MATEMATIKA I.

5.9.

1. domača naloga

1.) $\operatorname{tg}\alpha = \frac{5}{12}$; $\pi < \alpha < \frac{3\pi}{2}$

$\sin\alpha$, $\cos\alpha$, $\operatorname{ctg}\alpha = ?$

- $\operatorname{ctg}\alpha = \operatorname{tg}^{-1}\alpha = \left(\frac{5}{12}\right)^{-1} = \frac{12}{5}$
- $\operatorname{tg}^2\alpha + 1 = \frac{1}{\cos^2\alpha} \Rightarrow$

$\Rightarrow \cos^2\alpha = \frac{1}{\operatorname{tg}^2\alpha + 1} = \frac{1}{\frac{25+144}{144}} = \frac{144}{169} \Rightarrow \cos\alpha = -\frac{12}{13}$

- $\sin^2\alpha + \cos^2\alpha = 1 \Rightarrow \sin\alpha = \sqrt{1 - \cos^2\alpha} = -\frac{5}{13}$

• $\sin^2\alpha + \cos^2\alpha = 1 \Rightarrow \sin\alpha = \sqrt{1-\cos^2\alpha} = -\frac{5}{13}$

2.) $2\sin^2 x - \sin 2x = 0$

$2\sin^2 x - 2\sin x\cos x = 0 \;/:(2\cos^2 x)$

$\operatorname{tg}^2 x - \operatorname{tg} x = 0$

$\operatorname{tg} x(\operatorname{tg} x - 1) = 0$

$\operatorname{tg} x = 0$

$x_1 = k\pi;\ k \in \mathbb{Z}$

$\operatorname{tg} x - 1 = 0$

$\operatorname{tg} x = 1$

$x_2 = \frac{\pi}{4} + k\pi;\ k \in \mathbb{Z}$

3) - stožec
- $S_{pl} : S_o = 5 : 3$
- $r = 12\,e$; e ... enota

$P, V = ?$

$$\left.\begin{aligned} S_{pl} &= \pi r s \\ S_o &= \pi r^2 \end{aligned}\right\} :$$

$$\frac{S_{pl}}{S_o} = \frac{\pi r s}{\pi r^2} = \frac{s}{r} = \frac{5}{3} \Rightarrow$$

$$\Rightarrow s = \frac{5}{3} r$$

$$s^2 = r^2 + v^2$$

$$\frac{25}{9} r^2 = r^2 + v^2 \Rightarrow$$

$$\Rightarrow v^2 = \frac{16}{9} r^2 \Rightarrow r = \sqrt{\frac{9 v^2}{16}} = \underline{9e}$$

$$s = \frac{5 \cdot 9}{3} = \underline{15e}$$

- $P = \pi r (s + r) =$
$= 9\pi (15 + 9) =$
$= \underline{216\pi\, e^2}$

- $V = \frac{1}{3} v r^2 \pi =$
$= \frac{1}{3} \cdot 12 \cdot 81 \cdot \pi =$
$= \underline{324\pi\, e^3}$

4.) $p(x) = x^3 + ax^2 + bx - 5$

↳ polinom deljiv z $(x+5)$ in $(x-1)$

$a, b = ?$

	1	a	b	-5
1		1	a+1	a+b+1
	1	a+1	a+b+1	a+b-4
-5		-5	-5a+20	
	1	a-4	-4a+b+21	

$a+b-4=0$

$-4a+b+21=0 \;/\cdot(-1)$

$a+b-4=0$

$4a-b-21=0$ } +

$5a-25=0$

$5a=25 \;/:5$

$\boxed{a=5}$

$5+b-4=0$

$\boxed{b=-1}$

5.) $p(x) = x^3 - 2x^2 - 2x + 7$

$k(x) = x^2 + x + 1$

$r(x) = 10$

$q(x) = ?$

$$q(x) = (x^3 - 2x^2 - 2x + 7) : (x^2 + x + 1) = x - 3$$

$$\underline{-x^3 \mp x^2 \mp x}$$

$$\not{0} \; -3x^2 - 3x + 7$$

$$\underline{+3x^2 + 3x + 3}$$

$$\not{0} \quad \not{0} \quad +10 \text{ ost.}$$

$$\boxed{q(x) = x - 3}$$

6.) · analiza funkcije

$$\cdot f(x) = \frac{x^2 - 2x - 3}{x - 1}$$

· <u>ničla</u>: $x^2 - 2x - 3 = 0$

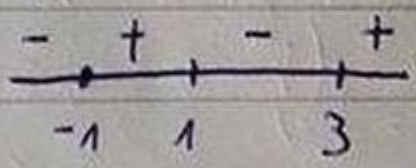
$(x+1)(x-3) = 0$

$x_1 = -1 \; ; \; x_2 = 3$

· <u>pol</u>: $x - 1 = 0$ · <u>z. v.</u>: $f(0) = 3$

$x_1 = 1$

· <u>znak</u>:



