Univerzitet u Tuzli

Fakultet elektrotehnike

KATALOG

riješenih zadataka za prijemni ispit iz Matematike na studijskom programu Elektrotehnika i računarstvo u akademskoj 2026/2027 godini

Tuzla, januar 2026.

UNIVERZITET U TUZLI **Fakultet elektrotehnike** **Katalog zadataka za prijemni ispit na EiR**	**1. GRUPA ZADATAKA**

1.	Rješenje uproštenog izraza $\frac{2x^2+5x-3}{x^2+x-6}\cdot\frac{x^2-3x+2}{2x^2+x-1}$ je:			
	a). 1	b). -1	c). $\frac{x-2}{2x-1}$	d). $\frac{x-1}{x+1}$
2.	Zbir rješenja sistema $2x-y=6$ i $5x+2y=-3$ je:			
	a). -5	b). -3	c). 3	d). 5
3.	Broj rješenja nejednačine $\frac{2x-1}{x-2}\le 1$ koji pripadaju skupu prirodnih brojeva je:			
	a). 1	b). 0	c). 2	d). 3
4.	Proizvod realnih rješenja jednačine $2\cdot 2^x+2^{-x}=3$ je:			
	a). -1	b). $\frac{1}{2}$	c). 0	d). 2
5.	Koliko iznosi vrijednost izraza $\log_3 27+2\log_{\frac{1}{2}} 8-3\log_{\frac{1}{3}} 3-2\log_2 \frac{1}{4}$?			
	a). -6	b). 4	c). 3	d). -5
6.	Koliko iznosi $Z\cdot\overline{Z}$, ako je $Z=3-i$? ($\overline{Z}$ - konjugovano kompleksna vrijednost broja Z)			
	a). 10	b). 8	c). 4	d). 5
7.	Koliko iznosi $ctgx$ ako je $\cos x=\frac{1}{2}$ i $x\in\left[0,\frac{\pi}{2}\right]$?			
	a). 1	b). $\frac{\sqrt{3}}{2}$	c). $\frac{\sqrt{3}}{3}$	d). $\sqrt{3}$
8.	Ako su x i y rješenja sistema: $x+y=1$ i $x^3+y^3=13$, tada je x^2+y^2 jednako:			
	a). 5	b). 9	c). 12	d). 10
9.	Koliko iznosi proizvod $\left(1-\frac{1}{2^2}\right)\cdot\left(1-\frac{1}{3^2}\right)\cdot\left(1-\frac{1}{4^2}\right)\cdot\ldots\cdot\left(1-\frac{1}{2023^2}\right)$?			
	a). 1	b). 2	c). $\frac{1023}{2023}$	d). $\frac{1012}{2023}$
10.	Ako se obim kružnice poveća za $\sqrt{3}$ puta, koliko puta se poveća površina kruga?			
	a). $\sqrt{3}$	b). 2	c). 3	d). 9

UNIVERZITET U TUZLI **Fakultet elektrotehnike** **Katalog zadataka za prijemni ispit na EiR**	**RJEŠENJA** **1. GRUPE ZADATAKA**

1.

$$\frac{2x^2+5x-3}{x^2+x-6}\cdot\frac{x^2-3x+2}{2x^2+x-1}=$$

$$ax^2+bx+c=a\left(x-x_1\right)\cdot\left(x-x_2\right)$$

$$x_{1,2}=\frac{-b\pm\sqrt{b^2-4ac}}{2a}$$

$$2x^2+5x-3=\left(2x-1\right)\left(x+3\right)$$

$$x^2+x-6=\left(x-2\right)\left(x+3\right)$$

$$x^2-3x+2=\left(x-1\right)\left(x-2\right)$$

$$2x^2+x-1=\left(2x-1\right)\left(x+1\right)$$

$$\frac{2x^2+5x-3}{x^2+x-6}\cdot\frac{x^2-3x+2}{2x^2+x-1}=\frac{\left(2x-1\right)\left(x+3\right)}{\left(x-2\right)\left(x+3\right)}\cdot\frac{\left(x-1\right)\left(x-2\right)}{\left(2x-1\right)\left(x+1\right)}=\frac{x-1}{x+1}$$

a). 1 b). -1 c). $\frac{x-2}{2x-1}$ **d).** $\frac{x-1}{x+1}$

2.

$$2x-y=6 \quad /\cdot 2$$

$$\underline{5x+2y=-3}$$

$$4x-2y=12$$

$$\underline{5x+2y=-3}$$

$$9x=9 \Rightarrow x=1$$

$$5\cdot 1+2y=-3 \Rightarrow 2y=-8 \Rightarrow y=-4$$

$$x+y=1-4=-3.$$

a). -5 **b). -3** c). 3 d). 5

3.

$$\frac{2x-1}{x-2}\le 1$$

$$D.P.: x-2\neq 0 \Rightarrow x\neq 2$$

$$\frac{2x-1}{x-2}-1\le 0$$

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

$$\frac{x+1}{x-2}\le 0 \Rightarrow x\in\left[-1,2\right)\wedge x\in N \Rightarrow x=1$$

Broj rješenja :1.

a). 1 b). 0 c). 2 d). 3

4.

$2\cdot 2^x + 2^{-x} = 3$

$2\cdot 2^x + \frac{1}{2^x} = 3 \ / \cdot 2^x$

$2\cdot 2^{2x} + 1 = 3\cdot 2^x$

$2\cdot 2^{2x} - 3\cdot 2^x + 1 = 0$

$2^x = t$

$2\cdot t^2 - 3\cdot t + 1 = 0$

$t_1 = 1 \ \wedge \ t_2 = \frac{1}{2}$

$2^x = 1 \Rightarrow 2^x = 2^0 \Rightarrow x_1 = 0$

$2^x = \frac{1}{2} \Rightarrow 2^x = 2^{-1} \Rightarrow x_2 = -1$

$x_1 \cdot x_2 = 0\cdot(-1) = 0.$

a). -1 b). $\frac{1}{2}$ **c). 0** d). 2

5.

$\log_3 27 + 2\log_{\frac{1}{2}} 8 - 3\log_{\frac{1}{3}} 3 - 2\log_2 \frac{1}{4} = \log_3 3^3 + 2\log_{2^{-1}} 2^3 - 3\log_{3^{-1}} 3 - 2\log_2 2^{-2} =$

$3\log_3 3 + \frac{2\cdot 3}{-1}\log_2 2 - \frac{3}{-1}\log_3 3 - 2\cdot(-2)\cdot\log_2 2 = 3 - 6 + 3 + 4 = 4.$

a). -6 **b). 4** c). 3 d). -5

6.

$Z\cdot\overline{Z} = ?$

$Z = 3 - i$

$\overline{Z} = 3 + i$

$Z\cdot\overline{Z} = (3-i)\cdot(3+i) = 3^2 - i^2 = 9 - (-1) = 10.$

a). 10 b). 8 c). 4 d). 5

7.

$\cos x = \frac{1}{2}$

$\sin^2 x + \cos^2 x = 1 \Rightarrow \sin x = \pm\sqrt{1-\cos^2 x} = \pm\sqrt{1-\frac{1}{4}} = \pm\sqrt{\frac{3}{4}} = \pm\frac{\sqrt{3}}{2}$

$\sin x = \frac{\sqrt{3}}{2}, \ jer \ x \in \left[0, \frac{\pi}{2}\right]$

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

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

8.

$x+y=1$

$x^3+y^3=13$

$x+y=1 \ /^3$

$x^3+3x^2y+3xy^2+y^3=1$

$x^3+y^3=1-3xy(x+y)$

$1-3xy(x+y)=13$

$1-3xy\cdot 1=13$

$-3xy=12$

$xy=-4$

$x+y=1 \ /^2 \Rightarrow x^2+2xy+y^2=1 \Rightarrow x^2+y^2=1-2xy=1-2\cdot(-4)=9.$

a). 5 **b). 9** c). 12 d). 10

9.

$$\left(1-\frac{1}{2^2}\right)\cdot\left(1-\frac{1}{3^2}\right)\cdot\left(1-\frac{1}{4^2}\right)\cdot\ldots\cdot\left(1-\frac{1}{2023^2}\right)=$$

$$=\frac{2^2-1}{2^2}\cdot\frac{3^2-1}{3^2}\cdot\frac{4^2-1}{4^2}\cdot\ldots\cdot\frac{2022^2-1}{2022^2}\cdot\frac{2023^2-1}{2023^2}=$$

$$=\frac{(2-1)\cdot(2+1)}{2\cdot 2}\cdot\frac{(3-1)\cdot(3+1)}{3\cdot 3}\cdot\frac{(4-1)\cdot(4+1)}{4\cdot 4}\cdot\ldots\cdot\frac{(2022-1)\cdot(2022+1)}{2022\cdot 2022}\cdot\frac{(2024-1)\cdot(2024+1)}{2024\cdot 2024}=$$

$$=\frac{1\cdot 3}{2\cdot 2}\cdot\frac{2\cdot 4}{3\cdot 3}\cdot\frac{3\cdot 5}{4\cdot 4}\cdot\ldots\cdot\frac{2021\cdot 2023}{2022\cdot 2022}\cdot\frac{2022\cdot 2024}{2023\cdot 2023}=$$

$$=\frac{1}{2}\cdot\frac{3}{2}\cdot\frac{2}{3}\cdot\frac{4}{3}\cdot\frac{3}{4}\cdot\frac{5}{4}\cdot\frac{4}{5}\cdot\frac{6}{5}\cdot\ldots\cdot\frac{2021}{2022}\cdot\frac{2023}{2022}\cdot\frac{2022}{2023}\cdot\frac{2024}{2023}=$$

$$=\frac{1}{2}\cdot\left(\frac{3}{2}\cdot\frac{2}{3}\right)\cdot\left(\frac{4}{3}\cdot\frac{3}{4}\right)\cdot\left(\frac{5}{4}\cdot\frac{4}{5}\right)\cdot\frac{6}{5}\cdot\ldots\cdot\frac{2021}{2022}\cdot\left(\frac{2023}{2022}\cdot\frac{2022}{2023}\right)\cdot\frac{2024}{2023}=$$

$$=\frac{1}{2}\cdot 1\cdot 1\cdot 1\cdot 1\cdot\ldots\cdot 1\cdot 1\cdot\frac{2024}{2023}=\frac{2024}{2\cdot 2023}=\frac{1012}{2023}.$$

a). 1 b). 2 c). $\frac{1023}{2023}$ **d).** $\frac{1012}{2023}$

10.

$O_1=2r_1\pi$

$O_2=2r_2\pi$

$\frac{O_2}{O_1}=\sqrt{3}$

$\frac{2r_2\pi}{2r_1\pi}=\sqrt{3} \ \Rightarrow \ r_2=r_1\sqrt{3}$

$P_1=r_1^2\pi$

$P_2=r_2^2\pi$

$\frac{P_2}{P_1}=\frac{r_2^2\pi}{r_1^2\pi}=\frac{\left(r_1\sqrt{3}\right)^2}{r_1^2}=\frac{3r_1^2}{r_1^2}=3$

Površina se poveća za 3 *puta*.

a). $\sqrt{3}$ b). 2 **c). 3** d). 9

UNIVERZITET U TUZLI **Fakultet elektrotehnike** **Katalog zadataka za prijemni ispit na EiR**	**2. GRUPA ZADATAKA**

1.	Rješenje uproštenog izraza $\frac{2x^2-5x-3}{x^2-x-6}\cdot\frac{x^2+3x+2}{2x^2-x-1}$ je:			
	a). -1	b). $\frac{x+1}{x-1}$	c). 1	d). $\frac{2x+1}{x+2}$
2.	Zbir rješenja sistema $3x+y=-3$ i $x+3y=7$ je:			
	a). 5	b). -5	c). 1	d). -1
3.	Broj rješenja nejednačine $\frac{2x-1}{x-3}\le 1$ koji pripadaju skupu prirodnih brojeva je:			
	a). 0	b). 3	c). 1	d). 2
4.	Proizvod realnih rješenja jednačine $4\cdot 2^x+2^{-x}=5$ je:			
	a). 0	b). $\frac{1}{2}$	c). -2	d). $\frac{1}{4}$
5.	Koliko iznosi vrijednost izraza $\log_3 9+3\log_{\frac{1}{2}} 2-2\log_{\frac{1}{3}} 3+\log_2\frac{1}{8}$?			
	a). -4	b). 6	c). 4	d). -2
6.	Koliko iznosi $Z\cdot\overline{Z}$, ako je $Z=2-i$? ($\overline{Z}$ - konjugovano kompleksna vrijednost broja Z)			
	a). 3	b). 2	c). 5	d). 6
7.	Koliko iznosi *ctgx* ako je $\cos x=\frac{\sqrt{3}}{2}$ i $x\in\left[0,\frac{\pi}{2}\right]$?			
	a). $\frac{\sqrt{3}}{2}$	b). $\frac{\sqrt{3}}{3}$	c). 1	d). $\sqrt{3}$
8.	Ako su x i y rješenja sistema: $x+y=2$ i $x^3+y^3=20$, tada je x^2+y^2 jednako:			
	a). 8	b). 5	c). 10	d). 12
9.	Koliko iznosi proizvod $\left(1-\frac{1}{2^2}\right)\cdot\left(1-\frac{1}{3^2}\right)\cdot\left(1-\frac{1}{4^2}\right)\cdot\ldots\cdot\left(1-\frac{1}{2025^2}\right)$?			
	a). 1	b). $\frac{1013}{2025}$	c). 2	d). $\frac{1026}{2025}$
10.	Ako se obim kružnice poveća za $\sqrt{2}$ puta, koliko puta se poveća površina kruga?			
	a). $\sqrt{2}$	b). 4	c). 2	d). 3

1.

$$\frac{2x^2-5x-3}{x^2-x-6}\cdot\frac{x^2+3x+2}{2x^2-x-1}=$$

$$ax^2+bx+c=a\left(x-x_1\right)\cdot\left(x-x_2\right)$$

$$x_{1,2}=\frac{-b\pm\sqrt{b^2-4ac}}{2a}$$

$$2x^2-5x-3=\left(2x+1\right)\left(x-3\right)$$

$$x^2-x-6=\left(x+2\right)\left(x-3\right)$$

$$x^2+3x+2=\left(x+1\right)\left(x+2\right)$$

$$2x^2-x-1=\left(2x+1\right)\left(x-1\right)$$

$$\frac{2x^2-5x-3}{x^2-x-6}\cdot\frac{x^2+3x+2}{2x^2-x-1}=\frac{\left(2x+1\right)\left(x-3\right)}{\left(x+2\right)\left(x-3\right)}\cdot\frac{\left(x+1\right)\left(x+2\right)}{\left(2x+1\right)\left(x-1\right)}=\frac{x+1}{x-1}$$

a). -1 **b).** $\frac{x+1}{x-1}$ c). 1 d). $\frac{2x+1}{x+2}$

2.

$$3x+y=-3\quad /\cdot(-3)$$

$$\underline{x+3y=7}$$

$$-9x-3y=9$$

$$\underline{x+3y=7}$$

$$-8x=16\ \Rightarrow\ x=-2$$

$$3\cdot(-2)+y=-3\ \Rightarrow\ y=3$$

$$x+y=-2+3=1.$$

a). 5 b). -5 **c). 1** d). -1

3.

$$\frac{2x-1}{x-3}\le 1$$

$$D.P.:\ x-3\neq 0\ \Rightarrow\ x\neq 3$$

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

$$\frac{2x-1-x+3}{x-3}\le 0$$

$$\frac{x+2}{x-3}\le 0\ \Rightarrow\ x\in\left[-2,3\right)\wedge x\in N\ \Rightarrow\ x=1,2$$

Broj rješenja : 2.

a). 0 b). 3 c). 1 **d). 2**

4.	$4\cdot 2^x+2^{-x}=5$ $4\cdot 2^x+\frac{1}{2^x}=5\ /\cdot 2^x$ $4\cdot 2^{2x}+1=5\cdot 2^x$ $4\cdot 2^{2x}-5\cdot 2^x+1=0$ $2^x=t$ $4\cdot t^2-5\cdot t+1=0$ $t_1=1\ \wedge\ t_2=\frac{1}{4}$ $2^x=1\ \Rightarrow\ 2^x=2^0\ \Rightarrow\ x_1=0$ $2^x=\frac{1}{4}\ \Rightarrow\ 2^x=2^{-2}\ \Rightarrow\ x_2=-2$ $x_1\cdot x_2=0\cdot(-2)=0.$			
	a). 0	b). $\frac{1}{2}$	c). -2	d). $\frac{1}{4}$
5.	$\log_3 9+3\log_{\frac{1}{2}}2-2\log_{\frac{1}{3}}3+\log_2\frac{1}{8}=\log_3 3^2+3\log_{2^{-1}}2-2\log_{3^{-1}}3+\log_2 2^{-3}=$ $2\log_3 3+\frac{3}{-1}\log_2 2-\frac{2}{-1}\log_3 3+(-3)\cdot\log_2 2^{-3}=2-3+2-3=-2.$			
	a). -4	b). 6	c). 4	**d). -2**
6.	$Z\cdot\overline{Z}=?$ $Z=2-i$ $\overline{Z}=2+i$ $Z\cdot\overline{Z}=(2-i)\cdot(2+i)=2^2-i^2=4-(-1)=5.$			
	a). 3	b). 2	**c). 5**	d). 6
7.	$\cos x=\frac{\sqrt{3}}{2}$ $\sin^2 x+\cos^2 x=1\ \Rightarrow\ \sin x=\pm\sqrt{1-\cos^2 x}=\pm\sqrt{1-\frac{3}{4}}=\pm\sqrt{\frac{1}{4}}=\pm\frac{1}{2}$ $\sin x=\frac{1}{2},\ jer\ x\in\left[0,\frac{\pi}{2}\right]$ $ctgx=\frac{\cos x}{\sin x}=\frac{\frac{\sqrt{3}}{2}}{\frac{1}{2}}=\sqrt{3}.$			
	a). $\frac{\sqrt{3}}{2}$	b). $\frac{\sqrt{3}}{3}$	c). 1	**d).** $\sqrt{3}$

8.

$x+y=2$

$x^3+y^3=20$

$x+y=2 \ \ /^3$

$x^3+3x^2y+3xy^2+y^3=8$

$x^3+y^3=8-3xy(x+y)$

$8-3xy(x+y)=20$

$8-3xy\cdot 2=20$

$-6xy=12$

$xy=-2$

$x+y=2 \ \ /^2 \Rightarrow x^2+2xy+y^2=4 \Rightarrow x^2+y^2=4-2xy=4-2\cdot(-2)=8.$

a). 8 b). 5 c). 10 d). 12

9.

$$\left(1-\frac{1}{2^2}\right)\cdot\left(1-\frac{1}{3^2}\right)\cdot\left(1-\frac{1}{4^2}\right)\cdot\ldots\cdot\left(1-\frac{1}{2025^2}\right)=$$

$$=\frac{2^2-1}{2^2}\cdot\frac{3^2-1}{3^2}\cdot\frac{4^2-1}{4^2}\cdot\ldots\cdot\frac{2024^2-1}{2024^2}\cdot\frac{2025^2-1}{2025^2}=$$

$$=\frac{(2-1)\cdot(2+1)}{2\cdot 2}\cdot\frac{(3-1)\cdot(3+1)}{3\cdot 3}\cdot\frac{(4-1)\cdot(4+1)}{4\cdot 4}\cdot\ldots\cdot\frac{(2024-1)\cdot(2024+1)}{2024\cdot 2024}\cdot\frac{(2025-1)\cdot(2025+1)}{2025\cdot 2025}=$$

$$=\frac{1\cdot 3}{2\cdot 2}\cdot\frac{2\cdot 4}{3\cdot 3}\cdot\frac{3\cdot 5}{4\cdot 4}\cdot\ldots\cdot\frac{2023\cdot 2025}{2024\cdot 2024}\cdot\frac{2024\cdot 2026}{2025\cdot 2025}=$$

$$=\frac{1}{2}\cdot\frac{3}{2}\cdot\frac{2}{3}\cdot\frac{4}{3}\cdot\frac{3}{4}\cdot\frac{5}{4}\cdot\frac{4}{5}\cdot\frac{6}{5}\cdot\ldots\cdot\frac{2023}{2024}\cdot\frac{2025}{2024}\cdot\frac{2024}{2025}\cdot\frac{2026}{2025}=$$

$$=\frac{1}{2}\cdot\left(\frac{3}{2}\cdot\frac{2}{3}\right)\cdot\left(\frac{4}{3}\cdot\frac{3}{4}\right)\cdot\left(\frac{5}{4}\cdot\frac{4}{5}\right)\cdot\frac{6}{5}\cdot\ldots\cdot\frac{2023}{2024}\cdot\left(\frac{2025}{2024}\cdot\frac{2024}{2025}\right)\cdot\frac{2026}{2025}=$$

$$=\frac{1}{2}\cdot 1\cdot 1\cdot 1\cdot 1\cdot\ldots\cdot 1\cdot 1\cdot\frac{2026}{2025}=\frac{2026}{2\cdot 2025}=\frac{1013}{2025}.$$

a). 1 **b).** $\frac{1013}{2025}$ c). 2 d). $\frac{1026}{2025}$

10.

$O_1=2r_1\pi$

$O_2=2r_2\pi$

$\frac{O_2}{O_1}=\sqrt{2}$

$\frac{2r_2\pi}{2r_1\pi}=\sqrt{2} \ \Rightarrow \ r_2=r_1\sqrt{2}$

$P_1=r_1^2\pi$

$P_2=r_2^2\pi$

$$\frac{P_2}{P_1}=\frac{r_2^2\pi}{r_1^2\pi}=\frac{\left(r_1\sqrt{2}\right)^2}{r_1^2}=\frac{2r_1^2}{r_1^2}=2$$

Površina se poveća za 2 *puta*.

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

UNIVERZITET U TUZLI **Fakultet elektrotehnike** **Katalog zadataka za prijemni ispit na EiR**	**3. GRUPA ZADATAKA**

1.	Rješenje uproštenog izraza $\frac{3x^2+5x-2}{x^2-x-6}\cdot\frac{x^2-4x+3}{3x^2+2x-1}$ je:			
	a). $\frac{3x-1}{x+2}$	b). $\frac{x-1}{x+1}$	c). 1	d). -1
2.	Zbir rješenja sistema $2x+y=2$ i $5x+2y=3$ je:			
	a). -3	b). 1	c). -1	d). 3
3.	Broj rješenja nejednačine $\frac{2x+3}{x-2}\le 1$ koji pripadaju skupu prirodnih brojeva je:			
	a). 1	b). 3	c). 4	d). 6
4.	Proizvod realnih rješenja jednačine $3\cdot 3^x+3^{-x}=4$ je:			
	a). $\frac{1}{3}$	b). 3	c). 0	d). -3
5.	Koliko iznosi vrijednost izraza $\log_2 8+2\log_{\frac{1}{3}}3-3\log_{\frac{1}{2}}4+2\log_3\frac{1}{9}$?			
	a). 3	b). -4	c). -2	d). 2
6.	Koliko iznosi $Z\cdot\overline{Z}$, ako je $Z=1+3i$? ($\overline{Z}$ - konjugovano kompleksna vrijednost broja Z)			
	a). 8	b). 10	c). 4	d). 5
7.	Koliko iznosi $ctgx$ ako je $\sin x=\frac{\sqrt{3}}{2}$ i $x\in\left[0,\frac{\pi}{2}\right]$?			
	a). $\frac{\sqrt{3}}{2}$	b). 1	c). $\sqrt{3}$	d). $\frac{\sqrt{3}}{3}$
8.	Ako su x i y rješenja sistema: $x+y=1$ i $x^3+y^3=10$, tada je x^2+y^2 jednako:			
	a). 5	b). 10	c). 7	d). 12
9.	Koliko iznosi proizvod $\left(1-\frac{1}{2^2}\right)\cdot\left(1-\frac{1}{3^2}\right)\cdot\left(1-\frac{1}{4^2}\right)\cdot\ldots\cdot\left(1-\frac{1}{2027^2}\right)$?			
	a). $\frac{1014}{2027}$	b). 2	c). 1	d). $\frac{1028}{2027}$
10.	Ako se obim kružnice poveća za 3 puta, koliko puta se poveća površina kruga?			
	a). 6	b). 3	c). 12	d). 9

1.

$$\frac{3x^2+5x-2}{x^2-x-6}\cdot\frac{x^2-4x+3}{3x^2+2x-1}=$$

$$ax^2+bx+c=a\left(x-x_1\right)\cdot\left(x-x_2\right)$$

$$x_{1,2}=\frac{-b\pm\sqrt{b^2-4ac}}{2a}$$

$$3x^2+5x-2=\left(3x-1\right)\left(x+2\right)$$

$$x^2-x-6=\left(x+2\right)\left(x-3\right)$$

$$x^2-4x+3=\left(x-1\right)\left(x-3\right)$$

$$3x^2+2x-1=\left(3x-1\right)\left(x+1\right)$$

$$\frac{3x^2+5x-2}{x^2-x-6}\cdot\frac{x^2-4x+3}{3x^2+2x-1}=\frac{\left(3x-1\right)\left(x+2\right)}{\left(x+2\right)\left(x-3\right)}\cdot\frac{\left(x-1\right)\left(x-3\right)}{\left(3x-1\right)\left(x+1\right)}=\frac{x-1}{x+1}$$

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

2.

$$2x+y=2 \quad /\cdot(-2)$$

$$\underline{5x+2y=3}$$

$$-4x-2y=-4$$

$$\underline{5x+2y=3}$$

$$x=-1$$

$$2\cdot(-1)+y=2 \Rightarrow y=4$$

$$x+y=-1+4=3.$$

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

3.

$$\frac{2x+3}{x-2}\le 1$$

$$D.P.: x-2\neq 0 \Rightarrow x\neq 2$$

$$\frac{2x+3}{x-2}-1\le 0$$

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

$$\frac{x+5}{x-2}\le 0 \Rightarrow x\in[-5,2)\wedge x\in N \Rightarrow x=1$$

Broj rješenja :1.

a). 1 b). 3 c). 4 d). 6

4.

