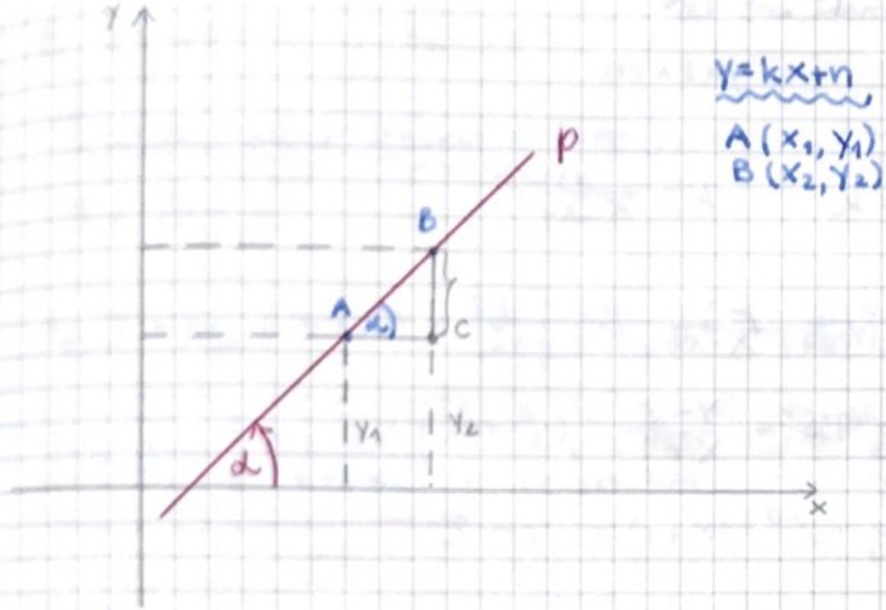
NAKLONSKI KOT PREMICE



$y = kx + n$

$A(x_1, y_1)$
$B(x_2, y_2)$

α - naklonski kot premice, kot med premico in pozitivno smerjo x osi.

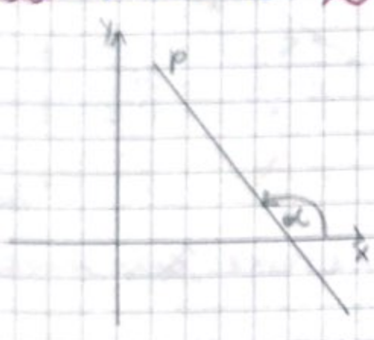
$\triangle ABC$ je pravokoten

$$tg\,\alpha = \frac{\overline{BC}}{\overline{AC}} = \boxed{\frac{y_2 - y_1}{x_2 - x_1} = k}$$ smerni koeficient

$$\boxed{tg\,\alpha = k}$$

- Smerni koeficient premice je enak tangensu naklonskega kota premice.

- $k < 0$ - premica je padajoča - naklonski kot je topi kot



- naklonski kot je lahko od 0° do 180°

10.12.02 - Zapiši enačbo premice, ki gre skozi točko $A(-1, 2)$ in ima naklonski kot $135°$.

$\alpha = 135°$
$A(-1, 2)$

$y = kx + n$

$\operatorname{tg} \alpha = k \qquad k = \frac{y - y_1}{x - x_1}$

$$\operatorname{tg} \alpha = \frac{y - y_1}{x - x_1}$$

$$\operatorname{tg} 135° = \frac{y-2}{x+1} \quad / \cdot (x+1)$$

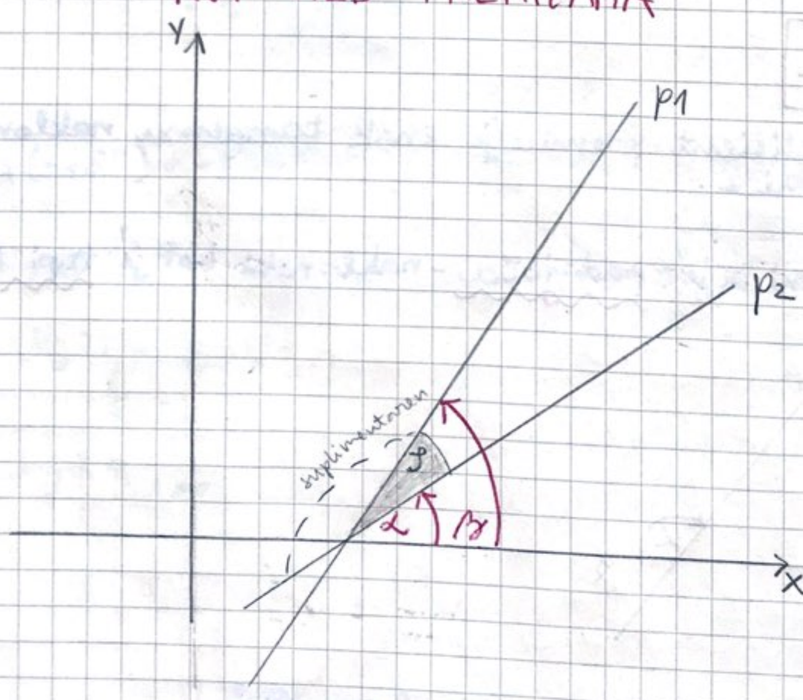
$$\operatorname{tg} 135° \cdot (x+1) = y - 2$$

