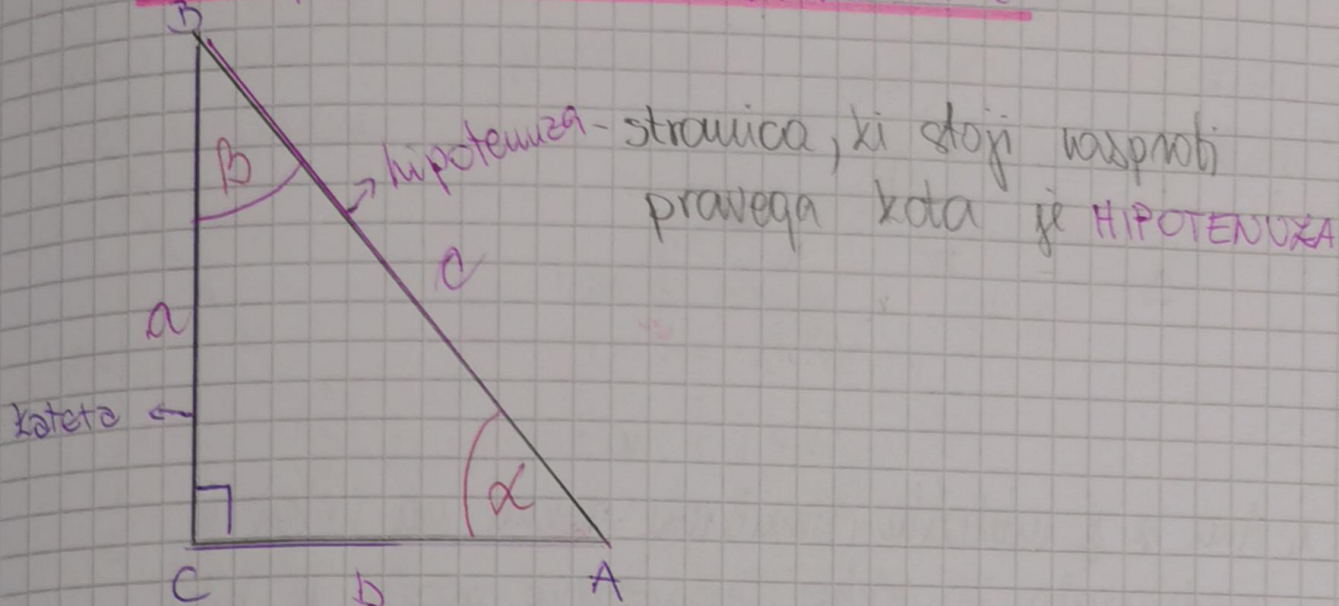


2. KOTNE FUNKCIJE

3 v pravokotnem trikotniku



PITAGOROV IZREK računamo stranice

$$h^2 = k_1^2 + k_2^2$$

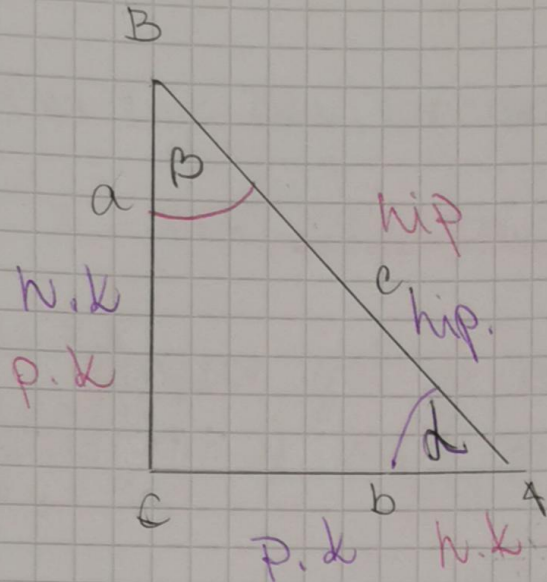
1. $\Rightarrow$ sinus = $\sin$ (razmerje med nasprotno kateto in hipotenuzo)
2. $\Rightarrow$ kosinus = $\cos$ (razmerje med priležno kateto in hipotenuzo)
3. $\Rightarrow$ tangens = $\tan$ (razmerje med nasprotno kateto in priležno kateto)
4. $\Rightarrow$ kotangens = $\cot$ (razmerje med priležno in nasprotno kateto)

