<-2$ je:			
	a) $(-2,-1)$	b) $(1,2)$	c) $(-1,1)$	d) $(2,+\infty)$

8.	Modul kompleksnog broja $Z=3+i$ je:			
	a) $\sqrt{10}$	b) $\sqrt{5}$	c) $\sqrt{2}$	d) 1

9.	Koliko iznosi x ako je $\sin x=\dfrac{1}{2}$?			
	a) $\dfrac{\pi}{4}$	b) $\dfrac{\pi}{2}$	c) $\dfrac{\pi}{6}$	d) $\dfrac{\pi}{3}$

10.	Vrijednosti hipotenuze i jedne katete pravouglog trougla su c=5 i a=4. Koliko iznosi druga kateta b?			
	a) 2	b) 3	c) 1	d) 4

| **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.

$$\sqrt{\frac{9}{16}+\frac{11}{3}:\left(3+\frac{2}{3}\right)}=\sqrt{\frac{9}{16}+\frac{11}{3}:\frac{9+2}{3}}=\sqrt{\frac{9}{16}+\frac{11}{3}:\frac{11}{3}}=\sqrt{\frac{9}{16}+1}=\sqrt{\frac{9+16}{16}}=\sqrt{\frac{25}{16}}=\frac{5}{4}$$

a) 1 b) $\frac{3}{4}$ c) 2 **d)** $\frac{5}{4}$

2.

$$a^2+b^2=\left(\frac{\sqrt{3}-\sqrt{2}}{2}\right)^2+\left(\frac{\sqrt{3}+\sqrt{2}}{2}\right)^2=\frac{3-2\sqrt{6}+2}{4}+\frac{3+2\sqrt{6}+2}{4}=\frac{10}{4}=\frac{5}{2}$$

a) $\frac{5}{2}$ b) $\sqrt{6}$ c) $2\sqrt{6}$ d) $-2\sqrt{6}$

3.

$$\frac{11}{18}+\left[\frac{1}{3}+\left(\frac{1}{9}-\frac{1}{6}\right)\right]\cdot\frac{7}{5}=\frac{11}{18}+\left[\frac{1}{3}+\frac{2-3}{18}\right]\cdot\frac{7}{5}=\frac{11}{18}+\left[\frac{1}{3}-\frac{1}{18}\right]\cdot\frac{7}{5}=\frac{11}{18}+\frac{6-1}{18}\cdot\frac{7}{5}=$$

$$=\frac{11}{18}+\frac{5}{18}\cdot\frac{7}{5}=\frac{11}{18}+\frac{7}{18}=1$$

a) $\frac{1}{2}$ **b)** 1 c) $\frac{17}{18}$ d) $\frac{1}{3}$

4.

$$\left(\sqrt[3]{a^4}\right)^3:\left(\sqrt[4]{a^3}\right)^4=\left(a^{\frac{4}{3}}\right)^3:\left(a^{\frac{3}{4}}\right)^4=a^4:a^3=a$$

a) $\sqrt{a}$ b) $\sqrt{a^3}$ **c)** a d) $\sqrt[3]{a^2}$

5.

$$2x+y=1 \quad /\cdot 2$$
$$x-2y=3$$
$$\overline{}$$
$$4x+2y=2$$
$$x-2y=3$$
$$\overline{}$$
$$5x=5$$
$$x=1$$
$$2\cdot 1+y=1$$
$$y=1-2$$
$$y=-1$$
$$x+y=1-1=0$$

a) 0 b) -1 c) 2 d) 1

6.

$$2x^2+3x-2=0$$

Viett − ova pravila za kvadratnu jednačinu $ax^2+bx+c=0$

$$x_1\cdot x_2=\frac{c}{a}=\frac{-2}{2}=-1$$

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

7.

$$x^2-3x<-2$$

a) $(-2,-1)$ **b)** $(1,2)$ c) $(-1,1)$ d) $(2,+\infty)$

8.	$Z = 3 + i$			
	$\|Z\| = \|3 + i\| = \sqrt{3^2 + 1^2} = \sqrt{10}$			
	a) $\sqrt{10}$	b) $\sqrt{5}$	c) $\sqrt{2}$	d) 1

9.	$\sin x = \dfrac{1}{2} \implies x = \arcsin \dfrac{1}{2} = \dfrac{\pi}{6}$			
	a) $\dfrac{\pi}{4}$	b) $\dfrac{\pi}{2}$	**c)** $\dfrac{\pi}{6}$	d) $\dfrac{\pi}{3}$

10.	$a = 4 \ \wedge \ c = 5$			
	$b = \sqrt{c^2 - a^2} = 3$			
	a) 2	**b) 3**	c) 1	d) 4

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.**