$$-1\,(x+1) = y - 2$$

$$-x - 1 = y - 2$$

$$y = -x + 1$$

KOT MED PREMICAMA



$p_1: \ y = k_1 x + n_1 \quad , \ k_1 = tg\,\alpha$

$p_2: \ y = k_2 x + n_2 \quad , \ k_2 = tg\,\beta$

φ - kot med premicama (ostri)

$\varphi = \beta - \alpha$

$$tg\,\varphi = tg\,(\beta - \alpha) = \frac{tg\,\beta - tg\,\alpha}{1 + tg\,\beta \cdot tg\,\alpha} = \frac{k_2 - k_1}{1 + k_2 \cdot k_1}$$

$$\boxed{tg\,\varphi = \left| \frac{k_2 - k_1}{1 + k_1 \cdot k_2} \right|}$$

če bo absolutna vrednost - bo tg > 0 in dobimo ostri kot (če bi bil tg < 0 - bi kot rezultat dobili topi kot)

1. zgled:

$p_1: \ 2x - 3y + 5 = 0$ (impl. obl.)

$p_2: \ y = \frac{3}{4}x + 1$ (ekspl. obl.)

$\varphi = ?$ izračunaj kot med njima

$p_1: \ 3y = 2x + 5$

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

$p_2: \ y = \frac{3}{4}x + 1$

$k_1 = \frac{2}{3}$ $\qquad$ $k_2 = \frac{3}{4}$

$$tg\,\varphi = \left| \frac{k_2 - k_1}{1 + k_1 \cdot k_2} \right| = \left| \frac{\frac{3}{4} - \frac{2}{3}}{1 + \frac{2}{3} \cdot \frac{3}{4}} \right| = \left| \frac{\frac{9-8}{12}}{1 + \frac{1}{2}} \right| =$$

$$= \left| \frac{\frac{1}{12}}{\frac{3}{2}} \right| = \left| \frac{2 \cdot 1}{12 \cdot 3} \right| = \frac{1}{18} \Rightarrow \varphi = 3{,}18^\circ = 3^\circ\, 11'$$

2. zgled:

a) premici sta vzporedni $\varphi = 0^\circ$

ŠTEVEC = 0 ⇒ ULI = 0

$$tg\,0^\circ = 0 = \frac{k_2 - k_1}{1 + k_1 \cdot k_2} \Rightarrow k_2 - k_1 = 0$$

$$\boxed{k_2 = k_1}$$

PREMICI STA VZPOREDNI, ČE IMATA ENAK SMERNI KOEFICIENT.

b) premici sta pravokotni $\varphi = 90°$

$tg\, 90° = \infty$

$\frac{k_1 - k_2}{1 + k_1 \cdot k_2} = \infty$ Ulomek ima neskončno vrednost, ko je imenovalec enak nič.

$1 + k_1 \cdot k_2 = 0$

$$\boxed{k_2 = -\frac{1}{k_1}}$$

SMERNI KOEF. JE OBRATEN IN NASPROTEN SMERNEMU KOEF. 1. PREMICE, ČE STA PREMICI PRAVOKOTNI.

Učb. str. 36 / 1, 2, 4, 5 zgledi → DN

Učb. str. 37/5

Kolikšen mora biti koeficient a za premico $ax - 2y + 3 = 0$, da bo pravokotna na premico $4x - 3y - 2 = 0$?