$3\cdot 3^{x}+3^{-x}=4$

$3\cdot 3^{x}+\frac{1}{3^{x}}=4 \ /\cdot 3^{x}$

$3\cdot 3^{2x}+1=4\cdot 3^{x}$

$3\cdot 3^{2x}-4\cdot 2^{x}+1=0$

$3^{x}=t$

$3\cdot t^{2}-4\cdot t+1=0$

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

$3^{x}=1 \Rightarrow 3^{x}=3^{0} \Rightarrow x_1=0$

$3^{x}=\frac{1}{3} \Rightarrow 3^{x}=3^{-1} \Rightarrow x_2=-1$

$x_1\cdot x_2=0\cdot(-1)=0.$

a). $\frac{1}{3}$ b). 3 **c). 0** d). -3

5.

$\log_2 8+2\log_{\frac{1}{3}} 3-3\log_{\frac{1}{2}} 4+2\log_3\frac{1}{9}=\log_2 2^3+2\log_{3^{-1}} 3-3\log_{2^{-1}} 2^2+2\log_3 3^{-2}=$

$3\log_2 2+\frac{2}{-1}\log_3 3-\frac{3\cdot 2}{-1}\log_2 2^2+2\cdot(-2)\cdot\log_3 3=3-2+6-4=3.$

a). 3 b). -4 c). -2 d). 2

6.

$Z\cdot\overline{Z}=?$

$Z=1+3i$

$\overline{Z}=1-3i$

$Z\cdot\overline{Z}=(1+3i)\cdot(1-3i)=1^2-(3i)^2=1-9i^2=1-9\cdot(-1)=10.$

a). 8 **b). 10** c). 4 d). 5

7.

$\sin x=\frac{\sqrt{3}}{2}$

$\sin^2 x+\cos^2 x=1 \Rightarrow \cos x=\pm\sqrt{1-\sin^2 x}=\pm\sqrt{1-\frac{3}{4}}=\pm\sqrt{\frac{1}{4}}=\pm\frac{1}{2}$

$\cos x=\frac{1}{2}, \ jer \ x\in\left[0,\frac{\pi}{2}\right]$

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

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

8.

$x+y=1$

$x^3+y^3=10$

$x+y=1 \ /^3$

$x^3+3x^2y+3xy^2+y^3=1$

$x^3+y^3=1-3xy(x+y)$

$1-3xy(x+y)=10$

$1-3xy\cdot 1=10$

$-3xy=9$

$xy=-3$

$x+y=1 \ /^2 \Rightarrow x^2+2xy+y^2=1 \Rightarrow x^2+y^2=1-2xy=1-2\cdot(-3)=7.$

a). 5 b). 10 **c). 7** d). 12

9.

$$\left(1-\frac{1}{2^2}\right)\cdot\left(1-\frac{1}{3^2}\right)\cdot\left(1-\frac{1}{4^2}\right)\cdot\ldots\cdot\left(1-\frac{1}{2027^2}\right)=$$

$$=\frac{2^2-1}{2^2}\cdot\frac{3^2-1}{3^2}\cdot\frac{4^2-1}{4^2}\cdot\ldots\cdot\frac{2026^2-1}{2026^2}\cdot\frac{2027^2-1}{2027^2}=$$

$$=\frac{(2-1)\cdot(2+1)}{2\cdot 2}\cdot\frac{(3-1)\cdot(3+1)}{3\cdot 3}\cdot\frac{(4-1)\cdot(4+1)}{4\cdot 4}\cdot\ldots\cdot\frac{(2026-1)\cdot(2026+1)}{2026\cdot 2026}\cdot\frac{(2027-1)\cdot(2027+1)}{2027\cdot 2027}=$$

$$=\frac{1\cdot 3}{2\cdot 2}\cdot\frac{2\cdot 4}{3\cdot 3}\cdot\frac{3\cdot 5}{4\cdot 4}\cdot\ldots\cdot\frac{2025\cdot 2027}{2026\cdot 2026}\cdot\frac{2026\cdot 2028}{2027\cdot 2027}=$$

$$=\frac{1}{2}\cdot\frac{3}{2}\cdot\frac{2}{3}\cdot\frac{4}{3}\cdot\frac{3}{4}\cdot\frac{5}{4}\cdot\frac{4}{5}\cdot\frac{6}{5}\cdot\ldots\cdot\frac{2025}{2026}\cdot\frac{2027}{2026}\cdot\frac{2026}{2027}\cdot\frac{2028}{2027}=$$

$$=\frac{1}{2}\cdot\left(\frac{3}{2}\cdot\frac{2}{3}\right)\cdot\left(\frac{4}{3}\cdot\frac{3}{4}\right)\cdot\left(\frac{5}{4}\cdot\frac{4}{5}\right)\cdot\frac{6}{5}\cdot\ldots\cdot\frac{2025}{2026}\cdot\left(\frac{2027}{2026}\cdot\frac{2026}{2027}\right)\cdot\frac{2028}{2027}=$$

$$=\frac{1}{2}\cdot 1\cdot 1\cdot 1\cdot 1\cdot\ldots\cdot 1\cdot 1\cdot\frac{2028}{2027}=\frac{2028}{2\cdot 2027}=\frac{1014}{2027}.$$

a). $\frac{1014}{2027}$ b). 2 c). 1 d). $\frac{1028}{2027}$

10.

$O_1=2r_1\pi$

$O_2=2r_2\pi$

$\frac{O_2}{O_1}=3$

$\frac{2r_2\pi}{2r_1\pi}=3 \Rightarrow r_2=3r_1$

$P_1=r_1^2\pi$

$P_2=r_2^2\pi$

$\frac{P_2}{P_1}=\frac{r_2^2\pi}{r_1^2\pi}=\frac{(3r_1)^2}{r_1^2}=\frac{9r_1^2}{r_1^2}=9$

Površina se poveća za 9 *puta.*

a). 6 b). 3 c). 12 **d). 9**

UNIVERZITET U TUZLI **Fakultet elektrotehnike** **Katalog zadataka za prijemni ispit na EiR**	**4. GRUPA ZADATAKA**

1.	Rješenje uproštenog izraza $\frac{3x^2-5x-2}{x^2+x-6}\cdot\frac{x^2+4x+3}{3x^2-2x-1}$ je:			
	a). $\frac{x+1}{x-1}$	b). -1	c). 1	d). $\frac{3x+1}{x-2}$
2.	Zbir rješenja sistema $3x+y=3$ i $x-2y=8$ je:			
	a). 2	b). -2	c). -1	d). 1
3.	Broj rješenja nejednačine $\frac{2x+1}{x-3}\le 1$ koji pripadaju skupu prirodnih brojeva je:			
	a). 1	b). 2	c). 4	d). 6
4.	Proizvod realnih rješenja jednačine $9\cdot 3^x+3^{-x}=10$ je:			
	a). 0	b). $\frac{1}{9}$	c). -1	d). $\frac{1}{3}$
5.	Koliko iznosi vrijednost izraza $3\log_2 4+2\log_{\frac{1}{3}} 9+2\log_{\frac{1}{2}} 8-3\log_3\frac{1}{3}$?			
	a). 5	b). -1	c). -7	d). 2
6.	Koliko iznosi $Z\cdot\overline{Z}$, ako je $Z=1+2i$? ($\overline{Z}$ - konjugovano kompleksna vrijednost broja Z)			
	a). 2	b). 3	c). 4	d). 5
7.	Koliko iznosi $ctgx$ ako je $\sin x=\frac{1}{2}$ i $x\in\left[0,\frac{\pi}{2}\right]$?			
	a). $\sqrt{3}$	b). $\frac{\sqrt{3}}{2}$	c). 1	d). $\frac{\sqrt{3}}{3}$
8.	Ako su x i y rješenja sistema: $x+y=2$ i $x^3+y^3=26$, tada je x^2+y^2 jednako:			
	a). 5	b). 10	c). 9	d). 12
9.	Koliko iznosi proizvod $\left(1-\frac{1}{2^2}\right)\cdot\left(1-\frac{1}{3^2}\right)\cdot\left(1-\frac{1}{4^2}\right)\cdot\ldots\cdot\left(1-\frac{1}{2029^2}\right)$?			
	a). 1	b). 2	c). $\frac{1030}{2029}$	d). $\frac{1015}{2029}$
10.	Ako se obim kružnice poveća za 2 puta, koliko puta se poveća površina kruga?			
	a). 2	b). 6	c). 4	d). 12

1.

$$\frac{3x^2-5x-2}{x^2+x-6}\cdot\frac{x^2+4x+3}{3x^2-2x-1}=$$

$$ax^2+bx+c=a\left(x-x_1\right)\cdot\left(x-x_2\right)$$

$$x_{1,2}=\frac{-b\pm\sqrt{b^2-4ac}}{2a}$$

$$3x^2-5x-2=\left(3x+1\right)\left(x-2\right)$$

$$x^2+x-6=\left(x-2\right)\left(x+3\right)$$

$$x^2+4x+3=\left(x+1\right)\left(x+3\right)$$

$$3x^2-2x-1=\left(3x+1\right)\left(x-1\right)$$

$$\frac{3x^2-5x-2}{x^2+x-6}\cdot\frac{x^2+4x+3}{3x^2-2x-1}=\frac{\left(3x+1\right)\left(x-2\right)}{\left(x-2\right)\left(x+3\right)}\cdot\frac{\left(x+1\right)\left(x+3\right)}{\left(3x+1\right)\left(x-1\right)}=\frac{x+1}{x-1}$$

a). $\frac{x+1}{x-1}$ b). -1 c). 1 d). $\frac{3x+1}{x-2}$

2.

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

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

$$6x+2y=6$$

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

$$7x=14 \Rightarrow x=2$$

$$3\cdot 2+y=3 \Rightarrow y=-3$$

$$x+y=2-3=-1.$$

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

3.

$$\frac{2x+1}{x-3}\le 1$$

$$D.P.: x-3\neq 0 \Rightarrow x\neq 3$$

$$\frac{2x+1}{x-3}-1\le 0$$

$$\frac{2x+1-x+3}{x-3}\le 0$$

$$\frac{x+4}{x-3}\le 0 \Rightarrow x\in\left[-4,3\right)\wedge x\in N \Rightarrow x=1,2$$

Broj rješenja : 2.

a). 1 **b). 2** c). 4 d). 6

4.	$9\cdot 3^x+3^{-x}=10$ $9\cdot 3^x+\frac{1}{3^x}=10 \ / \cdot 3^x$ $9\cdot 3^{2x}+1=10\cdot 3^x$ $9\cdot 3^{2x}-10\cdot 2^x+1=0$ $3^x=t$ $9\cdot t^2-10\cdot t+1=0$ $t_1=1 \ \wedge \ t_2=\frac{1}{9}$ $3^x=1 \Rightarrow 3^x=3^0 \Rightarrow x_1=0$ $3^x=\frac{1}{9} \Rightarrow 3^x=3^{-2} \Rightarrow x_2=-2$ $x_1\cdot x_2=0\cdot(-2)=0.$			
	a). 0	b). $\frac{1}{9}$	c). -1	d). $\frac{1}{3}$
5.	$3\log_2 4+2\log_{\frac{1}{3}} 9+2\log_{\frac{1}{2}} 8-3\log_3\frac{1}{3}=3\log_2 2^2+2\log_{3^{-1}} 3^2+2\log_{2^{-1}} 2^3-3\log_3 3^{-1}=$ $3\cdot 2\log_2 2+\frac{2\cdot 2}{-1}\log_3 3+\frac{2\cdot 3}{-1}\log_{2^{-1}} 2-3\cdot(-1)\cdot\log_3 3=6-4-6+3=-1.$			
	a). 5	**b). -1**	c). -7	d). 2
6.	$Z\cdot\overline{Z}=?$ $Z=1+2i$ $\overline{Z}=1-2i$ $Z\cdot\overline{Z}=(1+2i)\cdot(1-2i)=1^2-(2i)^2=1-4i^2=1-4\cdot(-1)=5.$			
	a). 2	b). 3	c). 4	**d). 5**
7.	$\sin x=\frac{1}{2}$ $\sin^2 x+\cos^2 x=1 \Rightarrow \cos x=\pm\sqrt{1-\sin^2 x}=\pm\sqrt{1-\frac{1}{4}}=\pm\sqrt{\frac{3}{4}}=\pm\frac{\sqrt{3}}{2}$ $\cos x=\frac{\sqrt{3}}{2}, \ jer \ x\in\left[0,\frac{\pi}{2}\right]$ $ctgx=\frac{\cos x}{\sin x}=\frac{\frac{\sqrt{3}}{2}}{\frac{1}{2}}=\sqrt{3}.$			
	a). $\sqrt{3}$	b). $\frac{\sqrt{3}}{2}$	c). 1	d). $\frac{\sqrt{3}}{3}$

8.

$x+y=2$

$x^3+y^3=26$

$x+y=2 \ \ /^3$

$x^3+3x^2y+3xy^2+y^3=8$

$x^3+y^3=8-3xy(x+y)$

$8-3xy(x+y)=26$

$8-3xy\cdot 2=26$

$-6xy=18$

$xy=-3$

$x+y=2 \ \ /^2 \Rightarrow x^2+2xy+y^2=4 \Rightarrow x^2+y^2=4-2xy=4-2\cdot(-3)=10.$

a). 5 **b). 10** c). 9 d). 12

9.

$$\left(1-\frac{1}{2^2}\right)\cdot\left(1-\frac{1}{3^2}\right)\cdot\left(1-\frac{1}{4^2}\right)\cdot\ldots\cdot\left(1-\frac{1}{2029^2}\right)=$$

$$=\frac{2^2-1}{2^2}\cdot\frac{3^2-1}{3^2}\cdot\frac{4^2-1}{4^2}\cdot\ldots\cdot\frac{2028^2-1}{2028^2}\cdot\frac{2029^2-1}{2029^2}=$$

$$=\frac{(2-1)\cdot(2+1)}{2\cdot 2}\cdot\frac{(3-1)\cdot(3+1)}{3\cdot 3}\cdot\frac{(4-1)\cdot(4+1)}{4\cdot 4}\cdot\ldots\cdot\frac{(2028-1)\cdot(2028+1)}{2028\cdot 2028}\cdot\frac{(2029-1)\cdot(2029+1)}{2029\cdot 2029}=$$

$$=\frac{1\cdot 3}{2\cdot 2}\cdot\frac{2\cdot 4}{3\cdot 3}\cdot\frac{3\cdot 5}{4\cdot 4}\cdot\ldots\cdot\frac{2027\cdot 2029}{2028\cdot 2028}\cdot\frac{2028\cdot 2030}{2029\cdot 2029}=$$

$$=\frac{1}{2}\cdot\frac{3}{2}\cdot\frac{2}{3}\cdot\frac{4}{3}\cdot\frac{3}{4}\cdot\frac{5}{4}\cdot\frac{4}{5}\cdot\frac{6}{5}\cdot\ldots\cdot\frac{2027}{2028}\cdot\frac{2029}{2028}\cdot\frac{2028}{2029}\cdot\frac{2030}{2029}=$$

$$=\frac{1}{2}\cdot\left(\frac{3}{2}\cdot\frac{2}{3}\right)\cdot\left(\frac{4}{3}\cdot\frac{3}{4}\right)\cdot\left(\frac{5}{4}\cdot\frac{4}{5}\right)\cdot\frac{6}{5}\cdot\ldots\cdot\frac{2027}{2028}\cdot\left(\frac{2029}{2028}\cdot\frac{2028}{2029}\right)\cdot\frac{2030}{2029}=$$

$$=\frac{1}{2}\cdot 1\cdot 1\cdot 1\cdot 1\cdot\ldots\cdot 1\cdot 1\cdot\frac{2030}{2029}=\frac{2030}{2\cdot 2029}=\frac{1015}{2029}.$$

a). 1 b). 2 c). $\frac{1030}{2029}$ **d).** $\frac{1015}{2029}$

10.

$O_1=2r_1\pi$

$O_2=2r_2\pi$

$\frac{O_2}{O_1}=2$

$\frac{2r_2\pi}{2r_1\pi}=2 \ \Rightarrow \ r_2=2r_1$

$P_1=r_1^2\pi$

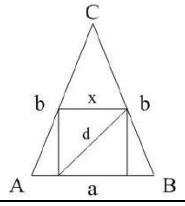
$P_2=r_2^2\pi$

$\frac{P_2}{P_1}=\frac{r_2^2\pi}{r_1^2\pi}=\frac{(2r_1)^2}{r_1^2}=\frac{4r_1^2}{r_1^2}=4$

Površina se poveća za 4 *puta*.

a). 2 b). 6 **c). 4** d). 12

UNIVERZITET U TUZLI **Fakultet elektrotehnike** **Katalog zadataka za prijemni ispit na EiR**	**5. GRUPA ZADATAKA**

1.	Vrijednost izraza $\left(\frac{3-2\sqrt{2}}{\sqrt{3}}\right)^2$ je:			
	a). $\frac{8-12\sqrt{2}}{3}$	b). $\frac{17-12\sqrt{2}}{3}$	c). $3-4\sqrt{2}$	d). 8
2.	Zbir svih realnih rješenja jednačine $4x^2-12x+7=0$ je:			
	a). 3	b). $\frac{7}{4}$	c). 2	d). $\frac{-12}{7}$
3.	Proizvod rješenja sistema $2x+y=5$ i $x-3y=13$ je:			
	a). $-\frac{4}{3}$	b). -7	c). $-\frac{3}{4}$	d). -12
4.	Skup realnih rješenja nejednačine $\frac{4x+1}{3x+1}\le 1$ je:			
	a). $\left(0,\frac{1}{3}\right]$	b). $\left(\frac{1}{3},1\right]$	c). $\left(-\frac{1}{3},0\right]$	d). $(1,+\infty)$
5.	Zbir realnih rješenja jednačine $9^{x+1}-10\cdot 3^{x+1}+9=0$ je:			
	a). 1	b). -1	c). 4	d). 0
6.	Proizvod svih realnih rješenja jednačine $\log_3^2 x+\log_3 x-2=0$ je:			
	a). $\frac{1}{3}$	b). $\frac{1}{9}$	c). 3	d). -3
7.	Modul kompleksnog broja $Z=\frac{3-4i}{2+i}$ je:			
	a). $\frac{\sqrt{5}}{5}$	b). $\sqrt{5}$	c). $2\sqrt{5}$	d). 5
8.	Koliko iznosi *tgx* ako je $\cos x=\frac{\sqrt{2}}{2}$ i $x\in\left[0,\frac{\pi}{2}\right]$?			
	a). $\frac{\sqrt{2}}{2}$	b). $\frac{\sqrt{3}}{2}$	c). 1	d). $\sqrt{3}$
9.	Koliko iznosi dijagonala kvadrata maksimalne površine upisanog u jednakokraki trougao stranica a=6 i b=5? 			
	a). $\frac{12\sqrt{2}}{5}$	b). $\frac{12}{5}$	c). $\frac{6\sqrt{2}}{5}$	d). $\frac{4\sqrt{2}}{3}$
10.	Ako su x i y prirodni brojevi koji zadovoljavaju jednakost $\frac{3}{x}-\frac{2}{y}=1+\frac{3}{xy}$, tada je x+y?			
	a). 5	b). 6	c). 9	d). 8

1.

$$\left(\frac{3-2\sqrt{2}}{\sqrt{3}}\right)^2=\frac{\left(3-2\sqrt{2}\right)^2}{\left(\sqrt{3}\right)^2}=\frac{3^2-2\cdot3\cdot2\sqrt{2}+\left(2\sqrt{2}\right)^2}{3}=\frac{9-12\sqrt{2}+8}{3}=\frac{17-12\sqrt{2}}{3}$$

a). $\frac{8-12\sqrt{2}}{3}$ **b).** $\frac{17-12\sqrt{2}}{3}$ c). $3-4\sqrt{2}$ d). 8

2.

$4x^2-12x+7=0$

$ax^2+bx+c=0$

Viettova pravila za zbir rješenja kvadratne jednačine: $x_1+x_2=-\frac{b}{a}$

$x_1+x_2=-\frac{-12}{4}=3$

a). 3 b). $\frac{7}{4}$ c). 2 d). $\frac{-12}{7}$

3.

$2x+y=5 \ /\cdot3$

$\underline{x-3y=13}$

$6x+3y=15$

$\underline{x-3y=13}$

$7x=28 \Rightarrow x=4$

$2\cdot4+y=5 \Rightarrow y=-3$

$x\cdot y=-12$

a). $-\frac{4}{3}$ b). -7 c). $-\frac{3}{4}$ **d).** -12

4.

$\frac{4x+1}{3x+1}\le1$

$\frac{4x+1}{3x+1}-1\le0$

$\frac{4x+1-3x-1}{3x+1}\le0$

$\frac{x}{3x+1}\le0$

D.P.:

$3x+1\neq0 \Rightarrow x\neq-\frac{1}{3}$

	$-\infty$		$-\frac{1}{3}$		0		$+\infty$
x		$-$		$-$		$+$	
$3x+1$		$-$		$+$		$+$	
		$+$		$-$		$+$	

$x\in\left(-\frac{1}{3},0\right]$

a). $\left(0,\frac{1}{3}\right]$ b). $\left(\frac{1}{3},1\right]$ **c).** $\left(-\frac{1}{3},0\right]$ d). $\left(1,+\infty\right)$

5.

$9^{x+1}-10\cdot 3^{x+1}+9=0$

$\left(3^2\right)^{x+1}-10\cdot 3^{x+1}+9=0$

$\left(3^{x+1}\right)^2-10\cdot 3^{x+1}+9=0$

$3^{x+1}=t$

$t^2-10t+9=0$

$t_{1/2}=\dfrac{10\pm\sqrt{(-10)^2-4\cdot 1\cdot 9}}{2\cdot 1}$

$t_1=1 \ \wedge \ t_2=9$

$3^{x+1}=1=3^0 \ \Rightarrow \ x+1=0 \ \Rightarrow \ x_1=-1$

$3^{x+1}=9=3^2 \ \Rightarrow \ x+1=2 \ \Rightarrow \ x_2=1$

$x_1+x_2=-1+1=0$

a). 1 b). -1 c). 4 **d).** 0

6.

$\log_3^2 x+\log_3 x-2=0$

$\left(\log_3 x\right)^2+\log_3 x-2=0$

$\log_3 x=t$

$t^2+t-2=0$

$t_{1/2}=\dfrac{-1\pm\sqrt{1^2-4\cdot 1\cdot(-2)}}{2\cdot 1}$

$t_1=1 \ \wedge \ t_2=-2$

$\log_3 x=1 \ \Rightarrow \ x_1=3^1=3$

$\log_3 x=-2 \ \Rightarrow \ x_2=3^{-2}=\dfrac{1}{9}$

$x_1\cdot x_2=3\cdot\dfrac{1}{9}=\dfrac{1}{3}$

a). $\dfrac{1}{3}$ b). $\dfrac{1}{9}$ c). 3 d). -3

7.

$Z=\dfrac{3-4i}{2+i}$

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

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

8.

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

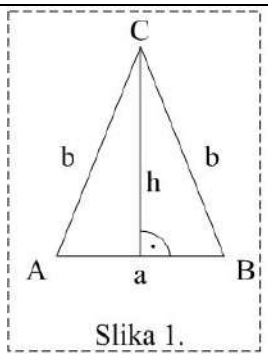
$$\sin x = \pm\sqrt{1-\cos^2 x} = \pm\sqrt{1-\left(\frac{\sqrt{2}}{2}\right)^2} = \pm\sqrt{1-\frac{2}{4}} = \pm\sqrt{\frac{2}{4}} = \pm\frac{\sqrt{2}}{2}$$

$$\sin x = \frac{\sqrt{2}}{2},\ x \in \left[0, \frac{\pi}{2}\right]$$

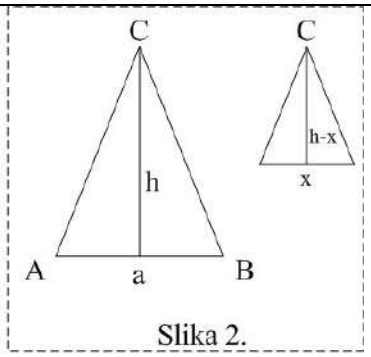
$$tgx = \frac{\sin x}{\cos x} = \frac{\frac{\sqrt{2}}{2}}{\frac{\sqrt{2}}{2}} = 1$$

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

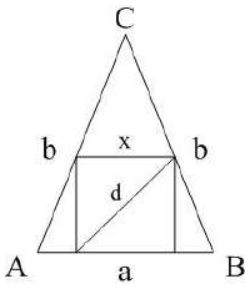
9.



Slika 1.



Slika 2.



Na slici 1. prikazan je pravougli trougao:

$$b^2 = \left(\frac{a}{2}\right)^2 + h^2 \ \Rightarrow\ h = 4$$

Na slici 2. prikazana su dva slična trougla:

$$a : x = h : (h - x)$$

$$ah - ax = hx$$

$$x = \frac{ah}{a+h} = \frac{24}{10} = \frac{12}{5}$$

Dijagonala kvadrata:

$$d = x\sqrt{2} = \frac{12\sqrt{2}}{5}$$

a). $\frac{12\sqrt{2}}{5}$ b). $\frac{12}{5}$ c). $\frac{6\sqrt{2}}{5}$ d). $\frac{4\sqrt{2}}{3}$

10.