$$1. \sin \alpha = \frac{\text{nasprotna kateta}}{\text{hipotenuza}}$$

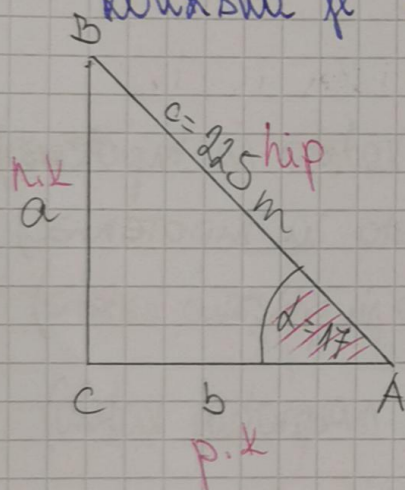
$$2. \cos \alpha = \frac{\text{priležna kateta}}{\text{hipotenuza}}$$

$$3. \tan \alpha = \frac{\text{nasprotna kateta}}{\text{priležna kateta}}$$

$$4. \cot \alpha = \frac{\text{priležna kateta}}{\text{nasprotna kateta}}$$



1. Ana se je udeležila smučarske tekme na kateri je sodelovalo 7 deklet. Tekmovalna proga je bila dolga 2250 m na kribu s 17° naklonom. Kolikšna je bila sprememba v nadmorski višini?



$$\sin \alpha = \frac{\text{n.k.}}{\text{hip.}}$$

$$\sin 17^\circ = \frac{a}{2250}$$

$$0,29 = \frac{a}{2250} / \cdot 2250$$

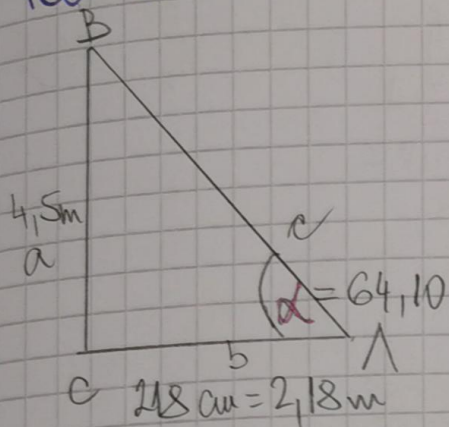
$$0,29 \cdot 2250 = a$$

$$a = 652,5 \text{ m}$$

Odg: Sprememba nadmorske višine je 652,5 m.

2. Fantič bi rad k dekletovemu oknu na 4,5 m priplezal po lestvi, ki je 218 cm oddaljena od stene. Kako dolgo lestev potrebuje?

Pod kolikšnim kotom glede na tla je priložil lestev?



$$\tan \alpha = \frac{n.k}{p.k}$$

$$\tan \alpha = \frac{4,5}{2,18}$$

$$\tan \alpha = 2,06$$

$$\alpha = \tan^{-1} 2,06 = 64,10$$

|| kalkulator: ali SHIFT ali 2NDF nato Tan in st.

Primer: SHIFT → TAN 2,06 = 64,10

$$\cos \alpha = \frac{p.k}{h}$$

$$\cos \alpha = \frac{2,18}{c}$$

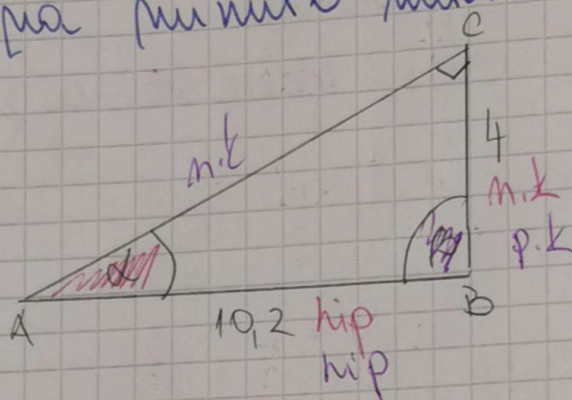
$$0,44 = \frac{2,18}{c} \cdot c$$

$$0,44 \cdot c = 2,18$$

$$c = \frac{2,18}{0,44}$$

$$c = 4,95 \text{ m}$$

- 30) Na skici je pravokotni trikotnik. Izračunajte velikosti kotov α in β . Rezultat zapišite na minuto merilno.



