

PRIPRAVA NA KONTROLNO NALOGO

6. Reši enačbo:

- a) $\cos^2 x - \sqrt{2} \cos x = 0$
 $\cos x(\cos x - \sqrt{2}) = 0$
 $\cos x = 0 \vee \cos x - \sqrt{2} = 0$
 1.) $\cos x = 0 \rightarrow x_1 = \frac{\pi}{2} + k\pi; \quad k \in \mathbb{Z}$
 2.) $\cos x - \sqrt{2} = 0 \rightarrow \cos x = \sqrt{2}$ Ni rešitve.
- b) $2 \sin^2 2x - 3 \sin 2x - 2 = 0$ nova neznanka $\sin 2x = t$
 $2t^2 - 3t - 2 = 0$
 $(2t + 1)(t - 2) = 0$
 $t_1 = -\frac{1}{2} \rightarrow \sin 2x = -\frac{1}{2}$
 $x_1 = -\frac{\pi}{12} + k\pi, x_2 = \frac{7\pi}{12} + k\pi; \quad k \in \mathbb{Z}$
 $t_2 = 2 \rightarrow \sin 2x = 2$ Ni rešitve.
- c) $3 \sin x \cos x - \sin^2 x = -2$
 $3 \sin x \cos x - \sin^2 x + 2 \cos^2 x + 2 \sin^2 x = 0 \mid : \cos^2 x, \cos x \neq 0$
 $2 \tan^2 x + 3 \tan x + 2 = 0$ nova neznanka $\tan x = t$
 $t^2 + 3t + 2 = 0$
 $(t + 2)(t + 1) = 0$
 $t_1 = -2 \rightarrow \tan x = -2$
 $x_1 = -\arctan 2 + k\pi; \quad k \in \mathbb{Z}$
 $t_2 = -1 \rightarrow \tan x = -1$
 $x_2 = -\frac{\pi}{4} + k\pi$
- d) $3 \sin x - 6 \cos x = 2$
 $3 \cdot 2 \sin \frac{x}{2} \cos \frac{x}{2} - 6(\cos^2 \frac{x}{2} - \sin^2 \frac{x}{2}) + 2(\cos^2 \frac{x}{2} + \sin^2 \frac{x}{2}) = 0$
 $6 \sin \frac{x}{2} \cos \frac{x}{2} - 8 \cos^2 \frac{x}{2} + 4 \sin^2 \frac{x}{2} = 0 \mid : 2 \cos^2 \frac{x}{2}, \cos \frac{x}{2} \neq 0$
 $2 \tan^2 \frac{x}{2} + 3 \tan \frac{x}{2} - 4 = 0$ nova neznanka $\tan \frac{x}{2} = t$
 $2t^2 + 3t - 4 = 0$
 $D = b^2 - 4ac \rightarrow D = 41$
 $t_{1,2} = \frac{-b \pm \sqrt{D}}{2a} \rightarrow t_{1,2} = \frac{-3 \pm \sqrt{41}}{4}$
 $\tan \frac{x}{2} = \frac{-3 \pm \sqrt{41}}{4} \rightarrow x_{1,2} = \arctan \frac{-3 \pm \sqrt{41}}{4} + 2k\pi; \quad k \in \mathbb{Z}$
- e) $\cos 5x - \cos 3x = \sin x$
 $-2 \sin 4x \sin x - \sin x = 0 \mid : (-1)$
 $\sin x(2 \sin x - 1) = 0$
 $\sin x = 0 \rightarrow x_1 = k\pi; \quad k \in \mathbb{Z}$
 $2 \sin 4x = -1 \rightarrow \sin 4x = -\frac{1}{2} \rightarrow x_2 = -\frac{\pi}{24} + \frac{k\pi}{2}, x_3 = \frac{7\pi}{24} + \frac{k\pi}{2}$

$$\begin{aligned}
\text{f) } & 3^{2 \cos x - \cot x} = 1 \\
& 2 \cos x - \cot x = 0 \\
& 2 \cos x - \frac{\cos x}{\sin x} = 0 \quad | : \sin x, \sin x \neq 0 \\
& 2 \cos x \sin x - \cos x = 0 \quad \cos x(2 \sin x - 1) = 0 \quad \cos x = 0 \rightarrow x_1 = \frac{\pi}{2} + k\pi; \quad k \in \mathbb{Z} \\
& 2 \sin x = 1 \rightarrow \sin x = \frac{1}{2} \rightarrow x_2 = \frac{\pi}{6} + 2k\pi, x_3 = \frac{5\pi}{6} + 2k\pi
\end{aligned}$$