$p_1: ax - 2y + 3 = 0$

$ax + 3 = 2y$

$y = \underbrace{\frac{a}{2}x + \frac{3}{2}}_{k_1}$

$p_2: 4x - 3y - 2 = 0$

$4x - 2 = 3y$

$y = \underbrace{\frac{4}{3}x - \frac{2}{3}}_{k_2}$

$k_2 = -\frac{1}{k_1}$

$\frac{4}{3} = -\frac{1}{\frac{a}{2}} \quad / \cdot (-1)$

$-\frac{4}{3} = \frac{\frac{1}{1}}{\frac{a}{2}} = \frac{2}{a} \quad / \cdot 3a$

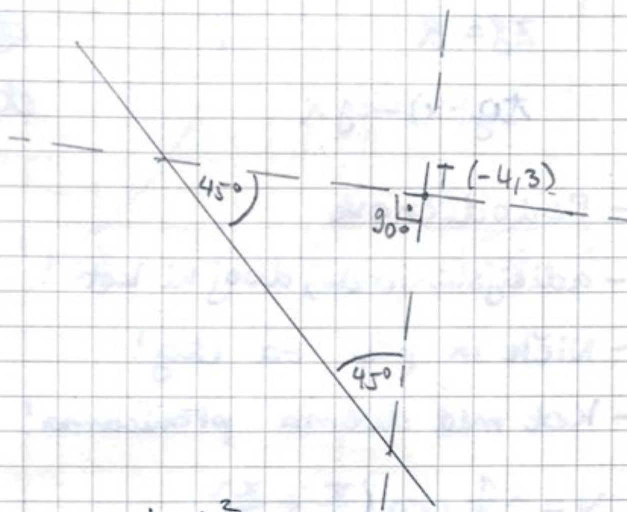
$-4a = 6$

$a = -\frac{6}{4} = -\frac{3}{2}$

Učb. str. 37/4

Napiši enačbi premic, ki gresta skozi točko T(-4,3) in oklepata s premico $2x+3y-7=0$ kot 45°. Kolikšna je medsebojna lega obeh premic?

$T(-4,3)$ $\quad\quad$ $\varphi = 45^\circ$



$p_1: 2x+3y-7=0$

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

$$y = \underbrace{-\frac{2}{3}}_{=k_1}x + \frac{7}{3}$$

$$\operatorname{tg}\varphi = \left|\frac{k_2-k_1}{1+k_1\cdot k_2}\right|$$

$$\operatorname{tg}45^\circ = \left|\frac{k_2+\frac{2}{3}}{1-\frac{2}{3}k_2}\right| = 1$$

1.) $\dfrac{k_2+\frac{2}{3}}{1-\frac{2}{3}k_2} = 1$

$$k_2+\frac{2}{3} = 1-\frac{2}{3}k_2$$

$$\frac{3}{3}k_2+\frac{2}{3}k_2 = \frac{3}{3}-\frac{2}{3}$$

$$\frac{5}{3}k_2 = \frac{1}{3} \quad /\cdot 3$$

$$5k_2 = 1$$

$$k_2 = \frac{1}{5}$$

2.) $\dfrac{k_2+\frac{2}{3}}{1-\frac{2}{3}k_2} = -1$

$$k_2+\frac{2}{3} = -1+\frac{2}{3}k_2$$

$$\frac{3}{3}k_2-\frac{2}{3}k_2 = -\frac{3}{3}-\frac{2}{3}$$

$$\frac{1}{3}k_2 = -\frac{5}{3} \quad /\cdot 3$$

$$k_2 = -5$$

$$k = \frac{y-y_1}{x-x_1} = \frac{1}{5} = \frac{y-3}{x+4} \quad /\cdot 5(x+4)$$

$$x+4 = 5(y-3)$$
$$x+4 = 5y-15$$
$$5y = x+19$$

$$p_1: y = \frac{x}{5}+\frac{19}{5} \quad /\cdot 5$$

$$5y-5x-19=0 \quad /\cdot(-1)$$

$$x-5y+19=0$$

$$k = \frac{y-y_1}{x-x_1} = -5 = \frac{y-3}{x+4}$$

$$-5(x+4) = y-3$$
$$-5x-20 = y-3$$
$$p_2: y = -5x-17$$

$$5x+y+17=0$$

- Premici sta med seboj pravokotni

Učb. str. 37/2

Iz točke $T(2,-3)$ položi pravokotnico in vzporednico na premico $5x+4y-1=0$ ter napiši njuni enačbi.

$T(2,-3)$

- pravokotnica - p_1
- vzporednica - p_2

$p: 5x+4y-1=0$

$4y=-5x+1 \quad /:4$

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

$k=-\frac{5}{4}$

1.) pravokot. - p_1:

$k_1=\frac{4}{5}$

$k_1=\frac{y-y_1}{x-x_1}$

$\frac{4}{5}=\frac{y+3}{x-2} \quad /\cdot 5(x-2)$

$4(x-2)=5(y+3)$

$4x-8=5y+15$

$5y=4x-8-15$

$y=\frac{4}{5}x-\frac{23}{5} \quad /\cdot 5$

$4x-5y-23=0$

2.) vzpor. - p_2:

$k_2=-\frac{5}{4}$

$k_2=\frac{y-y_1}{x-x_1}$

$-\frac{5}{4}=\frac{y+3}{x-2} \quad /\cdot 4(x-2)$

$-5(x-2)=4(y+3)$

$-5x+10=4y+12$

$4y=-5x+\overbrace{10-12}^{-2}$

$y=-\frac{5x}{4}-\frac{2}{4}$

$y=-\frac{5x}{4}-\frac{1}{2} \quad /\cdot 4$

$5x+4y+2=0$