α

$$\sin \alpha = \frac{n.k.}{hip}$$

$$\sin \alpha = \frac{4}{10,2}$$

$$\sin \alpha = 0,39$$

$$\alpha = \sin^{-1} 0,39$$

$$\alpha = 22,95^\circ$$

β

$$\cos \beta = \frac{p.k.}{n.k.}$$

$$\cos \beta = \frac{4}{10,2}$$

$$\cos \beta = 0,39$$

$$\beta = \cos^{-1} 0,39$$

$$\beta = 67,05^\circ$$

POVEZAVE MED KOTNIMI FUNKCIJAMI

$$\sin^2 \alpha + \cos^2 \alpha = 1$$

$$\tan \alpha + \cot \alpha = 1$$

$$\cot \alpha = \frac{\cos \alpha}{\sin \alpha}$$

$$\tan \alpha = \frac{\sin \alpha}{\cos \alpha}$$

$$1 + \tan^2 \alpha = \frac{1}{\cos^2 \alpha}$$

$$1 + \cos^2 \alpha = \frac{1}{\sin^2 \alpha}$$

11) Vypočítajte numerickú hodnotu $\cos \alpha$, keď je $\sin \alpha = \frac{2}{5}$ a je α ostrý uhol.

$$\sin \alpha = \frac{2}{5}$$

$$\cos \alpha = \frac{\sqrt{21}}{5}$$

$$\sin^2 \alpha + \cos^2 \alpha = 1$$

$$\left(\frac{2}{5}\right)^2 + \cos^2 \alpha = 1$$

$$\frac{4}{25} + \cos^2 \alpha = 1$$

$$\cos^2 \alpha = 1 - \frac{4}{25}$$

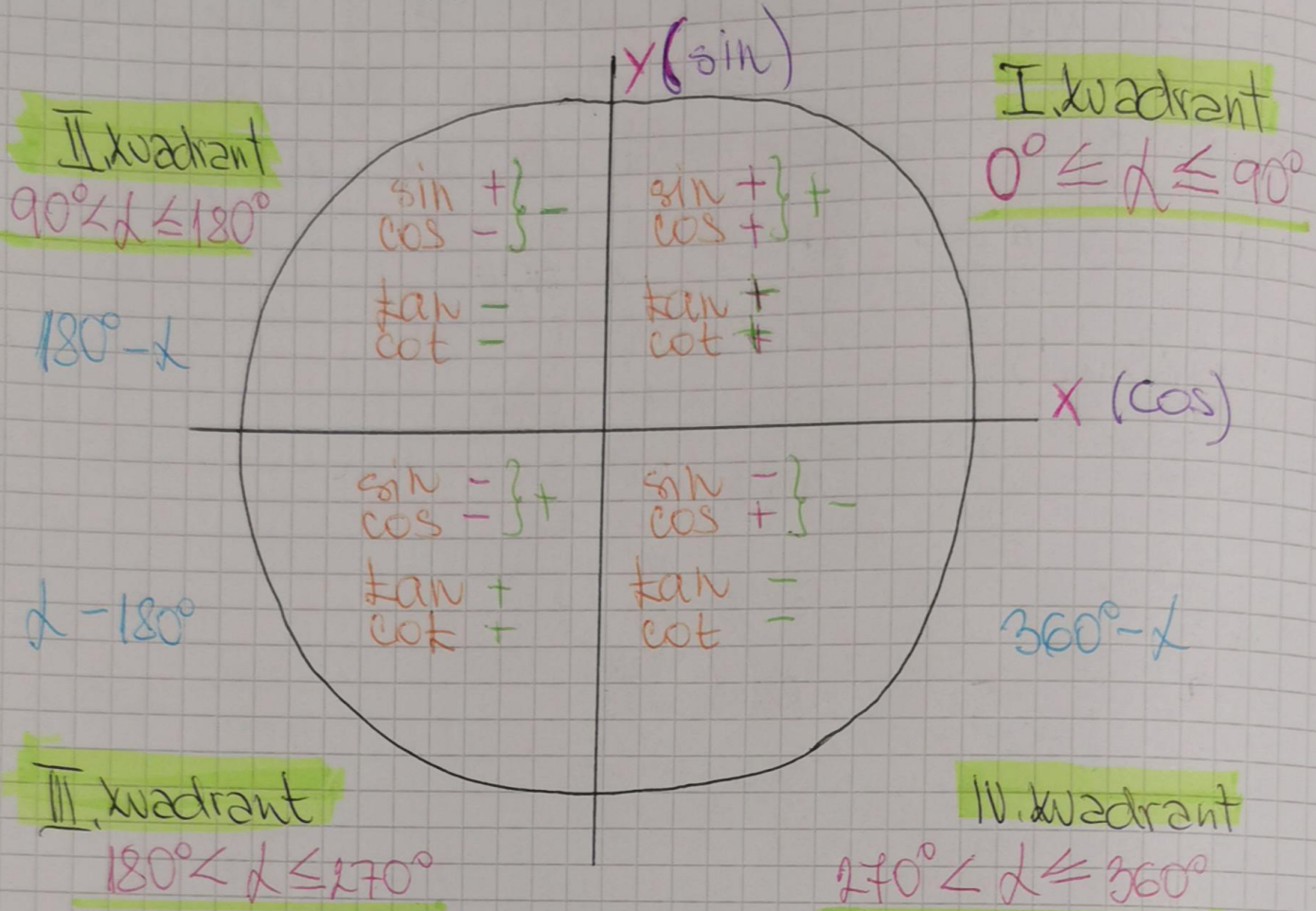
$$\cos^2 \alpha = \frac{25}{25} - \frac{4}{25}$$