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

$$3y - 2x = xy + 3$$

$$-2x - xy + 3y = 3$$

$$-x(2+y) + 3y + 6 = 3 + 6$$

$$-x(2+y) + 3(2+y) = 9$$

$$(2+y)(3-x) = 9$$

Za $x, y \in N$ postoji samo jedna kombinacija proizvoda:

$(2+y)(3-x)=9$

$9 \cdot 1 = 9$

$y = 7$

$x = 2$

$x + y = 9$

jer za drugu kombinaciju proizvoda:

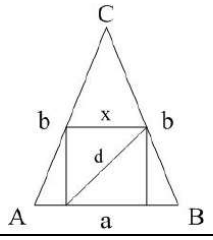
$(2+y)(3-x)=9$

$3 \cdot 3 = 9$

slijedi da je x=0, tj. $x \notin N$

a). 5	b). 6	**c).** 9	d). 8

UNIVERZITET U TUZLI **Fakultet elektrotehnike** **Katalog zadataka za prijemni ispit na EiR**	**6. GRUPA ZADATAKA**

1.	Vrijednost izraza $\left(\frac{3-2\sqrt{3}}{\sqrt{2}}\right)^2$ je:			
	a). 8	b). $\frac{13+12\sqrt{3}}{2}$	c). $\frac{21+12\sqrt{3}}{2}$	d). $5+6\sqrt{3}$
2.	Zbir svih realnih rješenja jednačine $5x^2-5x-2=0$ je:			
	a). 1	b). $-\frac{2}{5}$	c). $\frac{2}{5}$	d). $-\frac{5}{2}$
3.	Proizvod rješenja sistema $x+2y=-8$ i $3x-y=11$ je:			
	a). $-\frac{2}{5}$	b). -10	c). $-\frac{5}{2}$	d). -5
4.	Skup realnih rješenja nejednačine $\frac{3x-1}{2x-1}\le 1$ je:			
	a). $\left[-\frac{1}{2},0\right)$	b). $\left[\frac{1}{2},1\right)$	c). $[1,+\infty)$	d). $\left[0,\frac{1}{2}\right)$
5.	Zbir realnih rješenja jednačine $4^{x-1}-5\cdot 2^{x-1}+4=0$ je:			
	a). 5	b). 1	c). 4	d). -1
6.	Proizvod svih realnih rješenja jednačine $\log_2^2 x-\log_2 x-2=0$ je:			
	a). $\frac{1}{2}$	b). 4	c). -4	d). 2
7.	Modul kompleksnog broja $Z=\frac{1+2i}{4-3i}$ je:			
	a). $\frac{2\sqrt{5}}{5}$	b). $\sqrt{5}$	c). $\frac{\sqrt{5}}{5}$	d). $2\sqrt{5}$
8.	Koliko iznosi tgx ako je $\cos x=\frac{1}{2}$ i $x\in\left[0,\frac{\pi}{2}\right]$?			
	a). $\sqrt{3}$	b). $\frac{\sqrt{3}}{3}$	c). 1	d). $\frac{\sqrt{3}}{2}$
9.	Koliko iznosi dijagonala kvadrata maksimalne površine upisanog u jednakokraki trougao stranica a=16 i b=10? 			
	a). $\frac{24}{11}$	b). $\frac{48\sqrt{2}}{11}$	c). $\frac{24\sqrt{2}}{11}$	d). $\frac{12}{7}$
10.	Ako su x i y prirodni brojevi koji zadovoljavaju jednakost $\frac{3}{x}-\frac{2}{y}=1-\frac{3}{xy}$, tada je x+y?			
	a). 3	b). 5	c). 2	d). 4

UNIVERZITET U TUZLI **Fakultet elektrotehnike** **Katalog zadataka za prijemni ispit na EiR**	**RJEŠENJA** **6. GRUPE ZADATAKA**

1.

$$\left(\frac{3-2\sqrt{3}}{\sqrt{2}}\right)^2=\frac{\left(3-2\sqrt{3}\right)^2}{\left(\sqrt{2}\right)^2}=\frac{3^2-2\cdot3\cdot2\sqrt{3}+\left(2\sqrt{3}\right)^2}{2}=\frac{9-12\sqrt{3}+12}{2}=\frac{21-12\sqrt{3}}{2}$$

a). 8 b). $\frac{13+12\sqrt{3}}{2}$ **c).** $\frac{21+12\sqrt{3}}{2}$ d). $5+6\sqrt{3}$

2.

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

$ax^2+bx+c=0$

Viettova pravila za zbir rješenja kvadratne jednačine: $x_1+x_2=-\frac{b}{a}$

$x_1+x_2=-\frac{-5}{5}=1$

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

3.

$x+2y=-8$

$3x-y=11 \ / \cdot 2$

$x+2y=-8$

$6x-2y=22$

$7x=14 \Rightarrow x=2$

$2+2y=-8 \Rightarrow y=-5$

$x\cdot y=-10$

a). $-\frac{2}{5}$ **b).** -10 c). $-\frac{5}{2}$ d). -5

4.

$\frac{3x-1}{2x-1}\le 1$

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

$\frac{3x-1-2x+1}{2x-1}\le 0$

$\frac{x}{2x-1}\le 0$

D.P.:

$2x-1\neq 0 \Rightarrow x\neq\frac{1}{2}$

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

$x\in\left[0,\frac{1}{2}\right)$

a). $\left[-\frac{1}{2},0\right)$ b). $\left[\frac{1}{2},1\right)$ c). $[1,+\infty)$ **d).** $\left[0,\frac{1}{2}\right)$

5.

$4^{x-1}-5\cdot 2^{x-1}+4=0$

$\left(2^2\right)^{x-1}-5\cdot 3^{x-1}+4=0$

$\left(2^{x-1}\right)^2-5\cdot 2^{x-1}+4=0$

$2^{x-1}=t$

$t^2-5t+4=0$

$t_{1/2}=\dfrac{5\pm\sqrt{(-5)^2-4\cdot 1\cdot 4}}{2\cdot 1}$

$t_1=1 \ \wedge \ t_2=4$

$2^{x-1}=1=2^0 \ \Rightarrow \ x-1=0 \ \Rightarrow \ x_1=1$

$2^{x-1}=4=2^2 \ \Rightarrow \ x-1=2 \ \Rightarrow \ x_2=3$

$x_1+x_2=1+3=4$

a). 5 b). 1 **c).** 4 d). −1

6.

$\log_2^2 x-\log_2 x-2=0$

$\left(\log_2 x\right)^2-\log_2 x-2=0$

$\log_2 x=t$

$t^2-t-2=0$

$t_{1/2}=\dfrac{1\pm\sqrt{(-1)^2-4\cdot 1\cdot(-2)}}{2\cdot 1}$

$t_1=2 \ \wedge \ t_2=-1$

$\log_2 x=2 \ \Rightarrow \ x_1=2^2=4$

$\log_2 x=-1 \ \Rightarrow \ x_2=2^{-1}=\dfrac{1}{2}$

$x_1\cdot x_2=4\cdot\dfrac{1}{2}=2$

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

7.

$Z=\dfrac{1+2i}{4-3i}$

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

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

8.

$$\cos x = \frac{1}{2}$$

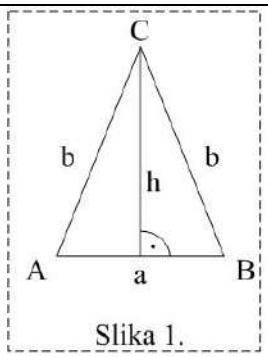
$$\sin x = \pm\sqrt{1-\cos^2 x} = \pm\sqrt{1-\left(\frac{1}{2}\right)^2} = \pm\sqrt{1-\frac{1}{4}} = \pm\sqrt{\frac{3}{4}} = \pm\frac{\sqrt{3}}{2}$$

$$\sin x = \frac{\sqrt{3}}{2},\ \ x \in \left[0, \frac{\pi}{2}\right]$$

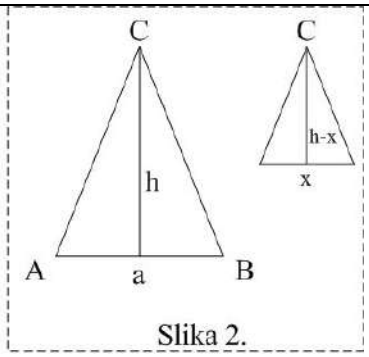
$$tgx = \frac{\sin x}{\cos x} = \frac{\frac{\sqrt{3}}{2}}{\frac{1}{2}} = \sqrt{3}$$

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

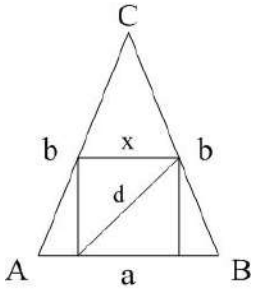
9.



Slika 1.



Slika 2.



Na slici 1. prikazan je pravougli trougao:

$$b^2 = \left(\frac{a}{2}\right)^2 + h^2 \ \Rightarrow\ h = 6$$

Na slici 2. prikazana su dva slična trougla:

$$a : x = h : (h - x)$$

$$ah - ax = hx$$

$$x = \frac{ah}{a+h} = \frac{24}{7}$$

Dijagonala kvadrata:

$$d = x\sqrt{2} = \frac{24\sqrt{2}}{7}$$

a). $\frac{24}{11}$ **b).** $\frac{48\sqrt{2}}{11}$ c). $\frac{24\sqrt{2}}{11}$ d). $\frac{12}{7}$

10.

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

$$3y - 2x = xy - 3$$

$$-2x - xy + 3y = -3$$

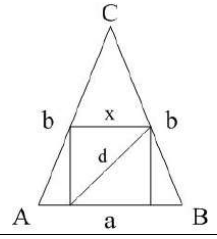
$$-x(2+y) + 3y + 6 = -3 + 6$$

$$-x(2+y) + 3(2+y) = 3$$

$$(2+y)(3-x) = 3$$

	Za $x, y \in N$ postoji samo jedna kombinacija proizvoda: $(2+y)(3-x)=3$ $3 \cdot 1 = 3$ $y = 1$ $x = 2$ $x + y = 3$			
	a). 3	b). 5	c). 2	d). 4

UNIVERZITET U TUZLI **Fakultet elektrotehnike** **Katalog zadataka za prijemni ispit na EiR**	**7. GRUPA ZADATAKA**

1.	Vrijednost izraza $\left(\frac{2-3\sqrt{2}}{\sqrt{3}}\right)^2$ je:			
	a). $\frac{22-12\sqrt{2}}{3}$	b). 6	c). $\frac{20-18\sqrt{2}}{3}$	d). $6-4\sqrt{2}$
2.	Zbir svih realnih rješenja jednačine $3x^2-9x+5=0$ je:			
	a). $\frac{5}{3}$	b). 3	c). $-\frac{5}{9}$	d). 2
3.	Proizvod rješenja sistema $x+2y=-5$ i $2x-y=10$ je:			
	a). -7	b). $-\frac{3}{4}$	c). -12	d). -1
4.	Skup realnih rješenja nejednačine $\frac{3x+1}{2x+1}\le 1$ je:			
	a). $\left(0,\frac{1}{2}\right]$	b). $\left(\frac{1}{2},1\right]$	c). $(1,+\infty)$	d). $\left(-\frac{1}{2},0\right]$
5.	Zbir realnih rješenja jednačine $4^{x+1}-6\cdot 2^{x+1}+8=0$ je:			
	a). 1	b). -1	c). 6	d). 3
6.	Proizvod svih realnih rješenja jednačine $\log_2^2 x+\log_2 x-2=0$ je:			
	a). 2	b). $\frac{1}{4}$	c). -1	d). $\frac{1}{2}$
7.	Modul kompleksnog broja $Z=\frac{3+4i}{1-2i}$ je:			
	a). $2\sqrt{5}$	b). $\sqrt{5}$	c). $\frac{\sqrt{5}}{5}$	d). 5
8.	Koliko iznosi tgx ako je $\sin x=\frac{\sqrt{2}}{2}$ i $x\in\left[0,\frac{\pi}{2}\right]$?			
	a). $\sqrt{3}$	b). $\frac{\sqrt{3}}{2}$	c). 1	d). $\frac{\sqrt{3}}{3}$
9.	Koliko iznosi dijagonala kvadrata maksimalne površine upisanog u jednakokraki trougao stranica a=8 i b=5? 			
	a). $\frac{24\sqrt{2}}{11}$	b). $\frac{14\sqrt{2}}{11}$	c). $\frac{14}{11}$	d). 6
10.	Ako su x i y prirodni brojevi koji zadovoljavaju jednakost $\frac{3}{x}-\frac{2}{y}=1-\frac{1}{xy}$, tada je x+y?			
	a). 2	b). 6	c). 5	d). 4

UNIVERZITET U TUZLI **Fakultet elektrotehnike** **Katalog zadataka za prijemni ispit na EiR**	**RJEŠENJA** **7. GRUPE ZADATAKA**

1.

$$\left(\frac{2-3\sqrt{2}}{\sqrt{3}}\right)^2=\frac{\left(2-3\sqrt{2}\right)^2}{\left(\sqrt{3}\right)^2}=\frac{2^2-2\cdot 2\cdot 3\sqrt{2}+\left(3\sqrt{2}\right)^2}{3}=\frac{4-12\sqrt{2}+18}{3}=\frac{22-12\sqrt{2}}{3}$$

a). $\frac{22-12\sqrt{2}}{3}$ b). 6 c). $\frac{20-18\sqrt{2}}{3}$ d). $6-4\sqrt{2}$

2.

$3x^2-9x+5=0$

$ax^2+bx+c=0$

Viettova pravila za zbir rješenja kvadratne jednačine: $x_1+x_2=-\frac{b}{a}$

$x_1+x_2=-\frac{-9}{3}=3$

a). $\frac{5}{3}$ **b).** 3 c). $-\frac{5}{9}$ d). 2

3.

$x+2y=-5$

$2x-y=10 \ /\cdot 2$

$x+2y=-5$

$4x-2y=20$

$5x=15 \Rightarrow x=3$

$3+2y=-5 \Rightarrow y=-4$

$x\cdot y=-12$

a). -7 b). $-\frac{3}{4}$ **c).** -12 d). -1

4.

$\frac{3x+1}{2x+1}\le 1$

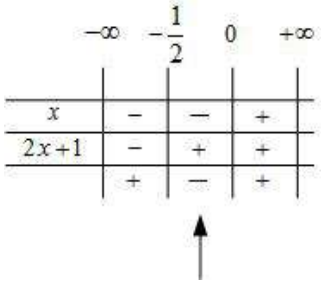
$\frac{3x+1}{2x+1}-1\le 0$

$\frac{3x+1-2x-1}{2x+1}\le 0$

$\frac{x}{2x+1}\le 0$

D.P.:

$2x+1\neq 0 \Rightarrow x\neq -\frac{1}{2}$



$x\in\left(-\frac{1}{2},0\right]$

a). $\left(0,\frac{1}{2}\right]$ b). $\left(\frac{1}{2},1\right]$ c). $(1,+\infty)$ **d).** $\left(-\frac{1}{2},0\right]$

5.

$4^{x+1}-6\cdot 2^{x+1}+8=0$

$\left(2^2\right)^{x+1}-6\cdot 3^{x+1}+8=0$

$\left(2^{x+1}\right)^2-6\cdot 2^{x+1}+8=0$

$2^{x+1}=t$

$t^2-6t+8=0$

$t_{1/2}=\dfrac{6\pm\sqrt{(-6)^2-4\cdot 1\cdot 8}}{2\cdot 1}$

$t_1=2 \ \wedge \ t_2=4$

$2^{x+1}=2=2^1 \ \Rightarrow \ x+1=1 \ \Rightarrow \ x_1=0$

$2^{x+1}=4=2^2 \ \Rightarrow \ x+1=2 \ \Rightarrow \ x_2=1$

$x_1+x_2=0+1=1$

a). 1 b). -1 c). 6 d). 3

6.

$\log_2^2 x+\log_2 x-2=0$

$\left(\log_2 x\right)^2+\log_2 x-2=0$

$\log_2 x=t$

$t^2+t-2=0$

$t_{1/2}=\dfrac{-1\pm\sqrt{1^2-4\cdot 1\cdot(-2)}}{2\cdot 1}$

$t_1=1 \ \wedge \ t_2=-2$

$\log_2 x=1 \ \Rightarrow \ x_1=2^1=2$

$\log_2 x=-2 \ \Rightarrow \ x_2=2^{-2}=\dfrac{1}{4}$

$x_1\cdot x_2=2\cdot\dfrac{1}{4}=\dfrac{1}{2}$

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

7.

$Z=\dfrac{3+4i}{1-2i}$

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

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

8.

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

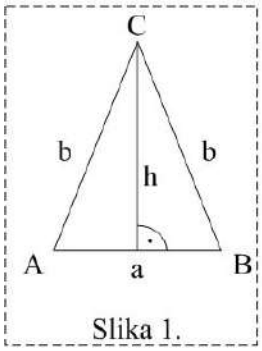
$$\cos x = \pm\sqrt{1-\sin^2 x} = \pm\sqrt{1-\left(\frac{\sqrt{2}}{2}\right)^2} = \pm\sqrt{1-\frac{2}{4}} = \pm\sqrt{\frac{2}{4}} = \pm\frac{\sqrt{2}}{2}$$

$$\cos x = \frac{\sqrt{2}}{2},\ x \in \left[0, \frac{\pi}{2}\right]$$

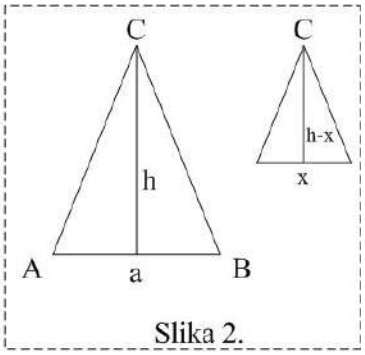
$$tgx = \frac{\sin x}{\cos x} = \frac{\frac{\sqrt{2}}{2}}{\frac{\sqrt{2}}{2}} = 1$$

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

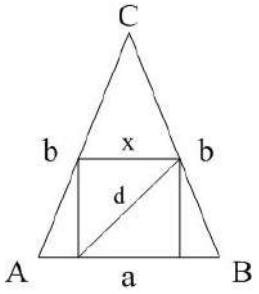
9.



Slika 1.



Slika 2.



Na slici 1. prikazan je pravougli trougao:

$$b^2 = \left(\frac{a}{2}\right)^2 + h^2 \ \Rightarrow\ h = 3$$

Na slici 2. prikazana su dva slična trougla:

$$a : x = h : (h - x)$$

$$ah - ax = hx$$

$$x = \frac{ah}{a+h} = \frac{24}{11}$$

Dijagonala kvadrata:

$$d = x\sqrt{2} = \frac{24\sqrt{2}}{11}$$

a). $\frac{24\sqrt{2}}{11}$ b). $\frac{14\sqrt{2}}{11}$ c). $\frac{14}{11}$ d). 6

10.

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

$3y-2x=xy-1$

$-2x-xy+3y=-1$

$-x(2+y)+3y+6=-1+6$

$-x(2+y)+3(2+y)=5$

$(2+y)(3-x)=5$

Za $x, y \in N$ postoji samo jedna kombinacija proizvoda:

$(2+y)(3-x)=5$

$5 \cdot 1=3$

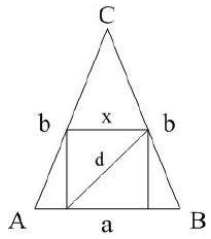
$y=3$

$x=2$

$x+y=5$

a). 2 b). 6 **c).** 5 d). 4

UNIVERZITET U TUZLI **Fakultet elektrotehnike** **Katalog zadataka za prijemni ispit na EiR**	**8. GRUPA ZADATAKA**

1.	Vrijednost izraza $\left(\frac{2-3\sqrt{3}}{\sqrt{2}}\right)^2$ je:			
	a). $\frac{21-12\sqrt{3}}{2}$	b). $15-6\sqrt{3}$	c). 6	d). $\frac{31-12\sqrt{3}}{2}$
2.	Zbir svih realnih rješenja jednačine $5x^2-10x-3=0$ je:			
	a). $-\frac{3}{5}$	b). 2	c). $\frac{3}{5}$	d). $\frac{5}{3}$
3.	Proizvod rješenja sistema $x+3y=-1$ i $2x-y=12$ je:			
	a). $-\frac{2}{5}$	b). -5	c). -10	d). $-\frac{5}{2}$
4.	Skup realnih rješenja nejednačine $\frac{4x-1}{3x-1}\le 1$ je:			
	a). $[1,+\infty)$	b). $\left[0,\frac{1}{3}\right)$	c). $\left[-\frac{1}{3},0\right)$	d). $\left[\frac{1}{3},1\right)$
5.	Zbir realnih rješenja jednačine $9^{x-1}-4\cdot 3^{x-1}+3=0$ je:			
	a). 4	b). -1	c). 3	d). 5
6.	Proizvod svih realnih rješenja jednačine $\log_3^2 x-\log_3 x-2=0$ je:			
	a). 3	b). $\frac{1}{3}$	c). $\frac{1}{9}$	d). $-\frac{1}{3}$
7.	Modul kompleksnog broja $Z=\frac{1+2i}{3-4i}$ je:			
	a). $\sqrt{5}$	b). $2\sqrt{5}$	c). $\frac{2\sqrt{5}}{5}$	d). $\frac{\sqrt{5}}{5}$
8.	Koliko iznosi tgx ako je $\sin x=\frac{\sqrt{3}}{2}$ i $x\in\left[0,\frac{\pi}{2}\right]$?			
	a). $\sqrt{3}$	b). $\frac{\sqrt{3}}{2}$	c). $\frac{\sqrt{2}}{2}$	d). 1
9.	Koliko iznosi dijagonala kvadrata maksimalne površine upisanog u jednakokraki trougao stranica a=12 i b=10? 			
	a). $\frac{12\sqrt{2}}{5}$	b). $\frac{24\sqrt{2}}{5}$	c). $\frac{12}{5}$	d). 12
10.	Ako su x i y prirodni brojevi koji zadovoljavaju jednakost $\frac{3}{x}-\frac{2}{y}=1+\frac{1}{xy}$, tada je x+y?			
	a). 5	b). 6	c). 3	d). 7

UNIVERZITET U TUZLI **Fakultet elektrotehnike** **Katalog zadataka za prijemni ispit na EiR**	**RJEŠENJA** **8. GRUPE ZADATAKA**

1.

$$\left(\frac{3-2\sqrt{3}}{\sqrt{2}}\right)^2=\frac{\left(2-3\sqrt{3}\right)^2}{\left(\sqrt{2}\right)^2}=\frac{2^2-2\cdot 2\cdot 3\sqrt{3}+\left(3\sqrt{3}\right)^2}{2}=\frac{4-12\sqrt{3}+27}{2}=\frac{31-12\sqrt{3}}{2}$$

a). $\frac{21-12\sqrt{3}}{2}$ b). $15-6\sqrt{3}$ c). 6 **d).** $\frac{31-12\sqrt{3}}{2}$

2.

$5x^2-10x-3=0$

$ax^2+bx+c=0$

Viettova pravila za zbir rješenja kvadratne jednačine: $x_1+x_2=-\frac{b}{a}$

$x_1+x_2=-\frac{-10}{5}=2$

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

3.

$x+3y=-1$

$\underline{2x-y=12\ /\cdot 3}$

$x+3y=-1$

$\underline{6x-3y=36}$

$7x=35\ \Rightarrow\ x=5$

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

$x\cdot y=-10$

a). $-\frac{2}{5}$ b). -5 **c).** -10 d). $-\frac{5}{2}$

4.

$\frac{4x-1}{3x-1}\le 1$

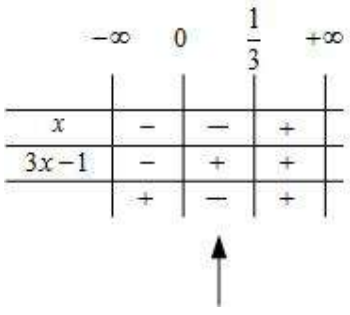
$\frac{4x-1}{3x-1}-1\le 0$

$\frac{4x-1-3x+1}{3x-1}\le 0$

$\frac{x}{3x-1}\le 0$

D.P.:

$3x-1\neq 0\ \Rightarrow\ x\neq\frac{1}{3}$



$x\in\left[0,\frac{1}{3}\right)$

a). $[1,+\infty)$ **b).** $\left[0,\frac{1}{3}\right)$ c). $\left[-\frac{1}{3},0\right)$ d). $\left[\frac{1}{3},1\right)$

5.

$9^{x-1}-4\cdot 3^{x-1}+3=0$

$\left(3^2\right)^{x11}-4\cdot 3^{x-1}+3=0$

$\left(3^{x-1}\right)^2-4\cdot 3^{x-1}+3=0$

$3^{x-1}=t$

$t^2-4t+3=0$

$t_{1/2}=\dfrac{4\pm\sqrt{(-4)^2-4\cdot 1\cdot 3}}{2\cdot 1}$

$t_1=3\ \wedge\ t_2=1$

$3^{x-1}=3=3^1\ \Rightarrow\ x-1=1\ \Rightarrow\ x_1=2$

$3^{x-1}=1=3^0\ \Rightarrow\ x-1=0\ \Rightarrow\ x_2=1$

$x_1+x_2=2+1=3$

a). 4 b). -1 **c).** 3 d). 5

6.

$\log_3^2 x-\log_3 x-2=0$

$\left(\log_3 x\right)^2-\log_3 x-2=0$

$\log_3 x=t$

$t^2-t-2=0$

$t_{1/2}=\dfrac{1\pm\sqrt{(-1)^2-4\cdot 1\cdot(-2)}}{2\cdot 1}$

$t_1=2\ \wedge\ t_2=-1$

$\log_3 x=2\ \Rightarrow\ x_1=3^2=9$

$\log_3 x=-1\ \Rightarrow\ x_2=3^{-1}=\dfrac{1}{3}$

$x_1\cdot x_2=9\cdot\dfrac{1}{3}=3$

a). 3 b). $\dfrac{1}{3}$ c). $\dfrac{1}{9}$ d). $-\dfrac{1}{3}$

7.

$Z=\dfrac{1+2i}{3-4i}$

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

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

8.

$$\sin x = \frac{\sqrt{3}}{2}$$

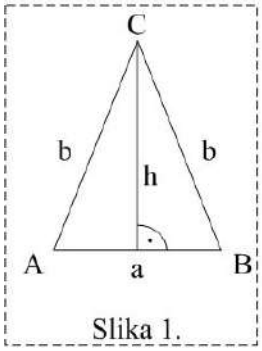
$$\cos x = \pm\sqrt{1-\sin^2 x} = \pm\sqrt{1-\left(\frac{\sqrt{3}}{2}\right)^2} = \pm\sqrt{1-\frac{3}{4}} = \pm\sqrt{\frac{1}{4}} = \pm\frac{1}{2}$$

$$\cos x = \frac{1}{2},\ x \in \left[0, \frac{\pi}{2}\right]$$

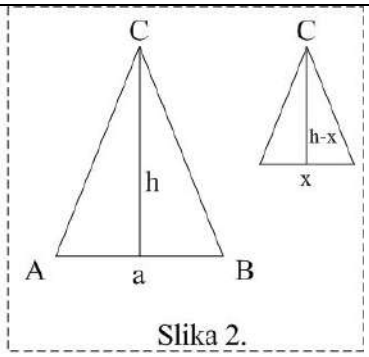
$$tgx = \frac{\sin x}{\cos x} = \frac{\frac{\sqrt{3}}{2}}{\frac{1}{2}} = \sqrt{3}$$

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

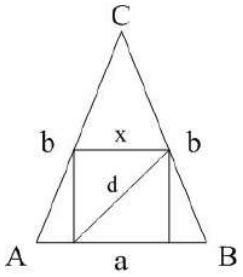
9.