<u>odvod</u>: $f'(x) = \frac{f'(x) \cdot g(x) - f(x) \cdot g'(x)}{[g(x)]^2} =$

$=$

• ničla: $x^2-2x-3=0$

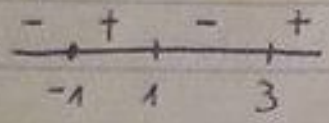
$(x+1)(x-3)=0$

$x_1=-1 \; ; \; x_2=3$

• pol: $x-1=0$ • z.v: $f(0)=3$

$x_1=1$

• znak:



• odvod: $f'(x)=\frac{f'(x)\cdot g(x)-f(x)\cdot g'(x)}{[g(x)]^2}=$

$=\frac{(2x-2)(x-1)-(x^2-2x-3)}{(x-1)^2}=$

$=\frac{x^2-2x+\boxed{5}}{x^2-2x+1}$

ničle 1. odv.: $x \notin \mathbb{R}$

asimptota: $(x^2-2x-3):(x-1)=x-1$

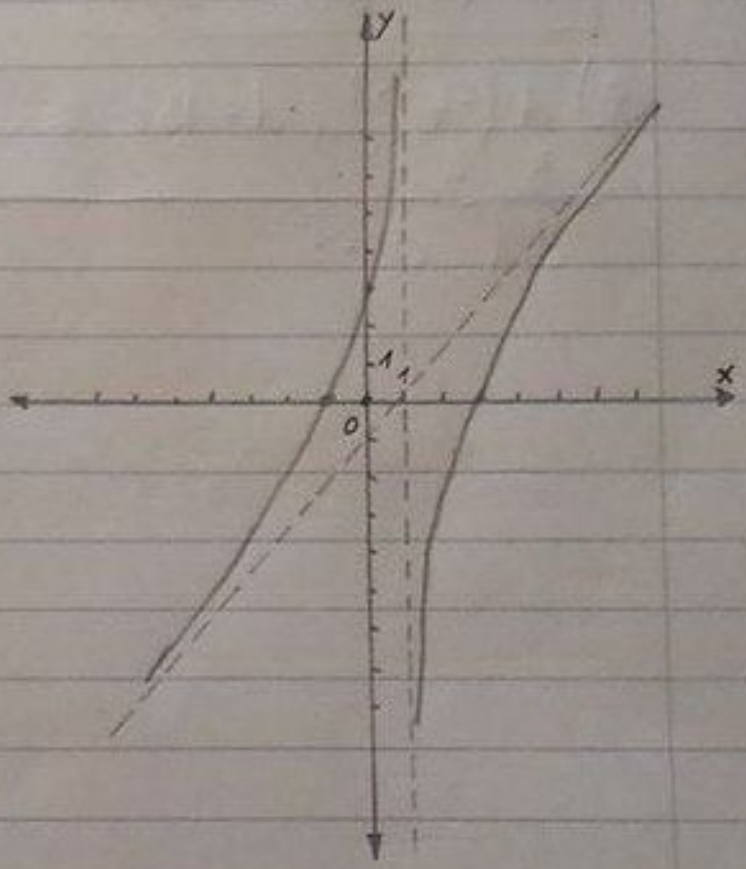
$-x^2+x$

$\quad -x-3$

$\quad +x+1$

$\quad -4$ ost.

$y=x-1$



Aleta

7.) $x^2+y^2-4x-2y+4=0$

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

$S, r, P = ?$

- $x^2-4x+y^2-2y+4=0$

$(x-2)^2-4+(y-1)^2-1+4=0$

$(x-2)^2+(y-1)^2=1$

$\boxed{S(2,1) \quad ; \quad r=1}$

- $P: x^2+\frac{1}{4}x^2-4x-x+4=0$

$5x^2-20x+16=0$

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

$=\frac{20\pm\sqrt{80}}{10}=$

$=\frac{10\pm 2\sqrt{5}}{5} \Rightarrow$

$\Rightarrow x_1=2+\frac{2\sqrt{5}}{5}$

$x_2=2-\frac{2\sqrt{5}}{5}$

- $P: y_1=\frac{1}{2}\left(2+\frac{2\sqrt{5}}{5}\right)=1+\frac{\sqrt{5}}{5}$

$y_2=\frac{1}{2}\left(2-\frac{2\sqrt{5}}{5}\right)=1-\frac{\sqrt{5}}{5}$

$\boxed{P_1\left(2+\frac{2\sqrt{5}}{5}\,;\,1+\frac{\sqrt{5}}{5}\right)}$

$\boxed{P_2\left(2-\frac{2\sqrt{5}}{5}\,;\,1-\frac{\sqrt{5}}{5}\right)}$

8.) $A(-4,0)$, $d=12e$; e.... enota

$B(4,0)$

$A=?$