$$\begin{aligned}
\text{g) } & \cos 6x \cos 4x = \cos 3x \cos 5x \\
& \frac{1}{2}[\cos 10x + \cos 2x] = \frac{1}{2}[\cos 8x + \cos 2x] \quad | : 2 \\
& \cos 10x + \cos 2x - \cos 8x - \cos 2x = 0 \\
& \cos 10x - \cos 8x = 0 \\
& -2 \sin 9x \sin x = 0 \\
& \sin x = 0 \rightarrow x_1 = k\pi; \quad k \in \mathbb{Z} \\
& \sin 9x = 0 \rightarrow x_2 = \frac{k\pi}{9}
\end{aligned}$$

7. Izračunaj:

$$\text{a) } \arcsin(\sin 1035^\circ) = \arcsin(\sin 315^\circ) = \arcsin(-\sin 45^\circ) = \frac{\pi}{4}$$

$$\text{b) } \arccos(\cos(\frac{14\pi}{3})) = \arccos(\cos(\frac{2\pi}{3})) = \frac{2\pi}{3}$$

$$\text{c) } \arcsin(\cos(-\frac{\pi}{5})) = \varphi \quad \cos x \text{ je soda funkcija}$$

$$\arcsin(\cos \frac{\pi}{5}) = \varphi$$

$$\sin(\arcsin(\cos \frac{\pi}{5})) = \sin \varphi$$

$$\cos \frac{\pi}{5} = \sin \varphi$$

$$\cos \frac{\pi}{5} = \cos(\frac{\pi}{2} - \varphi)$$

$$\frac{\pi}{5} = \frac{\pi}{2} - \varphi$$

$$\varphi = \frac{3\pi}{10}$$

$$\text{d) } \arctan(\cos 17) = -0,2685 \quad \text{Izračunaj s pomočjo kalkulatorja.}$$

$$\text{e) } \sin(\arccos(\frac{2\sqrt{2}}{3})) = x$$

$$\arccos(\frac{2\sqrt{2}}{3}) = \varphi \rightarrow \sin \varphi = x$$

$$\cos(\arccos(\frac{2\sqrt{2}}{3})) = \cos \varphi \rightarrow \cos \varphi = \frac{2\sqrt{2}}{3}$$

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

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

$$x^2 = \frac{1}{9}$$

$$x = \frac{1}{3} \quad \text{Ker je } \varphi \in (0, \pi).$$

8. Nariši graf funkcij $f(x) =$:

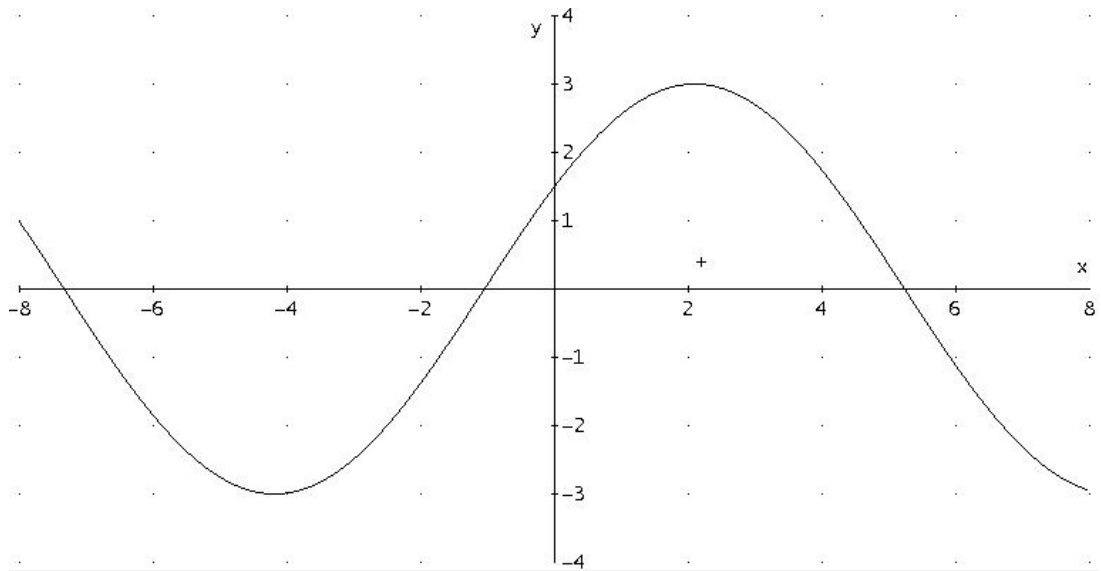
a) $3 \sin\left(\frac{x}{2} + \frac{\pi}{6}\right) = 3 \sin\left(\frac{1}{2}\left(x + \frac{\pi}{3}\right)\right)$