Slika 1.



Slika 2.



Na slici 1. prikazan je pravougli trougao:

$$b^2 = \left(\frac{a}{2}\right)^2 + h^2 \ \Rightarrow\ h = 8$$

Na slici 2. prikazana su dva slična trougla:

$$a : x = h : (h - x)$$

$$ah - ax = hx$$

$$x = \frac{ah}{a+h} = \frac{24}{5}$$

Dijagonala kvadrata:

$$d = x\sqrt{2} = \frac{24\sqrt{2}}{5}$$

a). $\frac{12\sqrt{2}}{5}$ **b).** $\frac{24\sqrt{2}}{5}$ c). $\frac{12}{5}$ d). 12

10.

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

$$3y - 2x = xy + 1$$

$$-2x - xy + 3y = 1$$

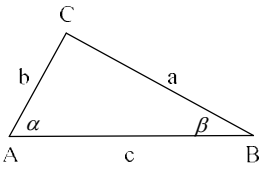
$$-x(2+y) + 3y + 6 = 1 + 6$$

$$-x(2+y) + 3(2+y) = 7$$

$$(2+y)(3-x) = 7$$

	Za $x, y \in N$ postoji samo jedna kombinacija proizvoda: $(2+y)(3-x)=7$ $7 \cdot 1 = 7$ $y = 5$ $x = 2$ $x + y = 7$
	a). 5 b). 6 c). 3 **d).** 7

UNIVERZITET U TUZLI **Fakultet elektrotehnike** **Katalog zadataka za prijemni ispit na EiR**	**9. GRUPA ZADATAKA**

1.	Vrijednost izraza $\left(2\sqrt{3}-\sqrt{6}\right)^2$ je:			
	a). $3\left(3+2\sqrt{2}\right)$	b). $6\sqrt{6}$	c). $6\left(3-2\sqrt{2}\right)$	d). $2\left(3\sqrt{2}+4\sqrt{3}\right)$
2.	Rješenje uproštenog izraza $\frac{(a-b)^2-c^2}{a^2-(b-c)^2}\cdot\frac{ab+b^2-bc}{a^2-ab-ac}$ je:			
	a). $\frac{a+b-c}{a-b-c}$	b). $\frac{b}{a}$	c). a	d). 1
3.	Proizvod realnih rješenja jednačine $3x^2-11x+6=0$ je:			
	a). 3	b). 11	c). 6	d). 2
4.	Proizvod rješenja sistema $4x+y=2$ i $x+3y=-5$ je:			
	a). -1	b). -2	c). $\frac{3}{2}$	d). $-\frac{1}{2}$
5.	Skup realnih rješenja nejednačine $\frac{2x+1}{3x+1}\geq 1$ je:			
	a). $\left(-\frac{1}{3},0\right]$	b). $\left(-\frac{1}{2},-\frac{1}{3}\right]$	c). $(0,1]$	d). $\left(\frac{4}{3},2\right]$
6.	Zbir realnih rješenja jednačine $\log_2^2 x-3\log_2 x+2=0$ je:			
	a). 3	b). 9	c). 6	d). 5
7.	Modul kompleksnog broja $Z=\frac{3-4i}{5i}$ je:			
	a). 1	b). $\frac{1}{5}$	c). $\sqrt{5}$	d). 3
8.	Koliko iznosi $\sin x$ ako je $\cos x=\frac{1}{2}$ i $x\in\left[0,\frac{\pi}{2}\right]$?			
	a). $\frac{1}{2}$	b). $-\frac{1}{2}$	c). $\frac{\sqrt{2}}{2}$	d). $\frac{\sqrt{3}}{2}$
9.	Koliko iznosi površina pravouglog trougla ako je poznato b=4 i $\beta=15^\circ$? 			
	a). $12\left(3-\sqrt{3}\right)$	b). $8\left(2+\sqrt{3}\right)$	c). 12	d). $8\sqrt{3}$
10.	Koliko ima prirodnih brojeva $n\leq 2023$ takvih da se broj 2^n u dekadnom zapisu završava cifrom 2?			
	a). 506	b). 556	c). 600	d). 456

1.

$$\left(2\sqrt{3}-\sqrt{6}\right)^2=\left(2\sqrt{3}\right)^2-2\cdot 2\sqrt{3}\cdot\sqrt{6}+\left(\sqrt{6}\right)^2=4\cdot 3-4\cdot\sqrt{18}+6=$$
$$=12-4\cdot\sqrt{9\cdot 2}+6=18-12\sqrt{2}=6\left(3-2\sqrt{2}\right)$$

a). $3\left(3+2\sqrt{2}\right)$ b). $6\sqrt{6}$ **c).** $6\left(3-2\sqrt{2}\right)$ d). $2\left(3\sqrt{2}+4\sqrt{3}\right)$

2.

$$\frac{(a-b)^2-c^2}{a^2-(b-c)^2}\cdot\frac{ab+b^2-bc}{a^2-ab-ac}=$$
$$=\frac{(a-b-c)\cdot(a-b+c)}{\left[a-(b-c)\right]\cdot\left[a+(b-c)\right]}\cdot\frac{b\cdot(a+b-c)}{a\cdot(a-b-c)}=$$
$$=\frac{(a-b-c)\cdot(a-b+c)}{(a-b+c)\cdot(a+b-c)}\cdot\frac{b\cdot(a+b-c)}{a\cdot(a-b-c)}=\frac{b}{a}$$

a). $\frac{a+b-c}{a-b-c}$ **b).** $\frac{b}{a}$ c). a d). 1

3.

Za kvadratnu jednačinu $ax^2+bx+c=0$ vrijedi Viett-ovo pravilo za proizvod rješenja

$$x_1\cdot x_2=\frac{c}{a}$$
$$3x^2-11x+6=0$$
$$x_1\cdot x_2=\frac{c}{a}=\frac{6}{3}=2$$

a). 3 b). 11 c). 6 **d).** 2

4.

$$4x+y=2\quad /\cdot(-3)$$
$$\underline{x+3y=-5}$$
$$-12x-3y=-6$$
$$\underline{x+3y=-5}$$
$$-11x=-11$$
$$x=1$$
$$4\cdot 1+y=2$$
$$y=2-4$$
$$y=-2$$
$$x\cdot y=1\cdot(-2)=-2$$

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

5. Definiciono područje:

$3x+1\neq 0 \Rightarrow x\neq -\frac{1}{3}$

$\frac{2x+1}{3x+1}\geq 1$

$\frac{2x+1}{3x+1}-1\geq 0$

$\frac{2x+1-3x-1}{3x+1}\geq 0$

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

$\frac{x}{3x+1}\leq 0$

	$-\infty$	$-\frac{1}{3}$	0	$+\infty$
x	$-$	$-$	$+$	
$3x+1$	$-$	$+$	$+$	
	$+$	$-$	$+$	

$x\in\left(-\frac{1}{3},0\right]$

a). $\left(-\frac{1}{3},0\right]$ b). $\left(-\frac{1}{2},-\frac{1}{3}\right]$ c). $(0,1]$ d). $\left(\frac{4}{3},2\right]$

6.

$\log_2^2 x-3\log_2 x+2=0$

Smjena: $\log_2 x=t$

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

$t_{1,2}=\frac{3\pm\sqrt{3^2-4\cdot 1\cdot 2}}{2\cdot 1}=\frac{3\pm\sqrt{9-8}}{2}=\frac{3\pm\sqrt{1}}{2}=\frac{3\pm 1}{2}$

$t_1=\frac{3+1}{2}=2$

$t_2=\frac{3-1}{2}=1$

$\log_2 x=2 \Rightarrow x_1=2^2=4$

$\log_2 x=1 \Rightarrow x_2=2^1=2$

$x_1+x_2=4+2=6$

a). 3 b). 9 **c).** 6 d). 5

7.

$$Z = \frac{3-4i}{5i}$$

$$|Z| = \left|\frac{3-4i}{5i}\right| = \frac{|3-4i|}{|5i|} = \frac{\sqrt{3^2+(-4)^2}}{\sqrt{0^2+5^2}} = \frac{\sqrt{9+16}}{\sqrt{25}} = 1$$

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

8.

$$\sin^2 x + \cos^2 x = 1 \Rightarrow \sin x = \pm\sqrt{1-\cos^2 x}$$

$$\cos x = \frac{1}{2}$$

$$\sin x = \pm\sqrt{1-\frac{1}{4}} = \pm\sqrt{\frac{3}{4}} = \pm\frac{\sqrt{3}}{2},\ x \in \left[0, \frac{\pi}{2}\right]$$

$$\sin x = \frac{\sqrt{3}}{2}$$

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

9.

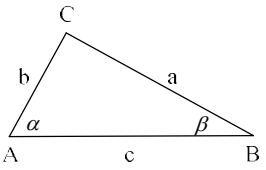
$b = 4$

$\beta = 15^\circ$

$P = ?$

$P = \frac{a \cdot b}{2}$

$a = ?$



Za pravougli trougao vrijedi relacija trigonometrijske funkcije:

$tg\beta = \frac{b}{a} \Rightarrow a = \frac{b}{tg\beta}$

$tg15^\circ = tg\left(45^\circ - 30^\circ\right) = \frac{tg45^\circ - tg30^\circ}{1 + tg45^\circ \cdot tg30^\circ} =$

$tg15^\circ = \frac{1 - \frac{\sqrt{3}}{3}}{1 + 1 \cdot \frac{\sqrt{3}}{3}} = \frac{\frac{3 - \sqrt{3}}{3}}{\frac{3 + \sqrt{3}}{3}} = \frac{3 - \sqrt{3}}{3 + \sqrt{3}} = \frac{\sqrt{3} - 1}{\sqrt{3} + 1}$

$a = \frac{4}{\frac{\sqrt{3} - 1}{\sqrt{3} + 1}} = \frac{4\left(\sqrt{3} + 1\right)}{\sqrt{3} - 1} \cdot \frac{\sqrt{3} + 1}{\sqrt{3} + 1} = \frac{4\left[\left(\sqrt{3}\right)^2 + 2 \cdot \sqrt{3} \cdot 1 + 1^2\right]}{\left(\sqrt{3}\right)^2 - 1} =$

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

$P = \frac{a \cdot b}{2} = \frac{4\left(2 + \sqrt{3}\right) \cdot 4}{2} = 8\left(2 + \sqrt{3}\right)$

a). $12\left(3 - \sqrt{3}\right)$ **b).** $8\left(2 + \sqrt{3}\right)$ c). 12 d). $8\sqrt{3}$

10.

2^n, $n \leq 2023$

$n = 1 \Rightarrow 2^1 = 2$

$n = 2 \Rightarrow 2^2 = 4$

$n = 3 \Rightarrow 2^3 = 8$

$n = 4 \Rightarrow 2^4 = 16$

$n = 5 \Rightarrow 2^5 = 32$

$n = 6 \Rightarrow 2^6 = 64$

$n = 7 \Rightarrow 2^7 = 128$

$n = 8 \Rightarrow 2^8 = 256$

$n = 9 \Rightarrow 2^9 = 512$

$n = 10 \Rightarrow 2^{10} = 1024$

...

Cifrom 2 završavaju brojevi:

$n = 1 \Rightarrow 2^1 = 2$

$n = 5 \Rightarrow 2^5 = 32$

...

To jest, kad vrijedi:

$n = 4k - 3, \ k \in N$

$n \leq 2023$

$4k - 3 \leq 2023$

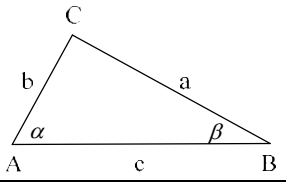
$4k \leq 2026$

$k \leq \frac{2026}{4} = 506.5$

Broj prirodnih brojeva 506.

a). 506 b). 556 c). 600 d). 456

UNIVERZITET U TUZLI **Fakultet elektrotehnike** **Katalog zadataka za prijemni ispit na EiR**	**10. GRUPA ZADATAKA**

1.	Vrijednost izraza $\left(3\sqrt{2}-\sqrt{6}\right)^2$ je:			
	a). $2\left(2+\sqrt{3}\right)$	b). $4\sqrt{6}$	c). $4\left(2\sqrt{3}-3\sqrt{6}\right)$	d). $12\left(2-\sqrt{3}\right)$
2.	Rješenje uproštenog izraza $\frac{\left(a+b\right)^2-c^2}{a^2-\left(b+c\right)^2}\cdot\frac{a^2-ab-ac}{ab+b^2-bc}$ je:			
	a). 1	b). b	c). $\frac{a}{b}$	d). $\frac{a-b-c}{a+b-c}$
3.	Proizvod realnih rješenja jednačine $2x^2-7x+6=0$ je:			
	a). 2	b). 3	c). 6	d). 7
4.	Proizvod rješenja sistema $3x+y=-1$ i $x+2y=3$ je:			
	a). $\frac{1}{2}$	b). $-\frac{3}{2}$	c). -1	d). -2
5.	Skup realnih rješenja nejednačine $\frac{3x+1}{4x+1}\geq 1$ je:			
	a). $\left(-\frac{1}{4},0\right]$	b). $\left(-\frac{1}{3},-\frac{1}{4}\right]$	c). $(0,1]$	d). $\left(\frac{3}{2},2\right]$
6.	Zbir realnih rješenja jednačine $\log_3^2 x-3\log_3 x+2=0$ je:			
	a). 10	b). 12	c). 4	d). 13
7.	Modul kompleksnog broja $Z=\frac{4-3i}{5i}$ je:			
	a). $\sqrt{5}$	b). $\frac{1}{5}$	c). 1	d). 2
8.	Koliko iznosi $\cos x$ ako je $\sin x=\frac{1}{2}$ i $x\in\left[0,\frac{\pi}{2}\right]$?			
	a). $\frac{\sqrt{3}}{2}$	b). $\frac{\sqrt{2}}{2}$	c). $\frac{1}{2}$	d). $-\frac{1}{2}$
9.	Koliko iznosi površina pravouglog trougla ako je poznato a=6 i $\alpha=75^\circ$? 			
	a). $2\left(3+\sqrt{3}\right)$	b). 16	c). $6\sqrt{3}$	d). $18\left(2-\sqrt{3}\right)$
10.	Koliko ima prirodnih brojeva $n\leq 2023$ takvih da se broj 2^n u dekadnom zapisu završava cifrom 6?			
	a). 555	b). 505	c). 600	d). 450

1.

$$\left(3\sqrt{2}-\sqrt{6}\right)^2=\left(3\sqrt{2}\right)^2-2\cdot 3\sqrt{2}\cdot\sqrt{6}+\left(\sqrt{6}\right)^2=9\cdot 2-6\cdot\sqrt{12}+6=$$
$$=18-6\cdot\sqrt{4\cdot 3}+6=24-12\sqrt{3}=12\left(2-\sqrt{3}\right)$$

a). $2\left(2+\sqrt{3}\right)$ b). $4\sqrt{6}$ c). $4\left(2\sqrt{3}-3\sqrt{6}\right)$ **d).** $12\left(2-\sqrt{3}\right)$

2.

$$\frac{(a+b)^2-c^2}{a^2-(b+c)^2}\cdot\frac{a^2-ab-ac}{ab+b^2-bc}=$$
$$=\frac{(a+b-c)\cdot(a+b+c)}{\left[a-(b+c)\right]\cdot\left[a+(b+c)\right]}\cdot\frac{a\cdot(a-b-c)}{b\cdot(a+b-c)}=$$
$$=\frac{(a+b-c)\cdot(a+b+c)}{(a-b-c)\cdot(a+b+c)}\cdot\frac{a\cdot(a-b-c)}{b\cdot(a+b-c)}=\frac{a}{b}$$

a). 1 b). b **c).** $\frac{a}{b}$ d). $\frac{a-b-c}{a+b-c}$

3.

Za kvadratnu jednačinu $ax^2+bx+c=0$ vrijedi Viett-ovo pravilo za proizvod rješenja

$$x_1\cdot x_2=\frac{c}{a}$$
$$2x^2-7x+6=0$$
$$x_1\cdot x_2=\frac{c}{a}=\frac{6}{2}=3$$

a). 2 **b).** 3 c). 6 d). 7

4.

$$3x+y=-1\ \ /\cdot(-2)$$
$$\underline{x+2y=3}$$
$$-6x-2y=2$$
$$\underline{x+2y=3}$$
$$-5x=5$$
$$x=-1$$
$$3\cdot(-1)+y=-1$$
$$y=-1+3$$
$$y=2$$
$$x\cdot y=-1\cdot 2=-2$$

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

5.

Definiciono područje:

$4x+1\neq 0 \Rightarrow x\neq -\frac{1}{4}$

$\frac{3x+1}{4x+1}\geq 1$

$\frac{3x+1}{4x+1}-1\geq 0$

$\frac{3x+1-4x-1}{4x+1}\geq 0$

$\frac{-x}{4x+1}\geq 0 \ / \cdot(-1)$

$\frac{x}{4x+1}\leq 0$

	$-\infty$	$-\frac{1}{4}$	0	$+\infty$
x	$-$	$-$	0	$+$
$4x+1$	$-$	0	$+$	$+$
	$+$	$\nexists$	$-$	$+$

$x\in\left(-\frac{1}{4},0\right]$

a). $\left(-\frac{1}{4},0\right]$ b). $\left(-\frac{1}{3},-\frac{1}{4}\right]$ c). $(0,1]$ d). $\left(\frac{3}{2},2\right]$

6.

$\log_3^2 x-3\log_3 x+2=0$

Smjena: $\log_3 x=t$

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

$t_{1,2}=\frac{3\pm\sqrt{3^2-4\cdot 1\cdot 2}}{2\cdot 1}=\frac{3\pm\sqrt{9-8}}{2}=\frac{3\pm\sqrt{1}}{2}=\frac{3\pm 1}{2}$

$t_1=\frac{3+1}{2}=2$

$t_2=\frac{3-1}{2}=1$

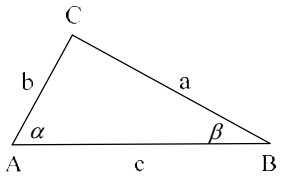
$\log_3 x=2 \Rightarrow x_1=3^2=9$

$\log_3 x=1 \Rightarrow x_2=3^1=3$

$x_1+x_2=9+3=12$

a). 10 **b).** 12 c). 4 d). 13

7.

	$Z = \frac{4-3i}{5i}$ $\lvert Z\rvert = \left\lvert \frac{4-3i}{5i} \right\rvert = \frac{\lvert 4-3i\rvert}{\lvert 5i\rvert} = \frac{\sqrt{4^2+(-3)^2}}{\sqrt{0^2+5^2}} = \frac{\sqrt{16+9}}{\sqrt{25}} = 1$
	a). $\sqrt{5}$ b). $\frac{1}{5}$ **c).** 1 d). 2
8.	$\sin^2 x + \cos^2 x = 1 \Rightarrow \cos x = \pm\sqrt{1-\sin^2 x}$ $\sin x = \frac{1}{2}$ $\cos x = \pm\sqrt{1-\frac{1}{4}} = \pm\sqrt{\frac{3}{4}} = \pm\frac{\sqrt{3}}{2},\ x \in \left[0, \frac{\pi}{2}\right]$ $\cos x = \frac{\sqrt{3}}{2}$
	a). $\frac{\sqrt{3}}{2}$ b). $\frac{\sqrt{2}}{2}$ c). $\frac{1}{2}$ d). $-\frac{1}{2}$
9.	$b = 6$ $\underline{\alpha = 75^\circ}$ $P = ?$ $P = \frac{a \cdot b}{2}$ $b = ?$  Za pravougli trougao vrijedi relacija trigonometrijske funkcije:

$tg\alpha = \frac{a}{b} \Rightarrow b = \frac{a}{tg\alpha}$

$tg75^\circ = tg\left(45^\circ + 30^\circ\right) = \frac{tg45^\circ + tg30^\circ}{1 - tg45^\circ \cdot tg30^\circ} =$

$tg15^\circ = \frac{1 + \frac{\sqrt{3}}{3}}{1 - 1 \cdot \frac{\sqrt{3}}{3}} = \frac{\frac{3+\sqrt{3}}{3}}{\frac{3-\sqrt{3}}{3}} = \frac{3+\sqrt{3}}{3-\sqrt{3}} = \frac{\sqrt{3}+1}{\sqrt{3}-1}$

$b = \frac{6}{\frac{\sqrt{3}+1}{\sqrt{3}-1}} = \frac{6\left(\sqrt{3}-1\right)}{\sqrt{3}+1} \cdot \frac{\sqrt{3}-1}{\sqrt{3}-1} = \frac{6\left[\left(\sqrt{3}\right)^2 - 2 \cdot \sqrt{3} \cdot 1 + 1^2\right]}{\left(\sqrt{3}\right)^2 - 1} =$

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

$P = \frac{a \cdot b}{2} = \frac{6 \cdot 6\left(2 - \sqrt{3}\right)}{2} = 18\left(2 - \sqrt{3}\right)$

a). $2\left(3+\sqrt{3}\right)$ b). 16 c). $6\sqrt{3}$ **d).** $18\left(2-\sqrt{3}\right)$

10.

2^n, $n \le 2023$

$n = 1 \Rightarrow 2^1 = 2$

$n = 2 \Rightarrow 2^2 = 4$

$n = 3 \Rightarrow 2^3 = 8$

$n = 4 \Rightarrow 2^4 = 16$

$n = 5 \Rightarrow 2^5 = 32$

$n = 6 \Rightarrow 2^6 = 64$

$n = 7 \Rightarrow 2^7 = 128$

$n = 8 \Rightarrow 2^8 = 256$

$n = 9 \Rightarrow 2^9 = 512$

$n = 10 \Rightarrow 2^{10} = 1024$

...

Cifrom 6 završavaju brojevi:

$n = 4 \Rightarrow 2^4 = 16$

$n = 8 \Rightarrow 2^8 = 256$

...

To jest, kad vrijedi:

$n = 4k,\ k \in N$

$n \le 2023$

$4k \le 2023$

$k \le \frac{2023}{4} = 505.75$

Broj prirodnih brojeva 505.

a). 555 **b). 505** c). 600 d). 450

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1.	Rješenje izraza $\left[\frac{2}{3}-\frac{3}{5}\left(2+\frac{1}{2}\right)\right]:\left[-\frac{1}{3}-\frac{5}{16}\left(2-\frac{2}{5}\right)\right]$ je:			
	a) $\frac{5}{6}$	b) $-\frac{5}{6}$	c) 1	d) $-\frac{1}{6}$
2.	Rješenje uproštenog izraza $\frac{xy-y^2}{xy-x^2}-\frac{x^2-y^2}{xy}$ je:			
	a) $\frac{x}{y}$	b) $-\frac{x}{y}$	c) 1	d) -1
3.	Zbir realnih rješenja kvadratne jednačine $x^2-7x+10=0$ je:			
	a) 7	b) $-\frac{7}{10}$	c) -3	d) 3
4.	Rješenje sistema jednačina $2x-y=5$ i $x+3y=-1$ zadovoljava jednačinu:			
	a) $y=\frac{x}{2}+3$	b) $y=\frac{x}{3}+2$	c) $y=x+2$	d) $y=x-3$
5.	Skup realnih rješenja nejednačine $\frac{3x+2}{2-x}>1$ je:			
	a) $(-4,-1)$	b) $(-1,0)$	c) $(0,2)$	d) $(2,5)$
6.	Zbir realnih rješenja jednačine $2^{2x}-3\cdot 2^x+2=0$ je:			
	a) 3	b) 1	c) $\frac{3}{2}$	d) $\frac{1}{2}$
7.	Ako je $Z=2+i$, vrijednost izraza $\frac{Z-i}{1+Z\cdot\overline{Z}}$ je:			
	a) $\frac{1+i}{3}$	b) $\frac{1}{2}$	c) $\frac{1+i}{6}$	d) $\frac{1}{3}$
8.	Ako je $\cos x=\frac{1}{2}$ i $\pi\le x\le 2\pi$, tada je:			
	a) $\frac{4\pi}{3}$	b) $\frac{5\pi}{3}$	c) $\frac{7\pi}{6}$	d) $\frac{11\pi}{6}$
9.	Ako se površina kvadrata poveća tri puta, za koliko puta se poveća obim kvadrata?			
	a) $\sqrt{3}$	b) $2\sqrt{3}$	c) $\frac{1}{3}$	d) 3
10.	Koliko iznosi najmanji pozitivni broj p za koji je proizvod $p\cdot\left(3\sqrt{3}-4\sqrt{2}\right)$ cijeli broj?			
	a) $\frac{4}{5}\sqrt{3}-\frac{3}{5}\sqrt{2}$	b) $\frac{4}{5}\sqrt{3}+\frac{3}{5}\sqrt{2}$	c) $\frac{2}{5}\sqrt{3}-\frac{4}{5}\sqrt{2}$	d) $\frac{3}{5}\sqrt{3}+\frac{4}{5}\sqrt{2}$

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1.

$$\left[\frac{2}{3}-\frac{3}{5}\left(2+\frac{1}{2}\right)\right]:\left[-\frac{1}{3}-\frac{5}{16}\left(2-\frac{2}{5}\right)\right]=\left(\frac{2}{3}-\frac{3}{5}\cdot\frac{4+1}{2}\right):\left(-\frac{1}{3}-\frac{5}{16}\cdot\frac{10-2}{5}\right)=$$

$$=\left(\frac{2}{3}-\frac{3}{5}\cdot\frac{5}{2}\right):\left(-\frac{1}{3}-\frac{5}{16}\cdot\frac{8}{5}\right)=\left(\frac{2}{3}-\frac{3}{2}\right):\left(-\frac{1}{3}-\frac{1}{2}\right)=\frac{4-9}{6}:\frac{-2-3}{6}=\frac{-5}{6}:\frac{-5}{6}=1$$

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

2.

$$\frac{xy-y^2}{xy-x^2}-\frac{x^2-y^2}{xy}=-\frac{xy-y^2}{x^2-xy}-\frac{x^2-y^2}{xy}=-\frac{y(x-y)}{x(x-y)}-\frac{x^2-y^2}{xy}=$$

$$=-\frac{y}{x}-\frac{x^2-y^2}{xy}=\frac{-y^2-x^2+y^2}{xy}=\frac{-x^2}{xy}=-\frac{x}{y}$$

a) $\frac{x}{y}$ **b)** $-\frac{x}{y}$ c) 1 d) -1

3.