$$\cos^2 \alpha = \frac{21}{25} \quad | \sqrt{}$$

$$\cos \alpha = \sqrt{\frac{21}{25}}$$

$$\cos \alpha = \frac{\sqrt{21}}{5}$$

ENOTSKA KROENICA



LOTNE FUNKCIJE OSTRIH KOTOV

	0°	30°	45°	60°	90°
$\sin \alpha$	0	$\frac{1}{2}$	$\frac{\sqrt{2}}{2}$	$\frac{\sqrt{3}}{2}$	1
$\cos \alpha$	1	$\frac{\sqrt{3}}{2}$	$\frac{\sqrt{2}}{2}$	$\frac{1}{2}$	0

π (pri kotih) = 180°

① Izračunajte vrednost funkcije $\cos x$, če je $\sin x = \frac{5}{13}$ in je x topi kot.

$$\sin x = \frac{5}{13}$$

x -topi kot $= 90^\circ < x < 180^\circ$ II. kvadrant

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

$$\left(\frac{5}{13}\right)^2 + \cos^2 x = 1$$

$$\frac{25}{169} + \cos^2 x = 1$$

$$\cos^2 x = 1 - \frac{25}{169}$$

$$\cos^2 x = \frac{169}{169} - \frac{25}{169}$$

$$\cos^2 x = \frac{144}{169}$$

$$\cos x = \sqrt{\frac{144}{169}} = -\frac{12}{13}$$

Ker je II. kvadrant, kjer je $\cos =$ (negativen), je tudi rezultat negativen.

② Izračunajte vrednost $\sin x$ in $\cos x$, če je $\tan x = -2$ in $\frac{\pi}{2} < x < \pi$