N: $\sin\left(\left(\frac{x}{2} + \frac{\pi}{6}\right)\right) = 0$

$x = -\frac{\pi}{3} + 2k\pi; \quad k \in \mathbb{Z}$

M: $\sin\left(\left(\frac{x}{2} + \frac{\pi}{6}\right)\right) = 1$

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



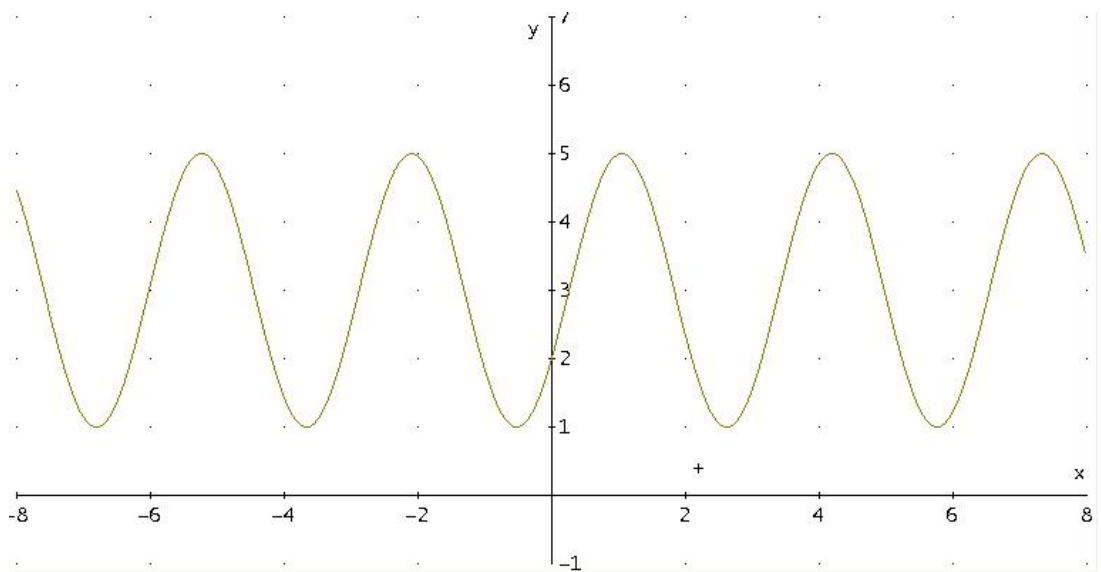
b) $3 - 2 \cos\left(2x + \frac{\pi}{3}\right)$