$x^2-7x+10=0$

Za kvadratnu jednačinu:

$ax^2+bx+c=0$

Zbir rješenja (*Viettovo pravilo*) *je*:

$x_1+x_2=-\frac{b}{a}=-\frac{-7}{1}=7$

a) 7 b) $-\frac{7}{10}$ c) -3 d) 3

4.

$2x-y=5 \quad /\cdot 3$

$\underline{x+3y=-1}$

$6x-3y=15$

$\underline{x+3y=-1}$

$7x=14$

$x=2$

$2\cdot 2-y=5$

$y=4-5=-1$

$y=x-3$

$-1=2-3$

a) $y=\frac{x}{2}+3$ b) $y=\frac{x}{3}+2$ c) $y=x+2$ **d)** $y=x-3$

5.	$\frac{3x+2}{2-x}>1$ $\frac{3x+2}{2-x}-1>0$ $\frac{3x+2-2+x}{2-x}>0$ $\frac{4x}{2-x}>0 \quad /:4$ $\frac{x}{2-x}>0$ $\frac{x}{-(x-2)}>0 \quad /\cdot(-1)$ $\frac{x}{x-2}<0$ $x\in(0,2)$			
	a) $(-4,-1)$	b) $(-1,0)$	**c)** $(0,2)$	d) $(2,5)$
6.	$2^{2x}-3\cdot 2^x+2=0$ $Smjena: 2^x=t$ $t^2-3t+2=0$ $t_1=1$ $t_2=2$ $2^{x_1}=1=2^0 \Rightarrow x_1=0$ $2^{x_2}=2=2^1 \Rightarrow x_2=1$ $x_1+x_2=0+1=1$			
	a) 3	**b)** 1	c) $\frac{3}{2}$	d) $\frac{1}{2}$
7.	$\frac{2+i-i}{1+(2+i)\cdot(2-i)}=\frac{2}{1+2^2-i^2}=\frac{2}{1+4-(-1)}=\frac{2}{1+5}=\frac{1}{3}$			
	a) $\frac{1+i}{3}$	b) $\frac{1}{2}$	c) $\frac{1+i}{6}$	**d)** $\frac{1}{3}$
8.	$\cos x=\frac{1}{2} \ \wedge \ I:\pi\le x\le 2\pi$ $x_1=\frac{\pi}{3}+2k\pi, k\in Z$ $x_2=\frac{5\pi}{3}+2k\pi, k\in Z$ $x=\frac{5\pi}{3}\in I$			
	a) $\frac{4\pi}{3}$	**b)** $\frac{5\pi}{3}$	c) $\frac{7\pi}{6}$	d) $\frac{11\pi}{6}$

9.

a_1 – *početna stranica kvadrata*

$P_1 = a_1^2,\ O_1 = 4a_1$

a_2 – *povećana stranica kvadrata*

$P_2 = a_2^2,\ O_2 = 4a_2$

$P_2 = 3P_1$

$a_2^2 = 3a_1^2$

$a_2 = a_1\sqrt{3}$

$$\frac{O_2}{O_1} = \frac{4a_2}{4a_1} = \frac{a_2}{a_1} = \frac{a_1\sqrt{3}}{a_1} = \sqrt{3}$$

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

10.

$p \cdot \left(3\sqrt{3} - 4\sqrt{2}\right)$

$p > 0 \ \wedge \ \left(3\sqrt{3} - 4\sqrt{2}\right) < 0 \ \Rightarrow \ p \cdot \left(3\sqrt{3} - 4\sqrt{2}\right) < 0$, *tj.*

$p \cdot \left(3\sqrt{3} - 4\sqrt{2}\right) \in \{-1, -2, -3, ...\}$

Najmanji p daje vrijednost :

$p \cdot \left(3\sqrt{3} - 4\sqrt{2}\right) = -1$

$$p = \frac{-1}{3\sqrt{3} - 4\sqrt{2}} = \frac{1}{4\sqrt{2} - 3\sqrt{3}} \cdot \frac{4\sqrt{2} + 3\sqrt{3}}{4\sqrt{2} + 3\sqrt{3}} = \frac{4\sqrt{2} + 3\sqrt{3}}{\left(4\sqrt{2}\right)^2 - \left(3\sqrt{3}\right)^2} =$$

$$= \frac{4\sqrt{2} + 3\sqrt{3}}{32 - 27} = \frac{3\sqrt{3} + 4\sqrt{2}}{5} = \frac{3}{5}\sqrt{3} + \frac{4}{5}\sqrt{2}$$

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

UNIVERZITET U TUZLI **Fakultet elektrotehnike** **Katalog zadataka za prijemni ispit na EiR**	**12. GRUPA ZADATAKA**

1.	Rješenje izraza $\left[\frac{4}{3}-\frac{2}{5}\left(1+\frac{1}{4}\right)\right]:\left[-\frac{1}{3}+\frac{5}{6}\left(\frac{2}{5}-1\right)\right]$ je:			
	a) -1	b) $-\frac{4}{3}$	c) $-\frac{1}{6}$	d) $-\frac{4}{3}$
2.	Rješenje uproštenog izraza $\frac{x^2-y^2}{xy}-\frac{y^2-xy}{x^2-xy}$ je:			
	a) -1	b) $-\frac{x}{y}$	c) $\frac{x}{y}$	d) x
3.	Zbir realnih rješenja kvadratne jednačine $x^2-7x+12=0$ je:			
	a) 12	b) $-\frac{7}{12}$	c) -1	d) 7
4.	Rješenje sistema jednačina $x+2y=-3$ i $3x-y=5$ zadovoljava jednačinu:			
	a) $y=x+4$	b) $y=x-3$	c) $y=\frac{x}{2}-3$	d) $y=\frac{x}{3}-2$
5.	Skup realnih rješenja nejednačine $\frac{2x+3}{3-x}>1$ je:			
	a) $(-3,-1)$	b) $(-1,0)$	c) $(0,3)$	d) $(3,6)$
6.	Zbir realnih rješenja jednačine $3^{2x}-4\cdot 3^x+3=0$ je:			
	a) 4	b) $-\frac{4}{3}$	c) $\frac{4}{3}$	d) 1
7.	Ako je $Z=2-i$, vrijednost izraza $\frac{Z+i}{1-Z\cdot\overline{Z}}$ je:			
	a) -1	b) $\frac{1-i}{4}$	c) $-\frac{1}{2}$	d) $\frac{1-i}{2}$
8.	Ako je $\sin x=\frac{1}{2}$ i $\frac{\pi}{2}\le x\le\frac{3\pi}{2}$, tada je:			
	a) $\frac{5\pi}{6}$	b) $\frac{7\pi}{6}$	c) $\frac{2\pi}{3}$	d) $\frac{4\pi}{3}$
9.	Ako se površina kvadrata poveća dva puta, za koliko puta se poveća obim kvadrata?			
	a) $2\sqrt{2}$	b) 2	c) $\frac{1}{2}$	d) $\sqrt{2}$
10.	Koliko iznosi najmanji pozitivni broj p za koji je proizvod $p\cdot\left(2\sqrt{3}-3\sqrt{2}\right)$ cijeli broj?			
	a) $\frac{3\sqrt{2}}{2}+\frac{2\sqrt{3}}{3}$	b) $\frac{\sqrt{2}}{2}+\frac{\sqrt{3}}{3}$	c) $\frac{3\sqrt{2}}{2}-\frac{2\sqrt{3}}{3}$	d) $\frac{2\sqrt{2}}{3}+\frac{3\sqrt{3}}{2}$

UNIVERZITET U TUZLI **Fakultet elektrotehnike** **Katalog zadataka za prijemni ispit na EiR**	**RJEŠENJA** **12. GRUPE ZADATAKA**

1.

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

$$=\left(\frac{4}{3}-\frac{1}{2}\right):\left(-\frac{1}{3}-\frac{1}{2}\right)=\frac{8-3}{6}:\frac{-2-3}{6}=\frac{5}{6}:\left(-\frac{5}{6}\right)=-1$$

a) -1 b) $-\frac{4}{3}$ c) $-\frac{1}{6}$ d) $-\frac{4}{3}$

2.

$$\frac{x^2-y^2}{xy}-\frac{y^2-xy}{x^2-xy}=\frac{x^2-y^2}{xy}-\frac{-xy+y^2}{x^2-xy}=$$

$$=\frac{x^2-y^2}{xy}-\frac{-\left(xy-y^2\right)}{x^2-xy}=\frac{x^2-y^2}{xy}+\frac{xy-y^2}{x^2-xy}=$$

$$=\frac{x^2-y^2}{xy}+\frac{y\left(x-y\right)}{x\left(x-y\right)}=\frac{x^2-y^2}{xy}+\frac{y}{x}=$$

$$\frac{x^2-y^2+y^2}{xy}=\frac{x^2}{xy}=\frac{x}{y}$$

a) -1 b) $-\frac{x}{y}$ **c)** $\frac{x}{y}$ d) x

3.

$x^2-7x+12=0$

Za kvadratnu jednačinu:

$ax^2+bx+c=0$

Zbir rješenja (*Viettovo pravilo*) *je*:

$$x_1+x_2=-\frac{b}{a}=-\frac{-7}{1}=7$$

a) 12 b) $-\frac{7}{12}$ c) -1 **d)** 7

4.

$x+2y=-3$

$\underline{3x-y=5} \quad /\cdot 2$

$x+2y=-3$

$\underline{6x-2y=10}$

$7x=7 \Rightarrow x=1$

$1+2y=-3$

$2y=-4$

$y=-2$

$y=x-3$

$-2=1-3$

a) $y=x+4$ **b)** $y=x-3$ c) $y=\frac{x}{2}-3$ d) $y=\frac{x}{3}-2$

5.

$$\frac{2x+3}{3-x}>1$$
$$\frac{2x+3}{3-x}-1>0$$
$$\frac{2x+3-3+x}{3-x}>0$$
$$\frac{3x}{3-x}>0 \quad :3$$
$$\frac{x}{3-x}>0$$
$$\frac{x}{-(x-3)}>0 \quad /\cdot(-1)$$
$$\frac{x}{x-3}<0$$
$$x\in(0,3)$$

a) $(-3,-1)$ b) $(-1,0)$ **c)** $(0,3)$ d) $(3,6)$

6.

$$3^{2x}-4\cdot 3^{x}+3=0$$
$$Smjena: 3^{x}=t$$
$$t^{2}-4t+3=0$$
$$t_1=1$$
$$t_2=2$$
$$3^{x_1}=1=3^{0} \Rightarrow x_1=0$$
$$3^{x_2}=3=3^{1} \Rightarrow x_2=1$$
$$x_1+x_2=0+1=1$$

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

7.

$$\frac{Z+i}{1-Z\cdot\overline{Z}}=\frac{2-i+i}{1-(2-i)\cdot(2+i)}=\frac{2}{1-(2^2-i^2)}=\frac{2}{1-[4-(-1)]}=\frac{2}{1-5}=\frac{2}{-4}=-\frac{1}{2}$$

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

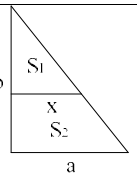
8.

$$\sin x=\frac{1}{2} \ \wedge \ I:\frac{\pi}{2}\le x\le\frac{3\pi}{2}$$
$$x_1=\frac{\pi}{6}+2k\pi, k\in Z$$
$$x_2=\frac{5\pi}{6}+2k\pi, k\in Z$$
$$x=\frac{5\pi}{6}\in I$$

a) $\frac{5\pi}{6}$ b) $\frac{7\pi}{6}$ c) $\frac{2\pi}{3}$ d) $\frac{4\pi}{3}$

9.	a_1 – *početna stranica kvadrata* $P_1 = a_1^2,\ O_1 = 4a_1$ a_2 – *povećana stranica kvadrata* $P_2 = a_2^2,\ O_2 = 4a_2$ $P_2 = 2P_1$ $a_2^2 = 2a_1^2$ $a_2 = a_1\sqrt{2}$ $\frac{O_2}{O_1} = \frac{4a_2}{4a_1} = \frac{a_2}{a_1} = \frac{a_1\sqrt{2}}{a_1} = \sqrt{2}$
	a) $2\sqrt{2}$ b) 2 c) $\frac{1}{2}$ **d)** $\sqrt{2}$
10.	$p\cdot\left(2\sqrt{3}-3\sqrt{2}\right)$ $p>0\ \wedge\ \left(2\sqrt{3}-3\sqrt{2}\right)<0\ \Rightarrow\ p\cdot\left(2\sqrt{3}-3\sqrt{2}\right)<0,\ tj.$ $p\cdot\left(2\sqrt{3}-3\sqrt{2}\right)\in\{-1,-2,-3,...\}$ *Najmanji p daje vrijednost* : $p\cdot\left(2\sqrt{3}-3\sqrt{2}\right)=-1$ $p=\frac{-1}{2\sqrt{3}-3\sqrt{2}}=\frac{1}{3\sqrt{2}-2\sqrt{3}}\cdot\frac{3\sqrt{2}+2\sqrt{3}}{3\sqrt{2}+2\sqrt{3}}=\frac{3\sqrt{2}+2\sqrt{3}}{\left(3\sqrt{2}\right)^2-\left(2\sqrt{3}\right)^2}=$ $=\frac{3\sqrt{2}+2\sqrt{3}}{18-12}=\frac{2\sqrt{3}+3\sqrt{2}}{6}=\frac{\sqrt{2}}{2}+\frac{\sqrt{3}}{3}$
	a) $\frac{3\sqrt{2}}{2}+\frac{2\sqrt{3}}{3}$ **b)** $\frac{\sqrt{2}}{2}+\frac{\sqrt{3}}{3}$ c) $\frac{3\sqrt{2}}{2}-\frac{2\sqrt{3}}{3}$ d) $\frac{2\sqrt{2}}{3}+\frac{3\sqrt{3}}{2}$

UNIVERZITET U TUZLI **Fakultet elektrotehnike** **Katalog zadataka za prijemni ispit na EiR**	**13. GRUPA ZADATAKA**

1.	Realna vrijednost izraza $\sqrt{3-\sqrt{2}}\cdot\sqrt[4]{11+6\sqrt{2}}$ je:			
	a). 1	b). 3	c). $\sqrt{7}$	d). $\sqrt{6}$
2.	Proizvod svih realnih rješenja sistema jednačina $\frac{3}{10x+5y}+\frac{4}{2x-y}=1$ i $\frac{9}{2x+y}-\frac{5}{2x-y}=2$ je:			
	a). -2	b). -4	c). $-\frac{1}{2}$	d). $\frac{1}{2}$
3.	Koliko iznosi zbir kvadrata svih realnih vrijednosti parametra k za koje su proizvod i zbir realnih rješenja jednačine $\left(k^2+3\right)x^2-\left(2k^2-2\right)x+k^2+7=0$ jednaki?			
	a). 9	b). 18	c). 5	d). 10
4.	Broj realnih cjelobrojnih rješenja nejednačine $\left\|\frac{2-7x}{3x+1}\right\|\le 2$ je:			
	a). 2	b). 6	c). 4	d). 5
5.	Zbir realnih rješenja jednačine $3^x+8\cdot 3^{-x}=6$ je:			
	a). $3\log_3 2$	b). $2\log_3 2$	c). 6	d). $\log_3 6$
6.	Vrijednost kompleksnog broja $\underline{Z}=-3+i\sqrt{3}$ u eksponencijalnom obliku je:			
	a). $2\sqrt{3}e^{-i\frac{\pi}{6}}$	b). $3\sqrt{2}e^{i\frac{2\pi}{3}}$	c). $2\sqrt{3}e^{i\frac{5\pi}{6}}$	d). $3\sqrt{2}e^{-i\frac{\pi}{3}}$
7.	Zbir realnih rješenja jednačine $\log_3 x+2\log_x 3+3=0$ je:			
	a). 12	b). 3	c). 4	d). $\frac{4}{9}$
8.	Zbir svih realnih rješenja jednačine $\sin 2x+1=\sin x+2\cos x$ na segmentu $\left[0,\frac{\pi}{2}\right]$ je:			
	a). $\frac{\pi}{6}$	b). $\frac{5\pi}{6}$	c). $\frac{\pi}{2}$	d). $\frac{2\pi}{3}$
9.	Koliko iznosi dužina x (x||a) da bi kod pravouglog trougla kateta a=10 i b=8 vrijedilo $S_1=S_2$? 			
	a). $5\sqrt{2}$	b). $4\sqrt{2}$	c). 5	d). 4
10.	Vrijednost izraza $\left(1-\frac{1}{2^2}\right)\cdot\left(1-\frac{1}{3^2}\right)\cdot\left(1-\frac{1}{4^2}\right)\cdot\ldots\cdot\left(1-\frac{1}{101^2}\right)$ je:			
	a). $\frac{51}{202}$	b). $\frac{102}{101}$	c). $\frac{201}{51}$	d). $\frac{51}{101}$

1.

$$\sqrt{3-\sqrt{2}}\cdot\sqrt[4]{11+6\sqrt{2}}=\sqrt[4]{\left(3-\sqrt{2}\right)^2}\cdot\sqrt[4]{11+6\sqrt{2}}=\sqrt[4]{\left(9-6\sqrt{2}+2\right)\cdot\left(11+6\sqrt{2}\right)}=$$

$$\sqrt[4]{\left(11-6\sqrt{2}\right)\cdot\left(11+6\sqrt{2}\right)}=\sqrt[4]{11^2-\left(6\sqrt{2}\right)^2}=\sqrt[4]{121-36\cdot 2}=\sqrt[4]{121-72}=\sqrt[4]{49}=\sqrt[4]{7^2}=\sqrt{7}$$

a). 1 b). 3 **c).** $\sqrt{7}$ d). $\sqrt{6}$

2.

$$\frac{3}{10x+5y}+\frac{4}{2x-y}=1$$

$$\frac{9}{2x+y}-\frac{5}{2x-y}=2$$

$$\frac{3}{5}\cdot\frac{1}{2x+y}+4\cdot\frac{1}{2x-y}=1$$

$$9\cdot\frac{1}{2x+y}-5\cdot\frac{1}{2x-y}=2$$

$$Smjena:\ \frac{1}{2x+y}=u\ \wedge\ \frac{1}{2x-y}=v$$

$$\frac{3}{5}u+4v=1\ \ /(-15)$$

$$\underline{9u-5v=2}$$

$$-9u-60v=-15$$

$$\underline{9u-5v=2}$$

$$-65v=-13$$

$$v=\frac{1}{5}$$

$$9u-5\cdot\frac{1}{5}=2$$

$$9u=3$$

$$u=\frac{1}{3}$$

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

$$\frac{1}{2x-y}=\frac{1}{5}\quad /^{-1}$$

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

$$\underline{2x-y=5}$$

$$4x=8$$

$$x=2$$

$$2\cdot 2+y=3$$

$$y=-1$$

$$x\cdot y=-2$$

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

3.

$$\left(k^2+3\right)x^2-\left(2k^2-2\right)x+k^2+7=0$$

Za kvadratnu jednačinu $ax^2+bx+c=0$ *po Viettovim pravi* $\lim a$:

zbir rješenja $x_1+x_2=-\frac{b}{a}\ \Rightarrow\ x_1+x_2=-\frac{-\left(2k^2-2\right)}{k^2+3}=\frac{2k^2-2}{k^2+3}$ *i*

proizvod rješenja $x_1\cdot x_2=\frac{c}{a}\ \Rightarrow\ x_1\cdot x_2=\frac{k^2+7}{k^2+3}.$

Po uslovu zadatka (*zbir i proizvod rješenja jednačine jednaki*):

$$x_1+x_2=x_1\cdot x_2\ \Rightarrow\ \frac{2k^2-2}{k^2+3}=\frac{k^2+7}{k^2+3}\ \Rightarrow\ 2k^2-2=k^2+7\ \Rightarrow\ k^2=9$$

$$k=\pm 3\ \Rightarrow\ k_1=3\ \wedge\ k_2=-3.$$

Zbir kvadrata rea $\ln$ *ih vrijednosti parametra k za koje vrijedi uslov*:

$$k_1^2+k_2^2=3^2+(-3)^2=18.$$

a). 9 **b).** 18 c). 5 d). 10

4.

$\left|\frac{2-7x}{3x+1}\right| \le 2,\ D.P.: 3x+1 \ne 0 \ \Rightarrow\ x \ne -\frac{1}{3}.$

$\frac{|2-7x|}{|3x+1|} \le 2,\ |2-7x| = \begin{cases} 2-7x,\ 2-7x \ge 0,\ x \le \frac{2}{7} \\ -(2-7x),\ 2-7x < 0,\ x > \frac{2}{7} \end{cases},\ |3x+1| = \begin{cases} 3x+1,\ 3x+1 > 0,\ x > -\frac{1}{3} \\ -(3x+1),\ 3x+1 < 0,\ x < -\frac{1}{3} \end{cases}$

$I: x \in \left(-\infty, -\frac{1}{3}\right)$

$\frac{2-7x}{-(3x+1)} - 2 \le 0 \ \Rightarrow\ \frac{7x-2}{3x+1} - 2 \le 0 \ \Rightarrow\ \frac{x-4}{3x+1} \le 0 \ \Rightarrow\ x \in \left(-\frac{1}{3}, 4\right] \cap I \ \Rightarrow\ x \in \{\varnothing\}.$

Nema rješenja. Nema cjelobrojnih rješenja.

$II: x \in \left(-\frac{1}{3}, \frac{2}{7}\right]$

$\frac{2-7x}{3x+1} - 2 \le 0 \ \Rightarrow\ \frac{7x-2}{3x+1} + 2 \ge 0 \ \Rightarrow\ \frac{13x}{3x+1} \ge 0 \ \Rightarrow\ x \in \left(-\infty, -\frac{1}{3}\right) \cup [0, +\infty) \cap II \ \Rightarrow\ x \in \left[0, \frac{2}{7}\right).$

Cjelobrojno rješenje: $x_1 = 0.$

$III: x \in \left(\frac{2}{7}, +\infty\right)$

$\frac{-(2-7x)}{3x+1} - 2 \le 0 \ \Rightarrow\ \frac{7x-2}{3x+1} - 2 \le 0 \ \Rightarrow\ \frac{x-4}{3x+1} \le 0 \ \Rightarrow\ x \in \left(-\frac{1}{3}, 4\right] \cap III \ \Rightarrow\ x \in \left(\frac{2}{7}, 4\right].$

Cjelobrojna rješenja: $x_2 = 1,\ x_3 = 2,\ x_4 = 3,\ x_5 = 4.$

Broj cjelobrojnih rješenja je 5.

a). 2 b). 6 c). 4 **d).** 5

5.

$3^x + 8 \cdot 3^{-x} = 6$

$3^x - 6 + \frac{8}{3^x} = 0 \ / \cdot 3^x$

$3^{2x} - 6 \cdot 3^x + 8 = 0$

Smjena: $3^x = t$

$t^2 - 6t + 8 = 0 \ \Rightarrow\ t_1 = 2 \ \wedge\ t_2 = 4.$

$3^x = 2 \ \Rightarrow\ x_1 = \log_3 2.$

$3^x = 4 \ \Rightarrow\ x_2 = \log_3 4.$

Zbir rješenja: $x_1 + x_2 = \log_3 2 + \log_3 4 = \log_3 8 = 3\log_3 2.$

a). $3\log_3 2$ b). $2\log_3 2$ c). 6 d). $\log_3 6$

6.

$\underline{Z} = -3 + i\sqrt{3} = a + ib = \rho \cdot e^{i\varphi}$

$\rho = \sqrt{a^2 + b^2} = \sqrt{(-3)^2 + \left(\sqrt{3}\right)^2} = \sqrt{12} = 2\sqrt{3}.$

$\varphi = \arctan\frac{b}{a} = \arctan\frac{\sqrt{3}}{-3} = \frac{5\pi}{6}$

$\left(ugao\ je\ u\ II\ kvadrantu,\ jer\ je\ rea\ \ln i\ dio\ kompleksnog\ broja\ negativan\right).$

$\underline{Z} = 2\sqrt{3}e^{i\frac{5\pi}{6}}.$

a). $2\sqrt{3}e^{-i\frac{\pi}{6}}$ b). $3\sqrt{2}e^{i\frac{2\pi}{3}}$ **c).** $2\sqrt{3}e^{i\frac{5\pi}{6}}$ d). $3\sqrt{2}e^{-i\frac{\pi}{3}}$

7.

$\log_3 x + 2\log_x 3 + 3 = 0,\ D.P.:\ x > 0 \ \wedge\ x \neq 1.$

$\log_3 x + \dfrac{2}{\log_3 x} + 3 = 0$

Smjena: $\log_3 x = t$

$t + 3 + \dfrac{2}{t} = 0 \ \Rightarrow\ t^2 + 3t + 2 = 0 \ \Rightarrow\ t_1 = -1 \ \wedge\ t_2 = -2.$

$\log_3 x = -1 \ \Rightarrow\ x = 3^{-1} \ \Rightarrow\ x_1 = \dfrac{1}{3} \in D.P.$

$\log_3 x = -2 \ \Rightarrow\ x = 3^{-2} \ \Rightarrow\ x_2 = \dfrac{1}{9} \in D.P.$

Zbir rješenja: $x_1 + x_2 = \dfrac{1}{3} + \dfrac{1}{9} = \dfrac{4}{9}.$

a). 12 b). 3 c). 4 **d).** $\dfrac{4}{9}$

8.