$\tan x = -2$ $\pi = 180^\circ$ $\frac{\pi}{2} = 90^\circ$, II. kvadrant
 $90^\circ < x < 180^\circ$

$$\frac{\pi}{2} < x < \pi$$

$$\sin x = \underline{\hspace{2cm}}$$

$$\cos x = \underline{\hspace{2cm}}$$

$$a) 1 + \tan^2 x = \frac{1}{\cos^2 x}$$

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

$$1 + 4 = \frac{1}{\cos^2 x}$$

$$\frac{5}{1} \times \frac{1}{\cos^2 x}$$

$$\frac{5}{\cos^2 x}$$

$$5 \cdot \cos^2 x = 1 \quad | :5$$

$$\cos^2 x = \frac{1}{5} \quad | \sqrt{}$$

$$\cos x = \sqrt{\frac{1}{5}} = \frac{\sqrt{1}}{\sqrt{5}}$$

* V imenovalcu NIKOLI ne
smemo biti korena

$$\cos x = \frac{1 \cdot \sqrt{5}}{\sqrt{5} \cdot \sqrt{5}} = \frac{1}{5}$$

$$\cos x = -\frac{\sqrt{5}}{5}$$

VEDNO PAŽI
NA PREDZNAK

$$b) \tan x = \frac{\sin x}{\cos x}$$

$$-2 = \frac{\sin x}{-\frac{\sqrt{5}}{5}} = \frac{\sin x}{1} \cdot \frac{5}{-\sqrt{5}}$$

$$\frac{-2}{1} = \frac{5 \sin x}{\sqrt{5}}$$

$$-5 \sin x = -2 \cdot \sqrt{5} \quad | :(-5)$$

$$\sin x = \frac{2\sqrt{5}}{5}$$

ADICIJSKI IZREKI

$$\sin(x + \beta) = \sin x \cos \beta + \cos x \sin \beta$$

$$\sin(x - \beta) = \sin x \cos \beta - \cos x \sin \beta$$

$$\cos(x + \beta) = \cos x \cos \beta - \sin x \sin \beta$$

$$\cos(x - \beta) = \cos x \cos \beta + \sin x \sin \beta$$

⑤ Proenostawii izraz:

$$\cos\left(x - \frac{\pi}{2}\right) \text{ in } 2\sin(\pi + x)$$

$$\cos\left(x - \frac{\pi}{2}\right) + 2\sin(\pi + x)$$

$$\cos(x - 90^\circ) + 2\sin(180^\circ + x)$$

$$= \cos x \cdot \cos 90 + \sin x \cdot \sin 90 +$$

$$2 \cdot (\sin 180 \cdot \cos x + \cos 180 \cdot \sin x)$$

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

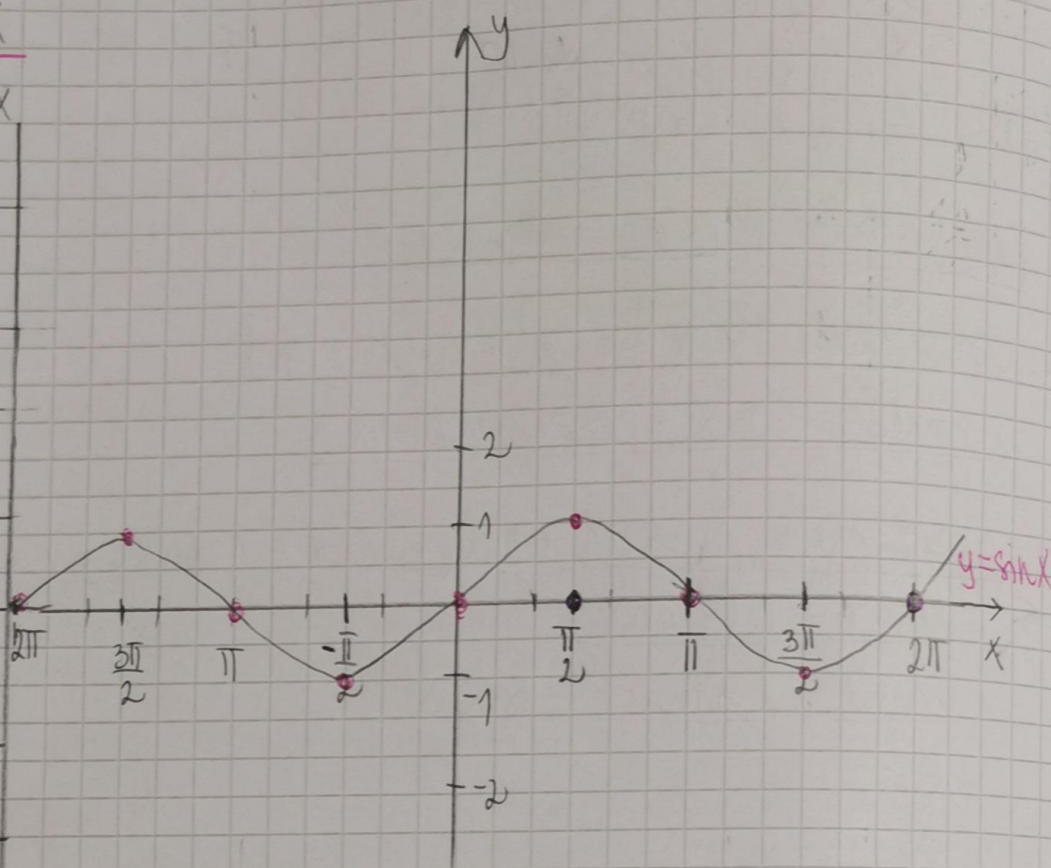
$$= \sin x + 2 \cdot (-\sin x) =$$

$$= \sin x - 2 \sin x = -\sin x$$

GRAF FUNKCIE SINUS a KOSINUS

$$f(x) = \sin x$$

RADIANY	x	y = sin x
360°	2π	0
270°	3π/2	1
180°	π	0
90°	π/2	1
0°	0	0
-90°	-π/2	-1
-180°	-π	0
-270°	-3π/2	1
-360°	-2π	0