N: $\cos\left(2x + \frac{\pi}{3}\right) = 0$

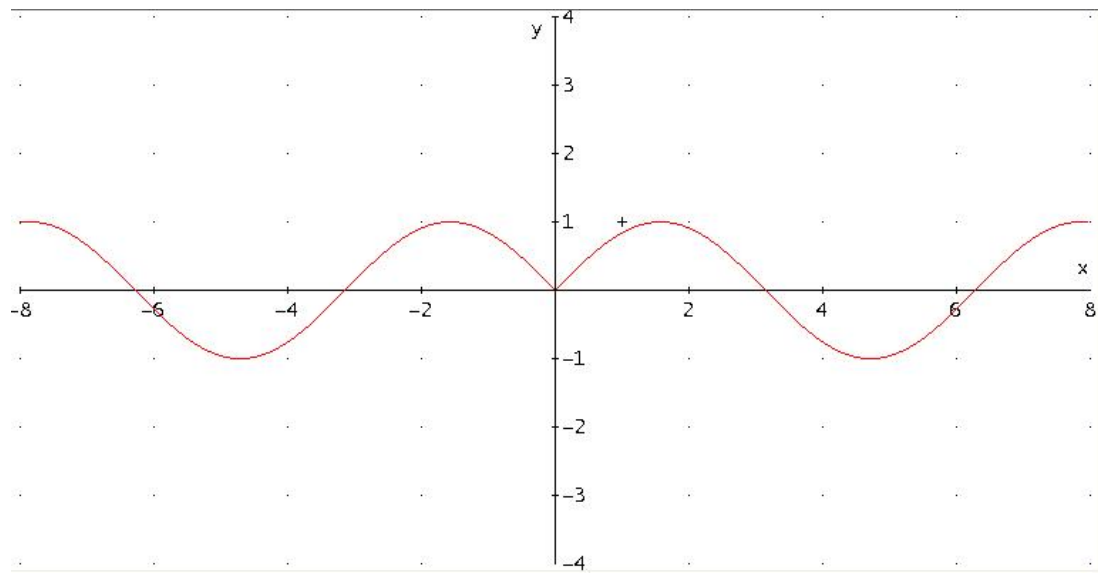
$x = \frac{\pi}{12} + \frac{k\pi}{2}; \quad k \in \mathbb{Z}$

M: $\cos\left(2x + \frac{\pi}{3}\right) = 1$

$x = -\frac{\pi}{6} + \frac{k\pi}{2}$

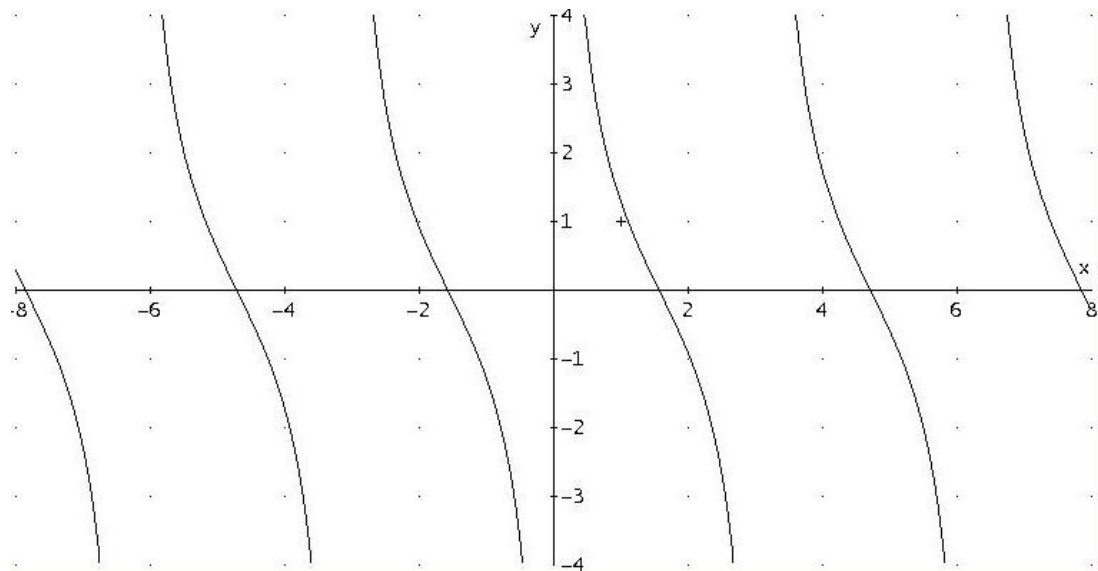


$$c) \sin|x| = \begin{cases} \sin x; & x \geq 0 \\ \sin(-x); & x < 0 \end{cases}$$



$$d) -2 \tan\left(x - \frac{\pi}{2}\right)$$

N: $\sin\left(x - \frac{\pi}{2}\right) = 0$ P: $\cos\left(x - \frac{\pi}{2}\right) = 0$
 $x = \frac{\pi}{2} + k\pi; \quad k \in \mathbb{Z}$ $x = \pi + k\pi$



e) $2 \arctan x + \frac{\pi}{3}$

