

Zadatak 5. Prikaži grafički funkcije:

1) $f(x) = \frac{1}{2} \operatorname{tg} 2x$;

2) $f(x) = -\operatorname{tg} \frac{x}{2}$;

3) $f(x) = 2 \operatorname{tg} \left(\frac{x}{2} - \frac{2\pi}{3} \right)$;

4) $f(x) = \operatorname{tg} \frac{\pi - x}{3}$.

Rješenje. 1) $f(x) = \frac{1}{2} \operatorname{tg} 2x$;

vertikalne asimptote:

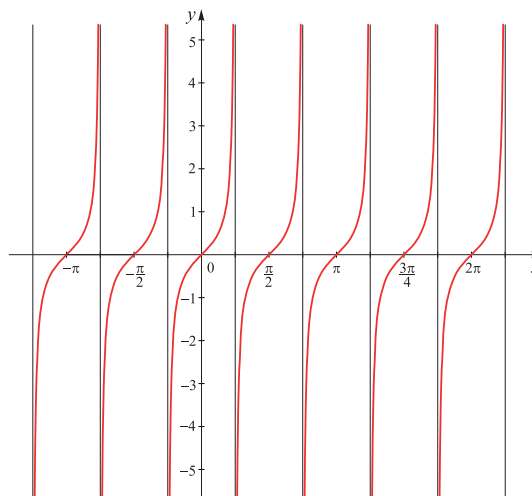
$$\begin{aligned} \operatorname{tg} 2x &= \pm\infty \\ 2x &= \frac{\pi}{2} + k\pi \quad / : 2 \\ x &= \frac{\pi}{4} + \frac{k\pi}{2} \end{aligned}$$

nultočke:

$$\begin{aligned} \operatorname{tg} 2x &= 0 \\ 2x &= k\pi \quad / : 2 \\ x &= \frac{k\pi}{2} \end{aligned}$$

period:

$$P = \frac{\pi}{2}$$



2) $f(x) = -\operatorname{tg} \frac{x}{2}$;

vertikalne asimptote:

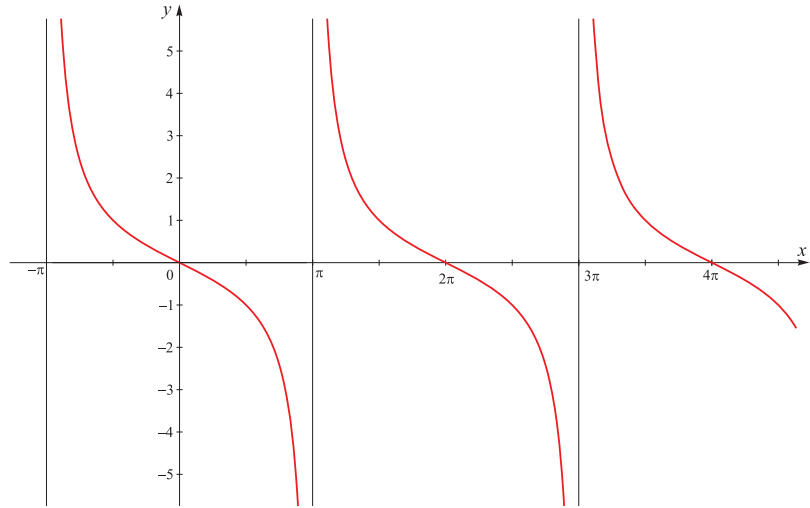
$$\begin{aligned} \operatorname{tg} \frac{x}{2} &= \pm\infty \\ \frac{x}{2} &= \frac{\pi}{2} + k\pi \quad / \cdot 2 \\ x &= \pi + 2k\pi \end{aligned}$$

nultočke:

$$\begin{aligned} \operatorname{tg} \frac{x}{2} &= 0 \\ \frac{x}{2} &= k\pi \quad / \cdot 2 \\ x &= 2k\pi \end{aligned}$$

period:

$$P = \frac{\pi}{\frac{1}{2}} = 2\pi$$



$$3) f(x) = 2 \operatorname{tg}\left(\frac{x}{2} - \frac{2\pi}{3}\right) = 2 \operatorname{tg}\frac{1}{2}\left(x - \frac{\pi}{3}\right);$$

vertikalne asimptote:

$$\operatorname{tg}\frac{1}{2}\left(x - \frac{\pi}{3}\right) = \pm\infty$$

$$\frac{1}{2}\left(x - \frac{\pi}{3}\right) = \frac{\pi}{2} + k\pi \quad / \cdot 2$$

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

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

nultočke:

$$\operatorname{tg}\frac{1}{2}\left(x - \frac{\pi}{3}\right) = 0$$

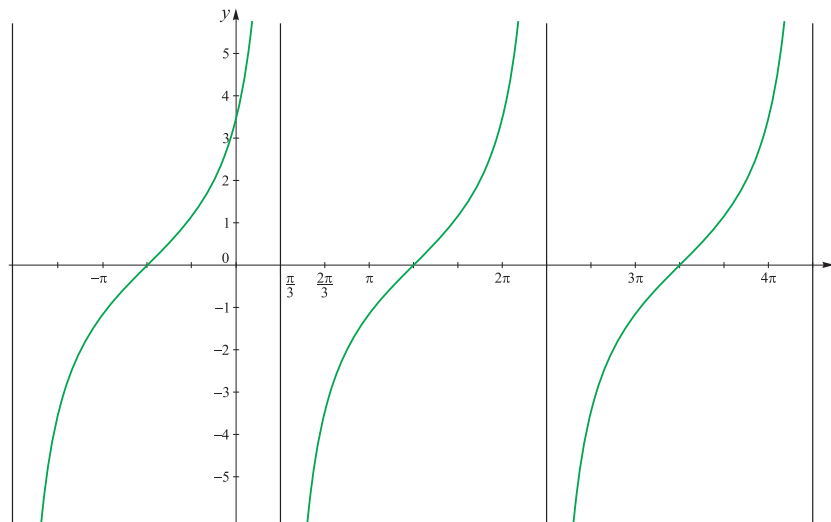
$$\frac{1}{2}\left(x - \frac{\pi}{3}\right) = k\pi \quad / \cdot 2$$

$$x - \frac{\pi}{3} = 2k\pi$$

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

period:

$$P = \frac{\pi}{\frac{1}{2}} = 2\pi$$



$$4) f(x) = \operatorname{tg} \frac{\pi - x}{3} = -\operatorname{tg} \frac{1}{3}(x - \pi)$$

vertikalne asimptote:

$$\operatorname{tg} \frac{1}{3}(x - \pi) = \pm \infty$$

$$\frac{1}{3}(x - \pi) = \frac{\pi}{2} + k\pi \quad / \cdot 3$$

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

$$x = \frac{5\pi}{2} + 3k\pi$$

nultočke:

$$\operatorname{tg} \frac{1}{3}(x - \pi) = 0$$

$$\frac{1}{3}(x - \pi) = k\pi \quad / \cdot 3$$

$$x - \pi = 3k\pi$$

$$x = \pi + 3k\pi$$

period:

$$P = \frac{\pi}{\frac{1}{3}} = 3\pi$$