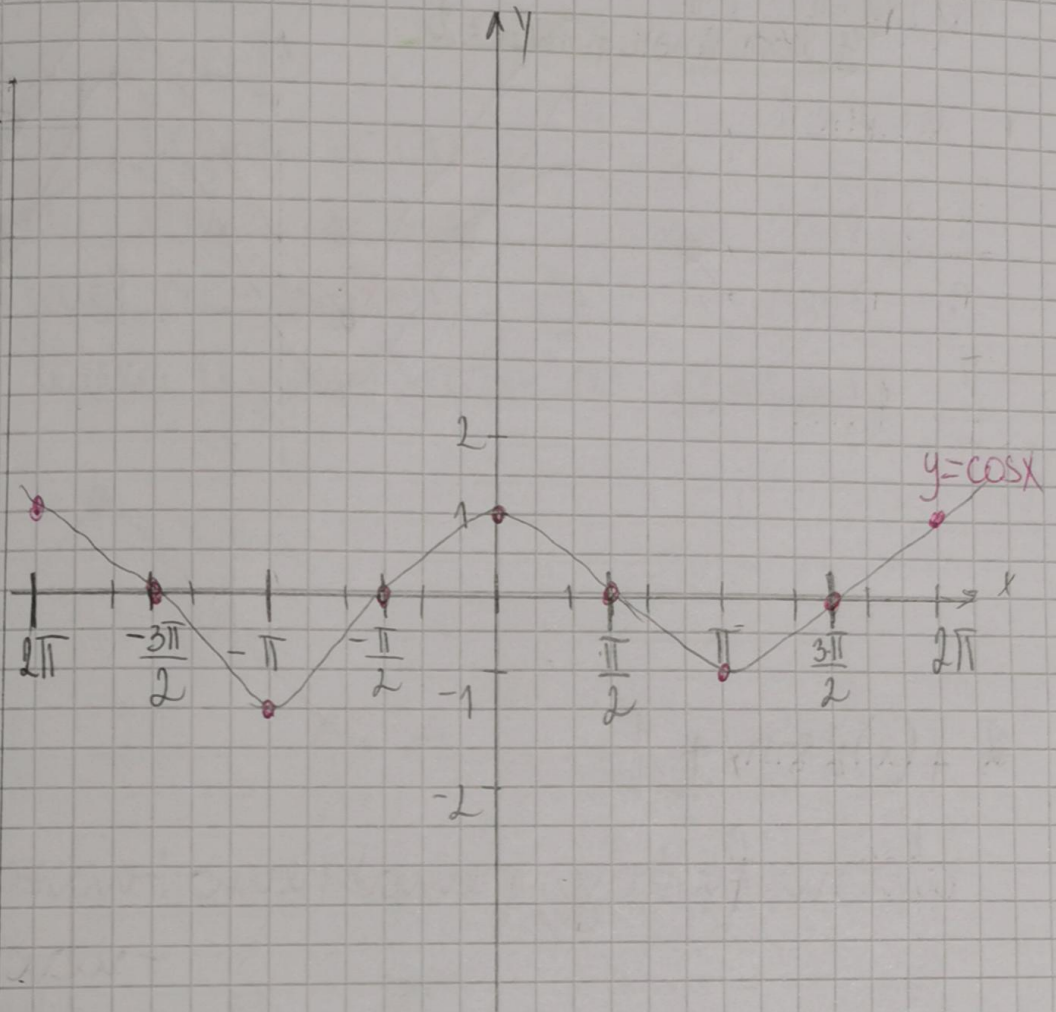


Točky povezuj prostočiarne

π má na 3cm

$$f(x) = \cos x$$

DEGREES	RADIANS	x	y = cos x
360°		2π	1
270°		3π/2	0
180°		π	-1
90°		π/2	0
0°		0	1
-90°		-π/2	0
-180°		-π	-1
-270°		-3π/2	0
-360°		-2π	1

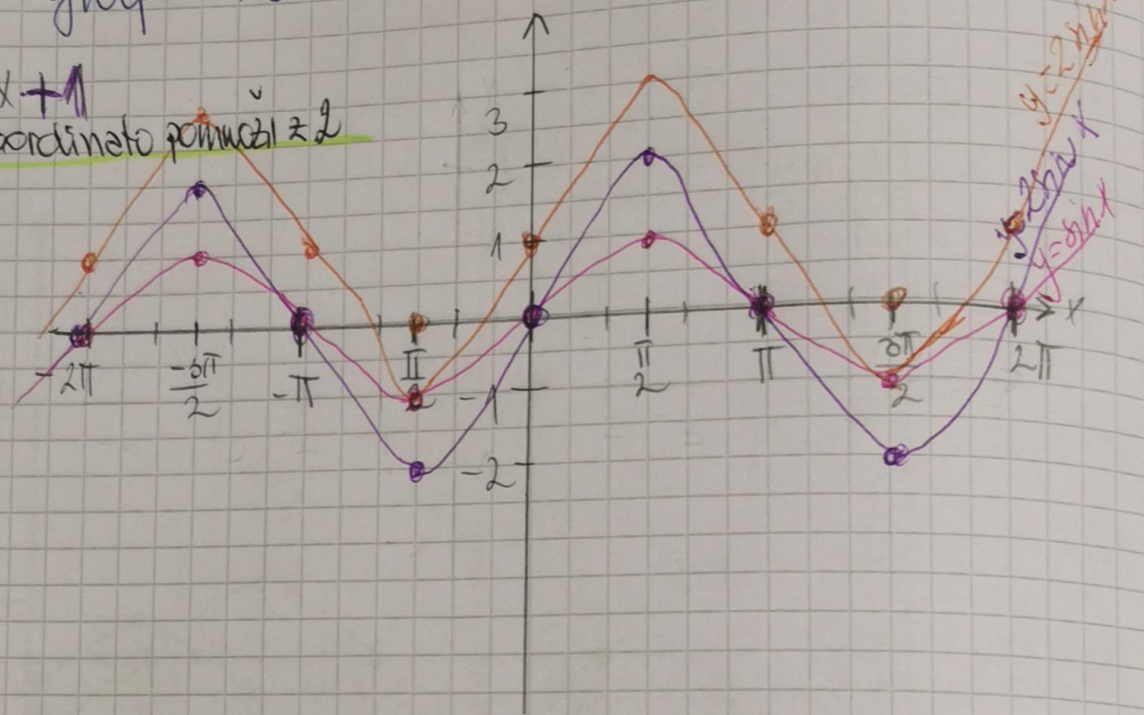


Najš graf $f(x) = 2 \sin x + 1$

$f(x) = 2 \sin x + 1$
 y koordinato pomakni ± 2

$y = \sin x$

x	$y = \sin x$
0	0 (0;2)
$\frac{\pi}{2}$	1 (1;2)



* $f(x) = 2 \sin x + 1$

celotno funkcijo premaknemo: navzgor +
 - navzdol -