$\sin 2x + 1 = \sin x + 2\cos x$

$2\sin x\cos x - \sin x - 2\cos x + 1 = 0$

$\sin x(2\cos x - 1) - (2\cos x - 1) = 0$

$(2\cos x - 1)(\sin x - 1) = 0$

$2\cos x - 1 = 0 \ \Rightarrow\ \cos x = \dfrac{1}{2} \ \Rightarrow\ x_1 = \dfrac{\pi}{3}$ *u prvom kvadrantu.*

$\sin x - 1 = 0 \ \Rightarrow\ \sin x = 1 \ \Rightarrow\ x_2 = \dfrac{\pi}{2}$ *u prvom kvadrantu.*

Zbir rješenja: $x_1 + x_2 = \dfrac{\pi}{3} + \dfrac{\pi}{2} = \dfrac{5\pi}{6}.$

a). $\dfrac{\pi}{6}$ **b).** $\dfrac{5\pi}{6}$ c). $\dfrac{\pi}{2}$ d). $\dfrac{2\pi}{3}$

9.

$S_1 + S_2 = S,\ S_1 = S_2 \ \Rightarrow\ 2S_1 = S$

$S = \dfrac{ab}{2} \ \wedge\ S_1 = \dfrac{xy}{2}$

Sličnost trouglova:

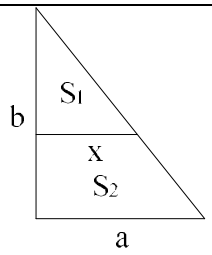
$a : x = b : y \ \Rightarrow\ y = \dfrac{b}{a}x.$

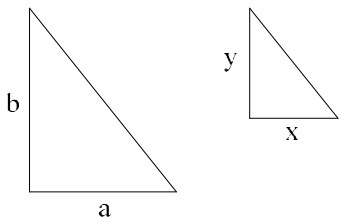
$2 \cdot \dfrac{xy}{2} = \dfrac{ab}{2}$

$x \cdot \dfrac{b}{a}x = \dfrac{ab}{2}$

$x^2 = \dfrac{a^2}{2} = 50$

$x = 5\sqrt{2}.$





a). $5\sqrt{2}$ b). $4\sqrt{2}$ c). 5 d). 4

10.

$$\left(1-\frac{1}{2^2}\right)\cdot\left(1-\frac{1}{3^2}\right)\cdot\left(1-\frac{1}{4^2}\right)\cdot\ldots\cdot\left(1-\frac{1}{101^2}\right)=$$

$$=\frac{2^2-1}{2^2}\cdot\frac{3^2-1}{3^2}\cdot\frac{4^2-1}{4^2}\cdot\frac{5^2-1}{5^2}\cdot\ldots\cdot\frac{99^2-1}{99^2}\cdot\frac{100^2-1}{100^2}\cdot\frac{101^2-1}{101^2}=$$

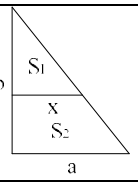
$$=\frac{(2-1)\cdot(2+1)}{2\cdot2}\cdot\frac{(3-1)\cdot(3+1)}{3\cdot3}\cdot\frac{(4-1)\cdot(4+1)}{4\cdot4}\cdot\frac{(5-1)\cdot(5+1)}{5\cdot5}\cdot\ldots\cdot$$

$$\cdot\frac{(99-1)\cdot(99+1)}{99\cdot99}\cdot\frac{(100-1)\cdot(100+1)}{100\cdot100}\cdot\frac{(101-1)\cdot(101+1)}{101\cdot101}\cdot=$$

$$=\frac{1\cdot3}{2\cdot2}\cdot\frac{2\cdot4}{3\cdot3}\cdot\frac{3\cdot5}{4\cdot4}\cdot\frac{4\cdot6}{5\cdot5}\cdot\ldots\cdot\frac{98\cdot100}{99\cdot99}\cdot\frac{99\cdot101}{100\cdot100}\cdot\frac{100\cdot102}{101\cdot101}\cdot=\frac{1}{2}\cdot\frac{102}{101}=\frac{51}{101}.$$

a). $\frac{51}{202}$ b). $\frac{102}{101}$ c). $\frac{102}{51}$ **d).** $\frac{51}{101}$

UNIVERZITET U TUZLI **Fakultet elektrotehnike** **Katalog zadataka za prijemni ispit na EiR**	**14. GRUPA ZADATAKA**

1.	Realna vrijednost izraza $\sqrt{4+\sqrt{3}}\cdot\sqrt[4]{19-8\sqrt{3}}$ je:			
	a). 2	b). $\sqrt{13}$	c). $2\sqrt{3}$	d). 3
2.	Proizvod svih realnih rješenja sistema jednačina $\frac{5}{2x+6y}+\frac{1}{x-3y}=-\frac{1}{2}$ i $\frac{4}{x+3y}-\frac{1}{5x-15y}=1$ je:			
	a). $-\frac{1}{2}$	b). $\frac{1}{2}$	c). 2	d). 4
3.	Koliko iznosi zbir kvadrata svih realnih vrijednosti parametra k za koje su proizvod i zbir realnih rješenja jednačine $\left(k^2-3\right)x^2-\left(3k^2-2\right)x+2k^2+2=0$ jednaki?			
	a). 10	b). 4	c). 5	d). 8
4.	Broj realnih cjelobrojnih rješenja nejednačine $\left\|\frac{2-5x}{2x+1}\right\|\le 2$ je:			
	a). 2	b). 6	c). 5	d). 4
5.	Zbir realnih rješenja jednačine $2^x+15\cdot 2^{-x}=8$ je:			
	a). $2\log_2 3$	b). $\log_2 15$	c). $2\log_2 5$	d). 8
6.	Vrijednost kompleksnog broja $\underline{Z}=-\sqrt{3}+3i$ u eksponencijalnom obliku je:			
	a). $2\sqrt{3}e^{i\frac{2\pi}{3}}$	b). $2\sqrt{3}e^{-i\frac{\pi}{3}}$	c). $3\sqrt{2}e^{i\frac{2\pi}{3}}$	d). $3\sqrt{2}e^{-i\frac{\pi}{6}}$
7.	Zbir realnih rješenja jednačine $\log_2 x+3\log_x 2+4=0$ je:			
	a). 12	b). 5	c). 4	d). $\frac{5}{8}$
8.	Zbir svih realnih rješenja jednačine $\sin 2x+1=2\sin x+\cos x$ na segmentu $\left[0,\frac{\pi}{2}\right]$ je:			
	a). $\frac{\pi}{6}$	b). $\frac{2\pi}{3}$	c). $\frac{\pi}{3}$	d). $\frac{\pi}{2}$
9.	Koliko iznosi dužina x (x||a) da bi kod pravouglog trougla kateta a=8 i b=10 vrijedilo $S_1=S_2$? 			
	a). $5\sqrt{2}$	b). 5	c). $4\sqrt{2}$	d). 4
10.	Vrijednost izraza $\left(1-\frac{1}{2^2}\right)\cdot\left(1-\frac{1}{3^2}\right)\cdot\left(1-\frac{1}{4^2}\right)\cdot\ldots\cdot\left(1-\frac{1}{201^2}\right)$ je:			
	a). $\frac{101}{201}$	b). $\frac{202}{201}$	c). $\frac{101}{402}$	d). $\frac{201}{101}$

1.

$$\sqrt{4+\sqrt{3}}\cdot\sqrt[4]{19-8\sqrt{3}}=\sqrt[4]{\left(4+\sqrt{3}\right)^2}\cdot\sqrt[4]{19-8\sqrt{3}}=\sqrt[4]{\left(16+8\sqrt{3}+3\right)\cdot\left(19-8\sqrt{3}\right)}=$$

$$\sqrt[4]{\left(19+8\sqrt{3}\right)\cdot\left(19-8\sqrt{3}\right)}=\sqrt[4]{19^2-\left(8\sqrt{3}\right)^2}=\sqrt[4]{361-64\cdot 3}=\sqrt[4]{361-192}=\sqrt[4]{169}=\sqrt[4]{13^2}=\sqrt{13}$$

a). 2 **b).** $\sqrt{13}$ c). $2\sqrt{3}$ d). 3

2.

$$\frac{5}{2x+6y}+\frac{1}{x-3y}=-\frac{1}{2}$$

$$\frac{4}{x+3y}-\frac{1}{5x-15y}=1$$

$$\frac{5}{2}\cdot\frac{1}{x+3y}+\frac{1}{x-3y}=-\frac{1}{2}$$

$$4\cdot\frac{1}{x+3y}-\frac{1}{5}\cdot\frac{1}{x-3y}=1$$

Smjena: $\frac{1}{x+3y}=u \ \wedge \ \frac{1}{x-3y}=v$

$$\frac{5}{2}u+v=-\frac{1}{2} \quad /\cdot 2$$

$$4u-\frac{1}{5}v=1 \quad /\cdot 10$$

$$5u+2v=-1$$

$$\underline{40u-2v=10}$$

$$45u=9$$

$$u=\frac{1}{5}$$

$$5\cdot\frac{1}{5}+2v=-1$$

$$2v=-2$$

$$v=-1$$

$$\frac{1}{x+3y}=\frac{1}{5} \quad /^{-1}$$

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

$$x+3y=5$$

$$\underline{x-3y=-1}$$

$$2x=4$$

$$x=2$$

$$2+3y=5$$

$$y=1$$

$$x\cdot y=2$$

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

3.

$$\left(k^2-3\right)x^2-\left(3k^2-2\right)x+2k^2+2=0$$

Za kvadratnu jednačinu $ax^2+bx+c=0$ *po Viettovim pravi* $\lim a$:

zbir rješenja $x_1+x_2=-\frac{b}{a} \ \Rightarrow \ x_1+x_2=-\frac{-\left(3k^2-2\right)}{k^2-3}=\frac{3k^2-2}{k^2-3}$ *i*

proizvod rješenja $x_1\cdot x_2=\frac{c}{a} \ \Rightarrow \ x_1\cdot x_2=\frac{2k^2+2}{k^2-3}.$

Po uslovu zadatka (*zbir i proizvod rješenja jednačine jednaki*):

$$x_1+x_2=x_1\cdot x_2 \ \Rightarrow \ \frac{3k^2-2}{k^2-3}=\frac{2k^2+2}{k^2-3} \ \Rightarrow \ 3k^2-2=2k^2+2 \ \Rightarrow \ k^2=4$$

$$k=\pm 2 \ \Rightarrow \ k_1=2 \ \wedge \ k_2=-2.$$

Zbir kvadrata rea $\ln$ *ih vrijednosti parametra k za koje vrijedi uslov*:

$$k_1^2+k_2^2=2^2+\left(-2\right)^2=8.$$

a). 10 b). 4 c). 5 **d).** 8

4.

$\left|\frac{2-5x}{2x+1}\right| \le 2,\ D.P.: 2x+1 \ne 0 \ \Rightarrow\ x \ne -\frac{1}{2}.$

$\frac{|2-5x|}{|2x+1|} \le 2,\ |2-5x| = \begin{cases} 2-5x,\ 2-5x \ge 0,\ x \le \frac{2}{5} \\ -(2-5x),\ 2-5x < 0,\ x > \frac{2}{5} \end{cases},\ |2x+1| = \begin{cases} 2x+1,\ 2x+1 > 0,\ x > -\frac{1}{2} \\ -(2x+1),\ 2x+1 < 0,\ x < -\frac{1}{2} \end{cases}$

$I: x \in \left(-\infty, -\frac{1}{2}\right)$

$\frac{2-5x}{-(2x+1)} - 2 \le 0 \ \Rightarrow\ \frac{5x-2}{2x+1} - 2 \le 0 \ \Rightarrow\ \frac{x-4}{2x+1} \le 0 \ \Rightarrow\ x \in \left(-\frac{1}{2}, 4\right] \cap I \ \Rightarrow\ x \in \{\varnothing\}.$

Nema rješenja. Nema cjelobrojnih rješenja.

$II: x \in \left(-\frac{1}{2}, \frac{2}{5}\right]$

$\frac{2-5x}{2x+1} - 2 \le 0 \ \Rightarrow\ \frac{5x-2}{2x+1} + 2 \ge 0 \ \Rightarrow\ \frac{9x}{2x+1} \ge 0 \ \Rightarrow\ x \in \left(-\infty, -\frac{1}{2}\right) \cup [0, +\infty) \cap II \ \Rightarrow\ x \in \left[0, \frac{2}{5}\right).$

Cjelobrojno rješenje: $x_1 = 0.$

$III: x \in \left(\frac{2}{5}, +\infty\right)$

$\frac{-(2-5x)}{2x+1} - 2 \le 0 \ \Rightarrow\ \frac{5x-2}{2x+1} - 2 \le 0 \ \Rightarrow\ \frac{x-4}{2x+1} \le 0 \ \Rightarrow\ x \in \left(-\frac{1}{2}, 4\right] \cap III \ \Rightarrow\ x \in \left(\frac{2}{5}, 4\right].$

Cjelobrojna rješenja: $x_2 = 1,\ x_3 = 2,\ x_4 = 3,\ x_5 = 4.$

Broj cjelobrojnih rješenja je 5.

a). 2 b). 6 **c).** 5 d). 4

5.

$2^x + 15 \cdot 2^{-x} = 8$

$2^x - 8 + \frac{15}{2^x} = 0 \ / \cdot 2^x$

$2^{2x} - 8 \cdot 2^x + 15 = 0$

Smjena: $2^x = t$

$t^2 - 8t + 15 = 0 \ \Rightarrow\ t_1 = 3 \ \wedge\ t_2 = 5.$

$2^x = 3 \ \Rightarrow\ x_1 = \log_2 3.$

$2^x = 5 \ \Rightarrow\ x_2 = \log_2 5.$

Zbir rješenja: $x_1 + x_2 = \log_2 3 + \log_2 5 = \log_2 15.$

a). $2\log_2 3$ **b).** $\log_2 15$ c). $2\log_2 5$ d). 8

6.

$\underline{Z} = -\sqrt{3} + 3i = a + ib = \rho \cdot e^{i\varphi}$

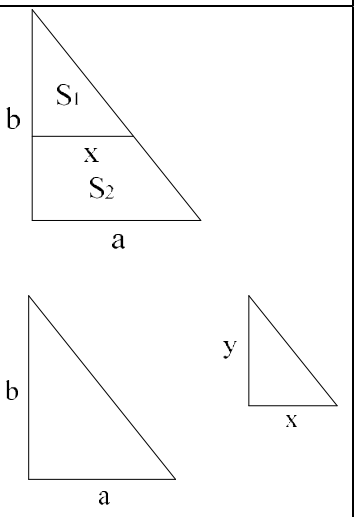
$\rho = \sqrt{a^2 + b^2} = \sqrt{\left(-\sqrt{3}\right)^2 + (3)^2} = \sqrt{12} = 2\sqrt{3}.$

$\varphi = \arctan\frac{b}{a} = \arctan\frac{3}{-\sqrt{3}} = \frac{2\pi}{3}$

$\left(ugao\ je\ u\ II\ kvadrantu,\ jer\ je\ rea\ \ln i\ dio\ kompleksnog\ broja\ negativan\right).$

$\underline{Z} = 2\sqrt{3}e^{i\frac{2\pi}{3}}.$

a). $2\sqrt{3}e^{i\frac{2\pi}{3}}$ b). $2\sqrt{3}e^{-i\frac{\pi}{3}}$ c). $3\sqrt{2}e^{i\frac{2\pi}{3}}$ d). $3\sqrt{2}e^{-i\frac{\pi}{6}}$

7.	$\log_2 x+3\log_x 2+4=0,\ D.P.:\ x>0\ \wedge\ x\neq 1.$ $\log_2 x+\frac{3}{\log_2 x}+4=0$ *Smjena*: $\log_2 x=t$ $t+4+\frac{3}{t}=0\ \Rightarrow\ t^2+4t+3=0\ \Rightarrow\ t_1=-1\ \wedge\ t_2=-3.$ $\log_2 x=-1\ \Rightarrow\ x=2^{-1}\ \Rightarrow\ x_1=\frac{1}{2}\in D.P.$ $\log_3 x=-3\ \Rightarrow\ x=2^{-3}\ \Rightarrow\ x_2=\frac{1}{8}\in D.P.$ *Zbir rješenja*: $x_1+x_2=\frac{1}{2}+\frac{1}{8}=\frac{5}{8}.$
	a). 12 b). 5 c). 4 **d).** $\frac{5}{8}$
8.	$\sin 2x+1=2\sin x+\cos x$ $2\sin x\cos x-2\sin x-\cos x+1=0$ $2\sin x(\cos x-1)-(\cos x-1)=0$ $(\cos x-1)(2\sin x-1)=0$ $\cos x-1=0\ \Rightarrow\ \cos x=1\ \Rightarrow\ x_1=0$ *u prvom kvadrantu.* $2\sin x-1=0\ \Rightarrow\ \sin x=\frac{1}{2}\ \Rightarrow\ x_2=\frac{\pi}{6}$ *u prvom kvadrantu.* *Zbir rješenja*: $x_1+x_2=0+\frac{\pi}{6}=\frac{\pi}{6}.$
	a). $\frac{\pi}{6}$ b). $\frac{2\pi}{3}$ c). $\frac{\pi}{3}$ d). $\frac{\pi}{2}$
9.	$S_1+S_2=S,\ S_1=S_2\ \Rightarrow\ 2S_1=S$ $S=\frac{ab}{2}\ \wedge\ S_1=\frac{xy}{2}$ *Sličnost trouglova*: $a:x=b:y\ \Rightarrow\ y=\frac{b}{a}x.$ $2\cdot\frac{xy}{2}=\frac{ab}{2}$ $x\cdot\frac{b}{a}x=\frac{ab}{2}$ $x^2=\frac{a^2}{2}=32$ $x=4\sqrt{2}.$ 
	a). $5\sqrt{2}$ b). 5 **c).** $4\sqrt{2}$ d). 4

10.

$$\left(1-\frac{1}{2^2}\right)\cdot\left(1-\frac{1}{3^2}\right)\cdot\left(1-\frac{1}{4^2}\right)\cdot\ldots\cdot\left(1-\frac{1}{201^2}\right)=$$

$$=\frac{2^2-1}{2^2}\cdot\frac{3^2-1}{3^2}\cdot\frac{4^2-1}{4^2}\cdot\frac{5^2-1}{5^2}\cdot\ldots\cdot\frac{199^2-1}{199^2}\cdot\frac{200^2-1}{200^2}\cdot\frac{201^2-1}{201^2}=$$

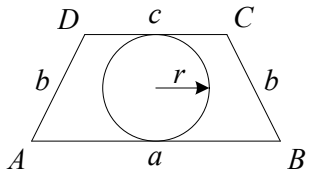
$$=\frac{(2-1)\cdot(2+1)}{2\cdot2}\cdot\frac{(3-1)\cdot(3+1)}{3\cdot3}\cdot\frac{(4-1)\cdot(4+1)}{4\cdot4}\cdot\frac{(5-1)\cdot(5+1)}{5\cdot5}\cdot\ldots\cdot$$

$$\cdot\frac{(199-1)\cdot(199+1)}{199\cdot199}\cdot\frac{(200-1)\cdot(200+1)}{200\cdot200}\cdot\frac{(201-1)\cdot(201+1)}{201\cdot201}\cdot=$$

$$=\frac{1\cdot3}{2\cdot2}\cdot\frac{2\cdot4}{3\cdot3}\cdot\frac{3\cdot5}{4\cdot4}\cdot\frac{4\cdot6}{5\cdot5}\cdot\ldots\cdot\frac{198\cdot200}{199\cdot199}\cdot\frac{199\cdot201}{200\cdot200}\cdot\frac{200\cdot202}{201\cdot201}\cdot=\frac{1}{2}\cdot\frac{202}{201}=\frac{101}{201}.$$

a). $\frac{101}{201}$ b). $\frac{202}{201}$ c). $\frac{101}{402}$ d). $\frac{201}{101}$

UNIVERZITET U TUZLI **Fakultet elektrotehnike** **Katalog zadataka za prijemni ispit na EiR**	**15. GRUPA ZADATAKA**

1.	Proizvod svih realnih rješenja jednačine $\left(x^2-2\right)^2-7\left(x^2-2\right)+12=0$ je:			
	a). 0	b). 30	c). -30	d). $\sqrt{30}$
2.	Broj cjelobrojnih realnih rješenja nejednačine $\frac{x-2}{2x-5}\geq 1$ je:			
	a). 0	b). 2	c). 1	d). 3
3.	Koliko iznosi zbir svih realnih parametara k tako da su proizvod i zbir realnih rješenja jednačine $5x^2-\frac{k+4}{k-3}x+k-2=0$ jednaki?			
	a). -5	b). $\sqrt{7}$	c). 5	d). 6
4.	Zbir realnih rješenja jednačine $5a^{2x}-6a^x+1=0,\ \left(a>0\ \wedge\ a\neq 1\right)$ je:			
	a). $-\log_a 5$	b). $1-\log_a 5$	c). $1+\log_a 5$	d). $\log_a 5$
5.	Proizvod svih realnih rješenja jednačine $\log_2 x-12\log_x 2=-1$ je:			
	a). 2	b). $\frac{1}{2}$	c). -12	d). $\log_2 12$
6.	Koliko iznosi realni dio kompleksnog broja Z koji zadovoljava jednakost $\left\|Z\right\|+i=Z-2$?			
	a). $\frac{3}{4}$	b). $\frac{5}{4}$	c). $\frac{4}{3}$	d). $-\frac{5}{4}$
7.	Realno rješenje jednačine $6\sin^2 x-13\sin x+2=0$ pripada intervalu:			
	a). $\left[\frac{\pi}{6},\frac{\pi}{4}\right)$	b). $\left[\frac{\pi}{4},\frac{\pi}{3}\right)$	c). $\left[0,\frac{\pi}{6}\right)$	d). $\left[\frac{\pi}{3},\frac{\pi}{2}\right)$
8.	Koliko iznos zbir realnih rješenja $x+y$ jednačine $x^2+y^2+2x-4y+5=0$?			
	a). -3	b). 3	c). -1	d). 1
9.	Koliko iznosi $f\left(2\right)$ ako je $3f\left(x\right)-xf\left(x\right)=x+2$?			
	a). 4	b). 0	c). $\frac{1}{4}$	d). $-\frac{1}{4}$
10.	Dat je jednakokraki trapez stranica $a=14, b=5$ i $c=6$ sa upisanom kružnicom. Koliko iznosi površina upisane kružnice? 			
	a). 9π	b). $\frac{9\pi}{4}$	c). 3π	d). $\frac{3\pi}{4}$

1.

$\left(x^2-2\right)^2-7\left(x^2-2\right)+12=0$

$S: x^2-2=t \Rightarrow t^2-7t+12=0 \Rightarrow t_1=3 \wedge t_2=4$

$x^2-2=3 \Rightarrow x^2=5 \Rightarrow x_{1,2}=\pm\sqrt{5}$

$x^2-2=4 \Rightarrow x^2=6 \Rightarrow x_{3,4}=\pm\sqrt{6}$

$x_1\cdot x_2\cdot x_3\cdot x_4=-\sqrt{5}\cdot\sqrt{5}\cdot\left(-\sqrt{6}\right)\cdot\sqrt{6}=30$

a). 0 **b).** 30 c). −30 d). $\sqrt{30}$

2.

$\frac{x-2}{2x-5}\geq 1;\ DP:\ 2x-5\neq 0 \Rightarrow x\neq\frac{5}{2}.$

$\frac{x-2}{2x-5}-1\geq 0$

$\frac{x-2-2x+5}{2x-5}\geq 0$

$\frac{-x+3}{2x-5}\geq 0$

$\frac{x-3}{2x-5}\leq 0$

$x\in\left(\frac{5}{2},3\right]$. *Broj cjelobrojnih rješenja je* $1\,(x=3)$.

	$-\infty$	$\frac{5}{2}$	3	$+\infty$
$x-3$	−	−	+	
$2x-5$	−	+	+	
	+	−	+	

a). 0 b). 2 **c).** 1 d). 3

3.

$5x^2-\frac{k+4}{k-3}x+k-2=0$

Za kvadratnu jednačinu $ax^2+bx+c=0$ *po Viettovim pravi* $\lim a$:

zbir rješenja $x_1+x_2=-\frac{b}{a} \Rightarrow x_1+x_2=-\frac{-\frac{k+4}{k-3}}{5}=\frac{\frac{k+4}{k-3}}{5}$ *i*

proizvod rješenja $x_1\cdot x_2=\frac{c}{a} \Rightarrow x_1\cdot x_2=\frac{k-2}{5}.$

Pr*vi uslov zadatka* (*zbir i proizvod rješenja jednačine jednaki*) :

$x_1+x_2=x_1\cdot x_2 \Rightarrow \frac{k-2}{5}=\frac{\frac{k+4}{k-3}}{5}.$

$k-2=\frac{k+4}{k-3} \Rightarrow (k-2)(k-3)=k+4$

$k^2-5k+6-k-4=0 \Rightarrow k^2-6k+2=0.$

Drugi uslov zadatka (*zbir rea* ln *ih vrijednosti parametra k za koje vrijedi prvi uslov*) :

$k_1+k_2=-\frac{-6}{1}=6.$

a). −5 b). $\sqrt{7}$ c). 5 **d).** 6

4.

$5a^{2x}-6a^{x}+1=0,\ DP:\ a>0\ \wedge\ a\neq 1$

$S:\ a^{x}=t$

$5t^{2}-6t+1=0\ \Rightarrow\ t_1=1\ \wedge\ t_1=\frac{1}{5}.$

$a^{x}=1\ \Rightarrow\ x_1=0.$

$a^{x}=\frac{1}{5}\ \Rightarrow\ \log_a a^{x}=\log_a\frac{1}{5}\ \Rightarrow\ x\log_a a=\log_a 5^{-1}\ \Rightarrow\ x_2=-\log_a 5.$

$x_1+x_2=-\log_a 5.$

a). $-\log_a 5$ b). $1-\log_a 5$ c). $1+\log_a 5$ d). $\log_a 5$

5.

$\log_2 x-12\log_x 2=-1;\ DP:\ x>0\ \wedge\ x\neq 1.$

$\log_2 x-12\cdot\frac{1}{\log_2 x}+1=0$

$S:\ \log_2 x=t$

$t-12\cdot\frac{1}{t}+1=0\ \Rightarrow\ t^{2}+t-12=0\ \Rightarrow\ t_1=3\ \wedge\ t_2=-4.$

$\log_2 x=3\ \Rightarrow\ x_1=2^{3}$

$\log_2 x=-4\ \Rightarrow\ x_2=2^{-4}$

$x_1\cdot x_2=2^{3}\cdot 2^{-4}=2^{-1}=\frac{1}{2}.$

a). 2 **b).** $\frac{1}{2}$ c). -12 d). $\log_2 12$

6.

