

**Zadatak 18.** Grafički prikaži sljedeće funkcije:

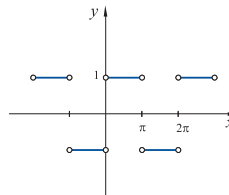
- 1)  $f(x) = \frac{\sin x}{|\sin x|}$ ;
- 2)  $f(x) = \sqrt{1 - \sin^2 2x}$ ;
- 3)  $f(x) = \operatorname{tg}(-2x) \cdot \operatorname{ctg} 2x$ .
- 4)  $f(x) = \sin^2 \sqrt{\operatorname{tg} x} + \cos^2 \sqrt{\operatorname{tg} x}$ .

**Rješenje.**

1) Uvjet:  $\sin x \neq 0 \implies x \neq k\pi, k \in \mathbf{Z}$ ;

$$\sin x \in \langle 2k\pi, \pi + 2k\pi \rangle, k \in \mathbf{Z} \implies f(x) = \frac{\sin x}{\sin x} = 1;$$

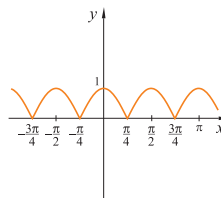
$$\sin x \in \langle \pi + 2k\pi, 2\pi + 2k\pi \rangle, k \in \mathbf{Z} \implies f(x) = \frac{\sin x}{-\sin x} = -1;$$



2)  $f(x) = \sqrt{1 - \sin^2(2x)} = \sqrt{\cos^2(2x)} = |\cos(2x)|$ ;

$$2x \in \left[-\frac{\pi}{2} + 2k\pi, \frac{\pi}{2} + 2k\pi\right], \text{ tj. } x \in \left[-\frac{\pi}{4} + k\pi, \frac{\pi}{4} + k\pi\right] \implies f(x) = \cos(2x);$$

$$2x \in \left[\frac{\pi}{2} + 2k\pi, \frac{3\pi}{2} + 2k\pi\right], \text{ tj. } x \in \left[\frac{\pi}{4} + k\pi, \frac{3\pi}{4} + k\pi\right] \implies f(x) = -\cos(2x);$$

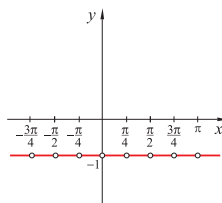


3) Uvjeti:

$$\sin x \neq 0 \implies 2x \neq k\pi, x \neq \frac{k\pi}{2};$$

$$\cos x \neq 0 \implies 2x \neq \frac{\pi}{2} + k\pi, x \neq \frac{\pi}{4} + \frac{k\pi}{2};$$

$$f(x) = \operatorname{tg}(-2x) \cdot \operatorname{ctg} 2x = \frac{\sin(-2x)}{\cos(-2x)} \cdot \frac{\cos(2x)}{\sin(2x)} = \frac{-\sin(2x)}{\cos(2x)} \cdot \frac{\cos(2x)}{\sin(2x)} = -1;$$



4)  $f(x) = \sin^2 \sqrt{\operatorname{tg} x} + \cos^2 \sqrt{\operatorname{tg} x} = 1$  za sve  $x$  za koje je funkcija definirana, tj. za koje vrijedi:

$$\operatorname{tg} x \geq 0 \implies x \in \left[ k\pi, \frac{\pi}{2} + k\pi \right);$$