$|Z|+i=Z-2$

$Z=x+iy;\ \mathrm{Re}\{Z\}=x,\ \mathrm{Im}\{Z\}=y,\ |Z|=\sqrt{x^{2}+y^{2}}$

$\sqrt{x^{2}+y^{2}}+i=x+iy-2\ \Rightarrow$

$\sqrt{x^{2}+y^{2}}=x-2$

$\underline{y=1}$

$\sqrt{x^{2}+1}=x-2$

$x^{2}+1=x^{2}-4x+4$

$4x=3$

$x=\frac{3}{4}.$

a). $\frac{3}{4}$ b). $\frac{5}{4}$ c). $\frac{4}{3}$ d). $-\frac{5}{4}$

7.

$6\sin^2 x - 13\sin x + 2 = 0$

$S: \sin x = t$

$6t^2 - 13t + 2 = 0 \Rightarrow t_1 = 2 \wedge t_2 = \frac{1}{6}$

$\sin x = 2 \Rightarrow x \notin R$

$\sin x = \frac{1}{6} \Rightarrow x \in R.$

Kako je:

$\sin 0 = 0 \Rightarrow x = 0 \wedge \sin\frac{\pi}{6} = \frac{1}{2}, te$

$0 < \frac{1}{6} < \frac{1}{2} \Rightarrow 0 < x < \frac{\pi}{6}.$

$x \in \left[0, \frac{\pi}{6}\right).$

a). $\left[\frac{\pi}{6}, \frac{\pi}{4}\right)$ b). $\left[\frac{\pi}{4}, \frac{\pi}{3}\right)$ **c).** $\left[0, \frac{\pi}{6}\right)$ d). $\left[\frac{\pi}{3}, \frac{\pi}{2}\right)$

8.

$x^2 + y^2 + 2x - 4y + 5 = 0$

$x^2 + 2x + 1 + y^2 - 4y + 4 = 0$

$(x+1)^2 + (y-2)^2 = 0.$

Kako su oba sabirka nenegativni izrazi, uz uslov $x, y \in R$, *onda je jedino rješenje da su oba sabirka jednaka* 0.

$(x+1)^2 = 0 \Rightarrow x + 1 = 0 \Rightarrow x = -1$

$(y-2)^2 = 0 \Rightarrow y - 2 = 0 \Rightarrow y = 2$

$x + y = -1 + 2 = 1.$

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

9.

$3f(x) - x f(x) = x + 2$

$f(x) \cdot (3 - x) = x + 2$

$f(x) = \frac{x+2}{3-x}$

$f(2) = \frac{2+2}{3-2} = 4.$

a). 4 b). 0 c). $\frac{1}{4}$ d). $-\frac{1}{4}$

10.

$\overline{BE} = x = \frac{a-c}{2} = 4$

$\triangle BCE$ *je pravougli*:

$b^2 = h^2 + x^2$

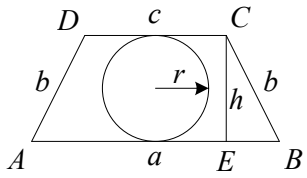
$h = 3.$

r – polupreč nik upisane kružnice

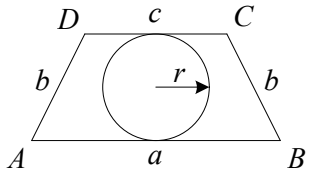
$2r = h \Rightarrow r = \frac{3}{2}.$

Površina upisane kružnice:

$P = r^2\pi = \frac{9\pi}{4}.$



a). 9π **b).** $\frac{9\pi}{4}$ c). 3π d). $\frac{3\pi}{4}$

1.	Proizvod svih realnih rješenja jednačine $\left(x^2-1\right)^2-7\left(x^2-1\right)+12=0$ je:			
	a). -20	b). $\sqrt{20}$	c). 0	d). 20
2.	Broj cjelobrojnih realnih rješenja nejednačine $\frac{x-2}{2x-3}\geq 1$ je:			
	a). 2	b). 0	c). 1	d). 3
3.	Koliko iznosi zbir svih realnih parametara k tako da su proizvod i zbir realnih rješenja jednačine $4x^2-\frac{k+4}{k+3}x+k+2=0$ jednaki?			
	a). -4	b). 6	c). -6	d). $\sqrt{2}$
4.	Zbir realnih rješenja jednačine $3a^{2x}-4a^x+1=0,\ \left(a>0\ \wedge\ a\neq 1\right)$ je:			
	a). $\log_a 3$	b). $-\log_a 3$	c). $1+\log_a 3$	d). $1-\log_a 3$
5.	Proizvod svih realnih rješenja jednačine $\log_2 x-12\log_x 2=1$ je:			
	a). $\frac{1}{2}$	b). -12	c). $\log_2 12$	d). 2
6.	Koliko iznosi realni dio kompleksnog broja Z koji zadovoljava jednakost $\left\|Z\right\|-i=Z+2$?			
	a). $-\frac{5}{4}$	b). $\frac{5}{4}$	c). $-\frac{3}{4}$	d). $-\frac{4}{3}$
7.	Realno rješenje jednačine $6\cos^2 x-13\cos x+2=0$ pripada intervalu:			
	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). $\left[0,\frac{\pi}{6}\right)$
8.	Koliko iznos zbir realnih rješenja $x+y$ jednačine $x^2+y^2-2x+4y+5=0$?			
	a). -3	b). -1	c). 3	d). 1
9.	Koliko iznosi $f\left(2\right)$ ako je $3f\left(x\right)-xf\left(x\right)=2x-1$?			
	a). 0	b). $-\frac{1}{3}$	c). 3	d). $\frac{1}{3}$
10.	Dat je jednakokraki trapez stranica $a=12, b=5$ i $c=6$ sa upisanom kružnicom. Koliko iznosi površina upisane kružnice? 			
	a). $\frac{9\pi}{4}$	b). 9π	c). $\frac{3\pi}{4}$	d). 4π

1.

$\left(x^2-1\right)^2-7\left(x^2-1\right)+12=0$

$S: x^2-1=t \Rightarrow t^2-7t+12=0 \Rightarrow t_1=3 \wedge t_2=4$

$x^2-1=3 \Rightarrow x^2=4 \Rightarrow x_{1,2}=\pm\sqrt{4}=\pm 2$

$x^2-1=4 \Rightarrow x^2=5 \Rightarrow x_{3,4}=\pm\sqrt{5}$

$x_1\cdot x_2\cdot x_3\cdot x_4=-2\cdot 2\cdot\left(-\sqrt{5}\right)\cdot\sqrt{5}=20$

a). -20 b). $\sqrt{20}$ c). 0 **d).** 20

2.

$\frac{x-2}{2x-3}\geq 1;\ DP:\ 2x-3\neq 0 \Rightarrow x\neq\frac{3}{2}.$

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

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

$\frac{-x+1}{2x-3}\geq 0$

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

$x\in\left[1,\frac{3}{2}\right)$. *Broj cjelobrojnih rješenja je* $1\,(x=1)$.

	$-\infty$		1		$\frac{3}{2}$		$+\infty$
$x-1$		$-$		$+$		$+$	
$2x-3$		$-$		$-$		$+$	
		$+$		$-$		$+$	

a). 2 b). 0 **c). 1** d). 3

3.

$4x^2-\frac{k+4}{k+3}x+k+2=0$

Za kvadratnu jednačinu $ax^2+bx+c=0$ *po Viettovim pravi* $\lim a$:

zbir rješenja $x_1+x_2=-\frac{b}{a} \Rightarrow x_1+x_2=-\frac{-\frac{k+4}{k+3}}{4}=\frac{\frac{k+4}{k+3}}{4}$ *i*

proizvod rješenja $x_1\cdot x_2=\frac{c}{a} \Rightarrow x_1\cdot x_2=\frac{k+2}{4}.$

Pr*vi uslov zadatka* (*zbir i proizvod rješenja jednačine jednaki*) :

$x_1+x_2=x_1\cdot x_2 \Rightarrow \frac{k+2}{4}=\frac{\frac{k+4}{k+3}}{4}.$

$k+2=\frac{k+4}{k+3} \Rightarrow (k+2)(k+3)=k+4$

$k^2+5k+6-k-4=0 \Rightarrow k^2+4k+2=0.$

Drugi uslov zadatka (*zbir rea* ln *ih vrijednosti parametra k za koje vrijedi prvi uslov*) :

$k_1+k_2=-\frac{4}{1}=-4.$

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

4.	$3a^{2x}-4a^{x}+1=0,\ DP:\ a>0\ \wedge\ a\neq 1$ $S:\ a^{x}=t$ $3t^{2}-4t+1=0\ \Rightarrow\ t_1=1\ \wedge\ t_1=\frac{1}{3}.$ $a^{x}=1\ \Rightarrow\ x_1=0.$ $a^{x}=\frac{1}{3}\ \Rightarrow\ \log_a a^{x}=\log_a\frac{1}{3}\ \Rightarrow\ x\log_a a=\log_a 3^{-1}\ \Rightarrow\ x_2=-\log_a 3.$ $x_1+x_2=-\log_a 3.$			
	a). $\log_a 3$	**b).** $-\log_a 3$	c). $1+\log_a 3$	d). $1-\log_a 3$
5.	$\log_2 x-12\log_x 2=1;\ DP:\ x>0\ \wedge\ x\neq 1.$ $\log_2 x-12\cdot\frac{1}{\log_2 x}-1=0$ $S:\ \log_2 x=t$ $t-12\cdot\frac{1}{t}-1=0\ \Rightarrow\ t^{2}-t-12=0\ \Rightarrow\ t_1=-3\ \wedge\ t_2=4.$ $\log_2 x=-3\ \Rightarrow\ x_1=2^{-3}$ $\log_2 x=4\ \Rightarrow\ x_2=2^{4}$ $x_1\cdot x_2=2^{-3}\cdot 2^{4}=2.$			
	a). $\frac{1}{2}$	b). -12	c). $\log_2 12$	**d).** 2
6.	$\lvert Z\rvert-i=Z+2$ $Z=x+iy;\ \mathrm{Re}\{Z\}=x,\ \mathrm{Im}\{Z\}=y,\ \lvert Z\rvert=\sqrt{x^{2}+y^{2}}$ $\sqrt{x^{2}+y^{2}}-i=x+iy+2\ \Rightarrow$ $\sqrt{x^{2}+y^{2}}=x+2$ $\underline{y=-1}$ $\sqrt{x^{2}+1}=x+2$ $x^{2}+1=x^{2}+4x+4$ $4x=-3$ $x=-\frac{3}{4}.$			
	a). $-\frac{5}{4}$	b). $\frac{5}{4}$	**c).** $-\frac{3}{4}$	d). $-\frac{4}{3}$

7.

$6\cos^2 x - 13\cos x + 2 = 0$

$S: \cos x = t$

$6t^2 - 13t + 2 = 0 \Rightarrow t_1 = 2 \wedge t_2 = \frac{1}{6}$

$\cos x = 2 \Rightarrow x \notin R$

$\cos x = \frac{1}{6} \Rightarrow x \in R.$

Kako je:

$\cos x = 0 \Rightarrow x = \frac{\pi}{2} \wedge \cos\frac{\pi}{3} = \frac{1}{2}, te$

$0 < \frac{1}{6} < \frac{1}{2} \Rightarrow \frac{\pi}{3} < x < \frac{\pi}{2}.$

$x \in \left[\frac{\pi}{3}, \frac{\pi}{2}\right).$

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). $\left[0, \frac{\pi}{6}\right)$

8.

$x^2 + y^2 - 2x + 4y + 5 = 0$

$x^2 - 2x + 1 + y^2 + 4y + 4 = 0$

$(x-1)^2 + (y+2)^2 = 0.$

Kako su oba sabirka nenegativni izrazi, uz uslov $x, y \in R$, *onda je jedino rješenje da su oba sabirka jednaka* 0.

$(x-1)^2 = 0 \Rightarrow x - 1 = 0 \Rightarrow x = 1$

$(y+2)^2 = 0 \Rightarrow y + 2 = 0 \Rightarrow y = -2$

$x + y = 1 - 2 = -1.$

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

9.

$3f(x) - x f(x) = 2x - 1$

$f(x) \cdot (3 - x) = 2x - 1$

$f(x) = \frac{2x-1}{3-x}$

$f(2) = \frac{4-1}{3-2} = 3.$

a). 0 b). $-\frac{1}{3}$ **c).** 3 d). $\frac{1}{3}$

10.

$\overline{BE} = x = \frac{a-c}{2} = 3$

$\triangle BCE$ *je pravougli*:

$b^2 = h^2 + x^2$

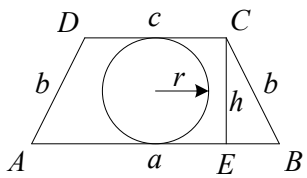
$h = 4.$

r – poluprečnik upisane kružnice

$2r = h \Rightarrow r = 2.$

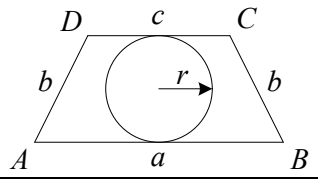
Površina upisane kružnice:

$P = r^2\pi = 4\pi.$



	a). $\frac{9\pi}{4}$	b). 9π	c). $\frac{3\pi}{4}$	**d).** 4π

UNIVERZITET U TUZLI **Fakultet elektrotehnike** **Katalog zadataka za prijemni ispit na EiR**	**17. GRUPA ZADATAKA**

1.	Proizvod svih realnih rješenja jednačine $\left(x^2-2\right)^2-7\left(x^2-2\right)+10=0$ je:			
	a). 28	b). -28	c). 0	d). $\sqrt{28}$
2.	Broj cjelobrojnih realnih rješenja nejednačine $\frac{x-1}{2x-5}\geq 1$ je:			
	a). 0	b). 3	c). 1	d). 2
3.	Koliko iznosi zbir svih realnih parametara k tako da su proizvod i zbir realnih rješenja jednačine $7x^2-\frac{k+3}{k-4}x+k-1=0$ jednaki?			
	a). -6	b). 6	c). -5	d). $2\sqrt{2}$
4.	Zbir realnih rješenja jednačine $4a^{2x}-5a^x+1=0,\ \left(a>0\ \wedge\ a\neq 1\right)$ je:			
	a). $1-\log_a 4$	b). $1+\log_a 4$	c). $-\log_a 4$	d). $\log_a 4$
5.	Proizvod svih realnih rješenja jednačine $\log_3 x-12\log_x 3=-1$ je:			
	a). $\frac{1}{3}$	b). 3	c). $\log_3 12$	d). -12
6.	Koliko iznosi realni dio kompleksnog broja Z koji zadovoljava jednakost $\left\|Z\right\|-2i=Z+1$?			
	a). $\frac{5}{2}$	b). $\frac{3}{2}$	c). $-\frac{5}{2}$	d). $\frac{2}{3}$
7.	Realno rješenje jednačine $5\sin^2 x-16\sin x+3=0$ pripada intervalu:			
	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). $\left[0,\frac{\pi}{6}\right)$
8.	Koliko iznos zbir realnih rješenja $x+y$ jednačine $x^2+y^2-4x+2y+5=0$?			
	a). -1	b). -3	c). 1	d). 3
9.	Koliko iznosi $f\left(1\right)$ ako je $3f\left(x\right)-xf\left(x\right)=5x-1$?			
	a). $\frac{1}{2}$	b). $-\frac{1}{2}$	c). 0	d). 2
10.	Dat je jednakokraki trapez stranica $a=12,\ b=5$ i $c=4$ sa upisanom kružnicom. Koliko iznosi površina upisane kružnice?			
	a). $\frac{9\pi}{4}$	b). 4π	c). $\frac{3\pi}{4}$	d). $\frac{3\pi}{2}$

1.

$\left(x^2-2\right)^2-7\left(x^2-2\right)+10=0$

$S: x^2-2=t \Rightarrow t^2-7t+10=0 \Rightarrow t_1=2 \wedge t_2=5$

$x^2-2=2 \Rightarrow x^2=4 \Rightarrow x_{1,2}=\pm\sqrt{4}=\pm 2$

$x^2-2=5 \Rightarrow x^2=7 \Rightarrow x_{3,4}=\pm\sqrt{7}$

$x_1\cdot x_2\cdot x_3\cdot x_4=-2\cdot 2\cdot\left(-\sqrt{7}\right)\cdot\sqrt{7}=28$

a). 28 b). -28 c). 0 d). $\sqrt{28}$

2.

$\frac{x-1}{2x-5}\geq 1;\ DP:\ 2x-5\neq 0 \Rightarrow x\neq\frac{5}{2}.$

$\frac{x-1}{2x-5}-1\geq 0$

$\frac{x-1-2x+5}{2x-5}\geq 0$

$\frac{-x+4}{2x-5}\geq 0$

$\frac{x-4}{2x-5}\leq 0$

$x\in\left(\frac{5}{2},4\right]$. *Broj cjelobrojnih rješenja je* $2\ (x_1=3 \Rightarrow x_1=4)$.

	$-\infty$	$\frac{5}{2}$	4	$+\infty$
$x-4$	$-$	$-$	$+$	
$2x-5$	$-$	$+$	$+$	
	$+$	$-$	$+$	

a). 0 b). 3 c). 1 **d).** 2

3.

$7x^2-\frac{k+3}{k-4}x+k-1=0$

Za kvadratnu jednačinu $ax^2+bx+c=0$ *po Viettovim pravi* $\lim a$:

zbir rješenja $x_1+x_2=-\frac{b}{a} \Rightarrow x_1+x_2=-\frac{-\frac{k+3}{k-4}}{7}=\frac{\frac{k+3}{k-4}}{7}$ *i*

proizvod rješenja $x_1\cdot x_2=\frac{c}{a} \Rightarrow x_1\cdot x_2=\frac{k-1}{7}.$

Pr*vi uslov zadatka* (*zbir i proizvod rješenja jednačine jednaki*) :

$x_1+x_2=x_1\cdot x_2 \Rightarrow \frac{\frac{k+3}{k-4}}{7}=\frac{k-1}{7}.$

$\frac{k+3}{k-4}=k-1 \Rightarrow k+3=(k-1)(k-4)$

$k^2-5k+4-k-3=0 \Rightarrow k^2-6k+1=0.$

Drugi uslov zadatka (*zbir rea* ln *ih vrijednosti parametra k za koje vrijedi prvi uslov*) :

$k_1+k_2=-\frac{-6}{1}=6.$

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

4.

$4a^{2x}-5a^{x}+1=0,\ DP:\ a>0\ \wedge\ a\neq 1$

$S:\ a^{x}=t$

$4t^{2}-5t+1=0\ \Rightarrow\ t_1=1\ \wedge\ t_1=\frac{1}{4}.$

$a^{x}=1\ \Rightarrow\ x_1=0.$

$a^{x}=\frac{1}{4}\ \Rightarrow\ \log_a a^{x}=\log_a \frac{1}{4}\ \Rightarrow\ x\log_a a=\log_a 4^{-1}\ \Rightarrow\ x_2=-\log_a 4.$

$x_1+x_2=-\log_a 4.$

a). $1-\log_a 4$ b). $1+\log_a 4$ **c).** $-\log_a 4$ d). $\log_a 4$

5.

$\log_3 x-12\log_x 3=-1;\ DP:\ x>0\ \wedge\ x\neq 1.$

$\log_3 x-12\cdot\frac{1}{\log_3 x}+1=0$

$S:\ \log_3 x=t$

$t-12\cdot\frac{1}{t}+1=0\ \Rightarrow\ t^{2}+t-12=0\ \Rightarrow\ t_1=3\ \wedge\ t_2=-4.$

$\log_3 x=3\ \Rightarrow\ x_1=3^{3}$

$\log_3 x=-4\ \Rightarrow\ x_2=3^{-4}$

$x_1\cdot x_2=3^{3}\cdot 3^{-4}=3^{-1}=\frac{1}{3}.$

a). $\frac{1}{3}$ b). 3 c). $\log_3 12$ d). -12

6.

$|Z|-2i=Z+1$

$Z=x+iy;\ \mathrm{Re}\{Z\}=x,\ \mathrm{Im}\{Z\}=y,\ |Z|=\sqrt{x^{2}+y^{2}}$

$\sqrt{x^{2}+y^{2}}-2i=x+iy+1\ \Rightarrow$

$\sqrt{x^{2}+y^{2}}=x+1$

$\underline{y=-2}$

$\sqrt{x^{2}+4}=x+1$

$x^{2}+4=x^{2}+2x+1$

$2x=3$

$x=\frac{3}{2}.$

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

7.

$5\sin^2 x - 16\sin x + 3 = 0$

$S: \sin x = t$

$5t^2 - 16t + 3 = 0 \Rightarrow t_1 = 3 \wedge t_2 = \frac{1}{5}$

$\sin x = 3 \Rightarrow x \notin R$

$\sin x = \frac{1}{5} \Rightarrow x \in R.$

Kako je:

$\sin 0 = 0 \Rightarrow x = 0 \wedge \sin\frac{\pi}{6} = \frac{1}{2}, te$

$0 < \frac{1}{5} < \frac{1}{2} \Rightarrow 0 < x < \frac{\pi}{6}.$

$x \in \left[0, \frac{\pi}{6}\right).$

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).** $\left[0, \frac{\pi}{6}\right)$

8.

$x^2 + y^2 - 4x + 2y + 5 = 0$

$x^2 - 4x + 4 + y^2 + 2y + 1 = 0$

$(x-2)^2 + (y+1)^2 = 0.$

Kako su oba sabirka nenegativni izrazi, uz uslov $x, y \in R$, *onda je jedino rješenje da su oba sabirka jednaka* 0.

$(x-2)^2 = 0 \Rightarrow x - 2 = 0 \Rightarrow x = 2$

$(y+1)^2 = 0 \Rightarrow y + 1 = 0 \Rightarrow y = -1$

$x + y = 2 - 1 = 1.$

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

9.

$3f(x) - x f(x) = 5x - 1$

$f(x) \cdot (3 - x) = 5x - 1$

$f(x) = \frac{5x-1}{3-x}$

$f(1) = \frac{5-1}{3-1} = 2.$

a). $\frac{1}{2}$ b). $-\frac{1}{2}$ c). 0 **d).** 2

10.

$\overline{BE} = x = \frac{a-c}{2} = 4$

$\triangle BCE$ *je pravougli*:

$b^2 = h^2 + x^2$

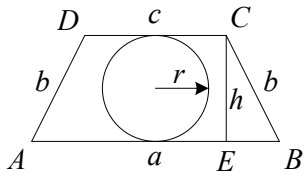
$h = 3.$

r – polupreč nik upisane kružnice

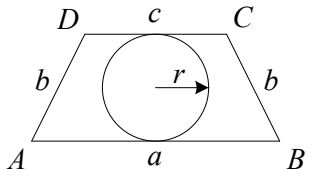
$2r = h \Rightarrow r = \frac{3}{2}.$

Površina upisane kružnice:

$P = r^2\pi = \frac{9\pi}{4}.$



a). $\frac{9\pi}{4}$ b). 4π c). $\frac{3\pi}{4}$ d). $\frac{3\pi}{2}$

1.	Proizvod svih realnih rješenja jednačine $\left(x^2-1\right)^2-7\left(x^2-1\right)+10=0$ je:			
	a). 0	b). $\sqrt{18}$	c). 18	d). -18
2.	Broj cjelobrojnih realnih rješenja nejednačine $\frac{x-1}{2x-3}\geq 1$ je:			
	a). 1	b). 0	c). 2	d). 3
3.	Koliko iznosi zbir svih realnih parametara k tako da su proizvod i zbir realnih rješenja jednačine $6x^2-\frac{k+3}{k+4}x+k+1=0$ jednaki?			
	a). 5	b). -5	c). $\sqrt{3}$	d). -4
4.	Zbir realnih rješenja jednačine $2a^{2x}-3a^x+1=0,\ \left(a>0\ \wedge\ a\neq 1\right)$ je:			
	a). $\log_a 2$	b). $-\log_a 2$	c). $1+\log_a 2$	d). $1-\log_a 2$
5.	Proizvod svih realnih rješenja jednačine $\log_3 x-12\log_x 3=1$ je:			
	a). $\frac{1}{3}$	b). -12	c). 3	d). $\log_3 12$
6.	Koliko iznosi realni dio kompleksnog broja Z koji zadovoljava jednakost $\left\|Z\right\|+2i=Z-1$?			
	a). $-\frac{2}{3}$	b). $-\frac{5}{2}$	c). $\frac{5}{2}$	d). $-\frac{3}{2}$
7.	Realno rješenje jednačine $5\cos^2 x-16\cos x+3=0$ pripada intervalu:			
	a). $\left[\frac{\pi}{4},\frac{\pi}{3}\right)$	b). $\left[\frac{\pi}{3},\frac{\pi}{2}\right)$	c). $\left[0,\frac{\pi}{6}\right)$	d). $\left[\frac{\pi}{6},\frac{\pi}{4}\right)$
8.	Koliko iznos zbir realnih rješenja $x+y$ jednačine $x^2+y^2+4x-2y+5=0$?			
	a). -1	b). 1	c). -3	d). 3
9.	Koliko iznosi $f\left(1\right)$ ako je $2f\left(x\right)-xf\left(x\right)=4x-1$?			
	a). 0	b). 3	c). $\frac{1}{3}$	d). $-\frac{1}{3}$
10.	Dat je jednakokraki trapez stranica $a=10, b=5$ i $c=4$ sa upisanom kružnicom. Koliko iznosi površina upisane kružnice? 			
	a). $\frac{3\pi}{2}$	b). $\frac{3\pi}{4}$	c). 4π	d). $\frac{4\pi}{3}$

1.

$\left(x^2-1\right)^2-7\left(x^2-1\right)+10=0$

$S: x^2-1=t \Rightarrow t^2-7t+10=0 \Rightarrow t_1=2 \wedge t_2=5$

$x^2-1=2 \Rightarrow x^2=3 \Rightarrow x_{1,2}=\pm\sqrt{3}$

$x^2-1=5 \Rightarrow x^2=6 \Rightarrow x_{3,4}=\pm\sqrt{6}$

$x_1\cdot x_2\cdot x_3\cdot x_4=-\sqrt{3}\cdot\sqrt{3}\cdot\left(-\sqrt{6}\right)\cdot\sqrt{6}=18$

a). 0 b). $\sqrt{18}$ **c).** 18 d). -18

2.

$\frac{x-1}{2x-3}\geq 1;\ DP:\ 2x-3\neq 0 \Rightarrow x\neq\frac{3}{2}.$

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

$\frac{x-1-2x+3}{2x-3}\geq 0$

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

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

$x\in\left[\frac{3}{2},\ 2\right)$. *Broj cjelobrojnih rješenja je* $1(x=2)$.

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

a). 1 b). 0 c). 2 d). 3

3.

$6x^2-\frac{k+3}{k+4}x+k+1=0$

Za kvadratnu jednačinu $ax^2+bx+c=0$ *po Viettovim pravi* $\lim a$:

zbir rješenja $x_1+x_2=-\frac{b}{a} \Rightarrow x_1+x_2=-\frac{-\frac{k+3}{k+4}}{6}=\frac{\frac{k+3}{k+4}}{6}$ *i*

proizvod rješenja $x_1\cdot x_2=\frac{c}{a} \Rightarrow x_1\cdot x_2=\frac{k+1}{6}.$

Pr*vi uslov zadatka* (*zbir i proizvod rješenja jednačine jednaki*) :

$x_1+x_2=x_1\cdot x_2 \Rightarrow \frac{\frac{k+3}{k+4}}{6}=\frac{k+1}{6}.$

$\frac{k+3}{k+4}=k+1 \Rightarrow k+3=\left(k+1\right)\left(k+4\right)$

$k^2+5k+4-k-3=0 \Rightarrow k^2+4k+1=0.$

Drugi uslov zadatka (*zbir rea* ln *ih vrijednosti parametra k za koje vrijedi prvi uslov*) :

$k_1+k_2=-\frac{4}{1}=-4.$

a). 5 b). -5 c). $\sqrt{3}$ **d).** -4

4.

$2a^{2x}-3a^{x}+1=0,\ DP:\ a>0\ \wedge\ a\neq 1$

$S:\ a^{x}=t$

$2t^{2}-3t+1=0\ \Rightarrow\ t_1=1\ \wedge\ t_1=\frac{1}{2}.$

$a^{x}=1\ \Rightarrow\ x_1=0.$

$a^{x}=\frac{1}{2}\ \Rightarrow\ \log_a a^{x}=\log_a\frac{1}{2}\ \Rightarrow\ x\log_a a=\log_a 2^{-1}\ \Rightarrow\ x_2=-\log_a 2.$

$x_1+x_2=-\log_a 2.$

a). $\log_a 2$ **b).** $-\log_a 2$ c). $1+\log_a 2$ d). $1-\log_a 2$

5.

$\log_3 x-12\log_x 3=1;\ DP:\ x>0\ \wedge\ x\neq 1.$

$\log_3 x-12\cdot\frac{1}{\log_3 x}-1=0$

$S:\ \log_3 x=t$

$t-12\cdot\frac{1}{t}-1=0\ \Rightarrow\ t^{2}-t-12=0\ \Rightarrow\ t_1=-3\ \wedge\ t_2=4.$

$\log_3 x=-3\ \Rightarrow\ x_1=3^{-3}$

$\log_2 x=4\ \Rightarrow\ x_2=3^{4}$

$x_1\cdot x_2=3^{-3}\cdot 3^{4}=3.$

a). $\frac{1}{3}$ b). -12 **c).** 3 d). $\log_3 12$

6.

$|Z|+2i=Z-1$

$Z=x+iy;\ \mathrm{Re}\{Z\}=x,\ \mathrm{Im}\{Z\}=y,\ |Z|=\sqrt{x^{2}+y^{2}}$

$\sqrt{x^{2}+y^{2}}+2i=x+iy-1\ \Rightarrow$

$\sqrt{x^{2}+y^{2}}=x-1$

$\underline{y=2}$

$\sqrt{x^{2}+4}=x-1$

$x^{2}+4=x^{2}-2x+1$

$2x=-3$

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

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

7.

$5\cos^2 x - 16\cos x + 3 = 0$

$S: \cos x = t$

$5t^2 - 16t + 2 = 0 \Rightarrow t_1 = 3 \wedge t_2 = \frac{1}{5}$

$\cos x = 3 \Rightarrow x \notin R$

$\cos x = \frac{1}{5} \Rightarrow x \in R.$

Kako je:

$\cos x = 0 \Rightarrow x = \frac{\pi}{2} \wedge \cos\frac{\pi}{3} = \frac{1}{2}, te$

$0 < \frac{1}{5} < \frac{1}{2} \Rightarrow \frac{\pi}{3} < x < \frac{\pi}{2}.$

$x \in \left[\frac{\pi}{3}, \frac{\pi}{2}\right).$

a). $\left[\frac{\pi}{4}, \frac{\pi}{3}\right)$ **b).** $\left[\frac{\pi}{3}, \frac{\pi}{2}\right)$ c). $\left[0, \frac{\pi}{6}\right)$ d). $\left[\frac{\pi}{6}, \frac{\pi}{4}\right)$

8.

$x^2 + y^2 + 4x - 2y + 5 = 0$

$x^2 + 4x + 4 + y^2 - 2y + 1 = 0$

$(x+2)^2 + (y-1)^2 = 0.$

Kako su oba sabirka nenegativni izrazi, uz uslov $x, y \in R$, *onda je jedino rješenje da su oba sabirka jednaka* 0.

$(x+2)^2 = 0 \Rightarrow x + 2 = 0 \Rightarrow x = -2$

$(y-1)^2 = 0 \Rightarrow y - 1 = 0 \Rightarrow y = 1$

$x + y = -2 + 1 = -1.$

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

9.

$2f(x) - x f(x) = 4x - 1$

$f(x) \cdot (2 - x) = 4x - 1$

$f(x) = \frac{4x-1}{2-x}$

$f(1) = \frac{4-1}{2-1} = 3.$

a). 0 **b).** 3 c). $\frac{1}{3}$ d). $-\frac{1}{3}$

10.

$\overline{BE} = x = \frac{a-c}{2} = 3$

$\triangle BCE$ *je pravougli*:

$b^2 = h^2 + x^2$

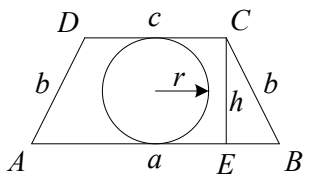
$h = 4.$

r – poluprečnik upisane kružnice

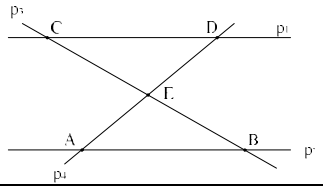
$2r = h \Rightarrow r = 2.$

Površina upisane kružnice:

$P = r^2\pi = 4\pi.$



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

1.	Proizvod realnih rješenja jednačine $\frac{3x+1}{3x-1}=\frac{2x+3}{x+2}$ je:			
	a). $\frac{5}{3}$	b). $-\frac{5}{3}$	c). $-\frac{3}{5}$	d). $\frac{3}{5}$
2.	Zbir realnih rješenja sistema jednačina $\frac{2}{x}-\frac{3}{x+y}=5$ i $\frac{4}{x}+\frac{5}{x+y}=-1$ je:			
	a). 1	b). 0	c). -2	d). -1
3.	Za koje vrijednosti parametra p su proizvod i zbir rješenja jednačine $(p-1)x^2-3(p+1)x-4(p+3)=0$ uvijek pozitivni?			
	a). $(-\infty,-3)$	b). $(1,3)$	c). $(-3,-1)$	d). $(-1,1)$
4.	Zbir svih realnih rješenja jednačine $2^{2x}+8=6\cdot 2^x$ je:			
	a). 2	b). 3	c). 1	d). 4
5.	Skup realnih rješenja nejednačine $\log_2(3x-4)\le 1$ je:			
	a). $\left(\frac{4}{3},2\right]$	b). $\left(0,\frac{4}{3}\right]$	c). $(2,4]$	d). $\left(-\frac{4}{3},0\right]$
6.	Modul kompleksnog broja $\underline{Z}=\frac{1+2i}{2i}$ je:			
	a). $\frac{5}{2}$	b). $\frac{3}{2}$	c). $\frac{\sqrt{5}}{2}$	d). 1
7.	Vrijednost izraza $\sin\frac{\pi}{2}\sin\frac{\pi}{4}+\cos\frac{\pi}{4}\cos\frac{\pi}{2}$ je:			
	a). $-\frac{\sqrt{2}}{2}$	b). 0	c). $\sqrt{2}$	d). $\frac{\sqrt{2}}{2}$
8.	Na izlet je krenulo 96 učesnika (učenica, učenika i nastavnika). Ako je učenica za šest više od učenika, a učenika sedam puta više od nastavnika, koliko je učenica krenulo na izlet?			
	a). 42	b). 48	c). 55	d). 45
9.	Koliko iznosi realni parametar k ako pravac $y=kx+1$ prolazi kroz tačku $A(1,-3)$?			
	a). -4	b). -3	c). -2	d). -1
10.	Dva paralelna pravca p_1 i p_2 ($p_1 \parallel p_2$) presiječeni su pravcima p_3 i p_4, kao na slici. Koliko iznosi $\overline{CD}$ ako je poznato $\overline{AE}:\overline{DE}=2:5$ i $\overline{AB}=3$? 			
	a). $\frac{6}{5}$	b). $\frac{5}{6}$	c). $\frac{15}{2}$	d). $\frac{10}{3}$

1.

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

D.P.:

$$3x-1\neq 0 \Rightarrow x\neq\frac{1}{3} \wedge x+2\neq 0 \Rightarrow x\neq -2.$$

$$\frac{3x+1}{3x-1}=\frac{2x+3}{x+2} \ /\cdot(3x-1)(x+2)$$

$$3x^2+6x+x+2=6x^2-2x+9x-3$$

$$3x^2=5 \Rightarrow x^2=\frac{5}{3} \Rightarrow x_{1,2}=\pm\sqrt{\frac{5}{3}}\in D.P.$$

$$x_1\cdot x_2=\sqrt{\frac{5}{3}}\cdot\left(-\sqrt{\frac{5}{3}}\right)=-\frac{5}{3}.$$

a). $\frac{5}{3}$ **b).** $-\frac{5}{3}$ c). $-\frac{3}{5}$ d). $\frac{3}{5}$

2.

$$\frac{2}{x}-\frac{3}{x+y}=5$$

$$\frac{4}{x}+\frac{5}{x+y}=-1$$

D.P.:

$$x\neq 0 \wedge x+y\neq 0 \Rightarrow x\neq 0 \wedge x\neq -y$$

$$Smjena: \ \frac{1}{x}=u \wedge \frac{1}{x+y}=v$$

$$2u-3v=5 \ /\cdot 5$$

$$\underline{4u+5v=-1} \ /\cdot 3$$

$$10u-15v=25$$

$$\underline{12u+15v=-3}$$

$$22u=22 \Rightarrow u=1 \Rightarrow x=1\in D.P.$$

$$4+5v=-1 \Rightarrow v=-1 \Rightarrow x+y=-1 \Rightarrow$$

$$y=-2\in D.P.$$

$$x+y=-1.$$

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

3.

$$(p-1)x^2-3(p+1)x-4(p+3)=0$$

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

$$x_1+x_2=-\frac{b}{a} \wedge x_1\cdot x_2=\frac{c}{a} \Rightarrow x_1+x_2=-\frac{-3(p+1)}{p-1} \wedge x_1\cdot x_2=\frac{-4(p+3)}{p-1}$$

Uslov zadatka $x_1+x_2>0 \wedge x_1\cdot x_2>0$

$$\frac{3(p+1)}{p-1}>0 \ /:3 \quad \Rightarrow \frac{p+1}{p-1}>0 \Rightarrow p_1\in(-\infty,-1)\cup(1,+\infty)$$

$$\frac{-4(p+3)}{p-1}>0 \ /:(-4) \quad \Rightarrow \frac{p+3}{p-1}<0 \Rightarrow p_2\in(-3,1)$$

Kako je potrebno zadovoljiti oba uslova, onda slijedi:

$$p=p_1\cap p_2 \Rightarrow p\in(-3,-1).$$

a). $(-\infty,-3)$ b). $(1,3)$ **c).** $(-3,-1)$ d). $(-1,1)$

4.

$2^{2x}+8=6\cdot 2^x$

$\left(2^x\right)^2-6\cdot 2^x+8=0$

Smjena: $2^x=t$

$t^2-6t+8=0$

$t_1=2 \Rightarrow 2^x=2 \Rightarrow 2^x=2^1 \Rightarrow x_1=1$

$t_2=4 \Rightarrow 2^x=4 \Rightarrow 2^x=2^2 \Rightarrow x_2=2$

$x_1+x_2=1+2=3.$

a). 2 **b).** 3 c). 1 d). 4

5.

$\log_2\left(3x-4\right)\le 1$

D.P.:

$3x-4>0 \Rightarrow x>\frac{4}{3}$

$\log_2\left(3x-4\right)\le \log_2 2$

$3x-4\le 2$

$x\le 2 \cap D.P. \Rightarrow x\in\left(\frac{4}{3},2\right].$

a). $\left(\frac{4}{3},2\right]$ b). $\left(0,\frac{4}{3}\right]$ c). $\left(2,4\right]$ d). $\left(-\frac{4}{3},0\right]$

6.

$\underline{Z}=\frac{1+2i}{2i}$

Modul kompleksnog broja:

$\left|\underline{Z}\right|=\left|\frac{1+2i}{2i}\right|=\frac{\left|1+2i\right|}{\left|2i\right|}=\frac{\sqrt{1^2+2^2}}{\sqrt{0^2+2^2}}=\frac{\sqrt{1+4}}{\sqrt{4}}=\frac{\sqrt{5}}{2}.$

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

7.

$\sin\frac{\pi}{2}\sin\frac{\pi}{4}+\cos\frac{\pi}{4}\cos\frac{\pi}{2}=?$

$\sin\frac{\pi}{2}=1$

$\sin\frac{\pi}{4}=\frac{\sqrt{2}}{2}$

$\cos\frac{\pi}{4}=\frac{\sqrt{2}}{2}$

$\cos\frac{\pi}{2}=0$

$\sin\frac{\pi}{2}\sin\frac{\pi}{4}+\cos\frac{\pi}{4}\cos\frac{\pi}{2}=1\cdot\frac{\sqrt{2}}{2}+\frac{\sqrt{2}}{2}\cdot 0=\frac{\sqrt{2}}{2}.$

a). $-\frac{\sqrt{2}}{2}$ b). 0 c). $\sqrt{2}$ **d).** $\frac{\sqrt{2}}{2}$

8.

$x-$*broj učenica*,

$y-$*broj učenika*,

$z-$*broj nastavnika*.

$x+y+z=96$

$x=y+6$

$y=7z \Rightarrow z=\frac{y}{7}$

$y+6+y+\frac{y}{7}=96$

$\frac{15y}{7}=90 \Rightarrow y=42 \Rightarrow x=48.$

a). 42 **b).** 48 c). 55 d). 45

9.

$y=kx+1, \quad A(1,-3)$

$-3=k+1$

$k=-4.$

a). -4 b). -3 c). -2 d). -1

10.

$\overline{AE}:\overline{DE}=2:5 \ \wedge \ \overline{AB}=3$

Jednakost uglova na transverzalama :

$\alpha_1=\alpha_2 \ \wedge \ \beta_1=\beta_2.$

Jednakost unakrsnih uglova : $\gamma_1=\gamma_2.$

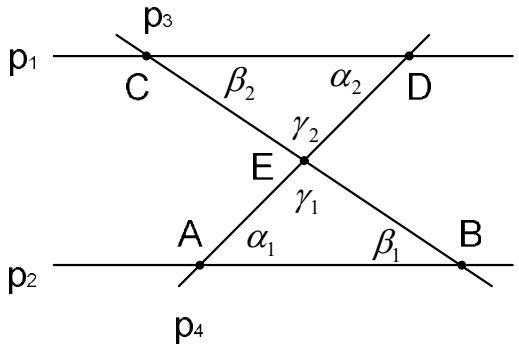
Iz jednakosti uglova dobija se sličnost trouglova : $\Delta ABE \sim \Delta CDE$, *pa vrijedi* :

$\overline{AE}:\overline{DE}=\overline{AB}:\overline{CD}$

$2:5=3:\overline{CD}$

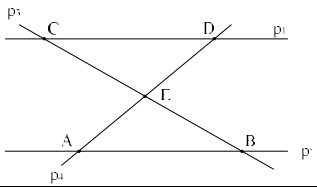
$2\overline{CD}=15$

$\overline{CD}=\frac{15}{2}.$



a). $\frac{6}{5}$ b). $\frac{5}{6}$ **c).** $\frac{15}{2}$ d). $\frac{10}{3}$

UNIVERZITET U TUZLI **Fakultet elektrotehnike** **Katalog zadataka za prijemni ispit na EiR**	**20. GRUPA ZADATAKA**

1.	Proizvod realnih rješenja jednačine $\frac{2x+1}{3x}=\frac{x+3}{x+4}$ je:			
	a). -4	b). 4	c). $-\frac{1}{4}$	d). $\frac{1}{4}$
2.	Zbir realnih rješenja sistema jednačina $\frac{2}{x}-\frac{1}{x-y}=3$ i $\frac{3}{x}+\frac{2}{x-y}=1$ je:			
	a). -1	b). 3	c). 1	d). 2
3.	Za koje vrijednosti parametra p su proizvod i zbir rješenja jednačine $(p-2)x^2-5(p+2)x-3(p+3)=0$ uvijek pozitivni?			
	a). $(-\infty,-3)$	b). $(2,3)$	c). $(-2,2)$	d). $(-3,-2)$
4.	Zbir svih realnih rješenja jednačine $3^{2x}+81=30\cdot 3^x$ je:			
	a). 4	b). 2	c). 3	d). 5
5.	Skup realnih rješenja nejednačine $\log_3(5x-3)\le 1$ je:			
	a). $\left(0,\frac{3}{5}\right]$	b). $\left(\frac{3}{5},\frac{6}{5}\right]$	c). $\left(\frac{6}{5},2\right]$	d). $\left(-\frac{3}{5},0\right]$
6.	Modul kompleksnog broja $\underline{Z}=\frac{2+i}{2i}$ je:			
	a). $\frac{3}{2}$	b). 1	c). $\frac{5}{2}$	d). $\frac{\sqrt{5}}{2}$
7.	Vrijednost izraza $\sin\frac{\pi}{2}\sin\frac{\pi}{3}+\cos\frac{\pi}{3}\cos\frac{\pi}{2}$ je:			
	a). $\frac{\sqrt{3}}{2}-\frac{1}{2}$	b). $\frac{\sqrt{3}}{2}$	c). $\frac{\sqrt{3}}{2}+\frac{1}{2}$	d). $\frac{1}{2}$
8.	Na izlet je krenulo 106 učesnika (učenica, učenika i nastavnika). Ako je učenica za sedam više od učenika, a učenika pet puta više od nastavnika, koliko je učenica krenulo na izlet?			
	a). 52	b). 45	c). 54	d). 42
9.	Koliko iznosi realni parametar k ako pravac $y=kx+2$ prolazi kroz tačku $A(3,-1)$?			
	a). -2	b). -4	c). -1	d). -3
10.	Dva paralelna pravca p_1 i p_2 ($p_1 \parallel p_2$) presiječeni su pravcima p_3 i p_4, kao na slici. Koliko iznosi $\overline{AB}$ ako je poznato $\overline{AE}:\overline{DE}=4:3$ i $\overline{CD}=2$? 			
	a). $\frac{3}{8}$	b). $\frac{3}{2}$	c). $\frac{2}{3}$	d). $\frac{8}{3}$

1.

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

D.P.:

$3x\neq 0 \Rightarrow x\neq 0 \wedge x+4\neq 0 \Rightarrow x\neq -4.$

$$\frac{2x+1}{3x}=\frac{x+3}{x+4} \ /\cdot 3x(x+4)$$

$3x^2+9x=2x^2+8x+x+4$

$x^2=4 \Rightarrow x_{1,2}=\pm 2\in D.P.$

$x_1\cdot x_2=2\cdot(-2)=-4.$

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

2.

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

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

D.P.:

$x\neq 0 \wedge x-y\neq 0 \Rightarrow x\neq 0 \wedge x\neq y$

Smjena: $\frac{1}{x}=u \wedge \frac{1}{x-y}=v$

$2u-v=3 \ /\cdot 2$

$\underline{3u+2v=1}$

$4u-2v=6$

$\underline{3u+2v=1}$

$7u=7 \Rightarrow u=1 \Rightarrow x=1\in D.P.$

$3+2v=1 \Rightarrow v=-1 \Rightarrow x-y=-1 \Rightarrow$

$y=2\in D.P.$

$x+y=3.$

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

3.

$(p-2)x^2-5(p+2)x-3(p+3)=0$

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

$$x_1+x_2=-\frac{b}{a} \wedge x_1\cdot x_2=\frac{c}{a} \Rightarrow x_1+x_2=-\frac{-5(p+2)}{p-2} \wedge x_1\cdot x_2=\frac{-3(p+3)}{p-2}$$

Uslov zadatka $x_1+x_2>0 \wedge x_1\cdot x_2>0$

$$\frac{5(p+2)}{p-2}>0 \ /:5 \quad \Rightarrow \frac{p+2}{p-2}>0 \Rightarrow p_1\in(-\infty,-2)\cup(2,+\infty)$$

$$\frac{-3(p+3)}{p-2}>0 \ /:(-4) \quad \Rightarrow \frac{p+3}{p-2}<0 \Rightarrow p_2\in(-3,2)$$

Kako je potrebno zadovoljiti oba uslova, onda slijedi:

$p=p_1\cap p_2 \Rightarrow p\in(-3,-2).$

a). $(-\infty,-3)$ b). $(2,3)$ c). $(-2,2)$ **d).** $(-3,-2)$

4.

$3^{2x}+81=30\cdot 3^x$

$\left(3^x\right)^2-30\cdot 3^x+81=0$

Smjena: $3^x=t$

$t^2-30t+81=0$

$t_1=3 \Rightarrow 3^x=3 \Rightarrow 3^x=3^1 \Rightarrow x_1=1$

$t_2=27 \Rightarrow 3^x=27 \Rightarrow 3^x=3^3 \Rightarrow x_2=3$

$x_1+x_2=1+3=4.$

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

5.

$\log_3\left(5x-3\right)\le 1$

D.P.:

$5x-3>0 \Rightarrow x>\frac{3}{5}$

$\log_3\left(5x-3\right)\le \log_3 3$

$5x-3\le 3$

$x\le\frac{6}{5}\cap D.P. \Rightarrow x\in\left(\frac{3}{5},\frac{6}{5}\right].$

a). $\left(0,\frac{3}{5}\right]$ **b).** $\left(\frac{3}{5},\frac{6}{5}\right]$ c). $\left(\frac{6}{5},2\right]$ d). $\left(-\frac{3}{5},0\right]$

6.

$\underline{Z}=\frac{2+i}{2i}$

Modul kompleksnog broja:

$|\underline{Z}|=\left|\frac{2+i}{2i}\right|=\frac{|2+i|}{|2i|}=\frac{\sqrt{2^2+1^2}}{\sqrt{0^2+2^2}}=\frac{\sqrt{4+1}}{\sqrt{4}}=\frac{\sqrt{5}}{2}.$

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

7.

$\sin\frac{\pi}{2}\sin\frac{\pi}{3}+\cos\frac{\pi}{3}\cos\frac{\pi}{2}=?$

$\sin\frac{\pi}{2}=1$

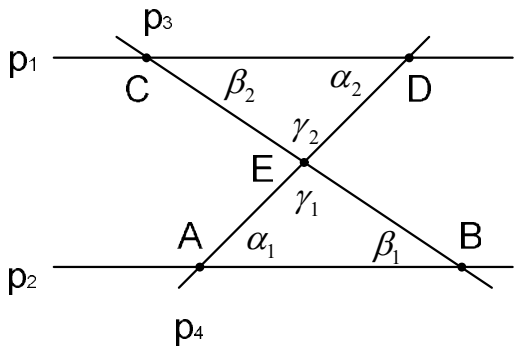
$\sin\frac{\pi}{3}=\frac{\sqrt{3}}{2}$

$\cos\frac{\pi}{3}=\frac{1}{2}$

$\cos\frac{\pi}{2}=0$

$\sin\frac{\pi}{2}\sin\frac{\pi}{3}+\cos\frac{\pi}{3}\cos\frac{\pi}{2}=1\cdot\frac{\sqrt{3}}{2}+\frac{1}{2}\cdot 0=\frac{\sqrt{3}}{2}.$

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

8.	$x-$*broj učenica*, $y-$*broj učenika*, $z-$*broj nastavnika*. $x+y+z=106$ $x=y+7$ $y=5z \Rightarrow z=\frac{y}{5}$ $y+7+y+\frac{y}{5}=106$ $\frac{11y}{5}=99 \Rightarrow y=45 \Rightarrow x=52.$			
	a). 52	b). 45	c). 54	d). 42
9.	$y=kx+2, \quad A(3,-1)$ $-1=3k+2$ $3k=-3$ $k=-1.$			
	a). -2	b). -4	**c).** -1	d). -3
10.	$\overline{AE}:\overline{DE}=4:3 \ \wedge \ \overline{CD}=2$ *Jednakost uglova na transverzalama* : $\alpha_1=\alpha_2 \ \wedge \ \beta_1=\beta_2.$ *Jednakost unakrsnih uglova* : $\gamma_1=\gamma_2.$ *Iz jednakosti uglova dobija se sličnost trouglova* : $\Delta ABE \sim \Delta CDE$, *pa vrijedi* : $\overline{AE}:\overline{DE}=\overline{AB}:\overline{CD}$ $4:3=\overline{AB}:2$ $3\overline{AB}=8$ $\overline{AB}=\frac{8}{3}.$			
	a). $\frac{3}{8}$	b). $\frac{3}{2}$	c). $\frac{2}{3}$	**d).** $\frac{8}{3}$