Zadatak 4. Koliko rješenja ima jednadžba:

1) $\log_2 |x| = 2 \sin |\pi x|$;

2) $|\log_{\frac{1}{2}} x| = 2 |\sin 2x|$;

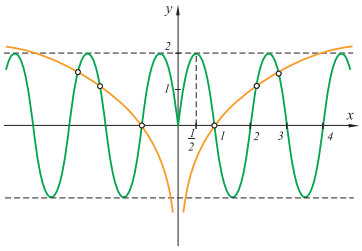
3) $\log_{\frac{1}{3}} |x| + 3 \left|\sin\left(\frac{\pi x}{3}\right)\right| = 0$;

4) $\cos x = 2^{-|x|}$?

Rješenje. **1)** $\log_2 |x| = 2 \sin |\pi x|$

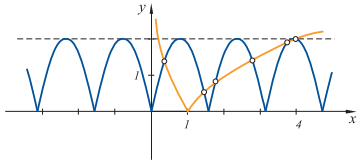
$f(x) = \log_2 |x|$ definirana $\forall x \in \mathbf{R}$

$g(x) = 2 \sin |\pi x|$ amplituda je $2 \implies g(x) \in [-2, 2]$, period $P = \frac{2\pi}{\pi} = 2$;



6 rješenja (vidi sliku!)

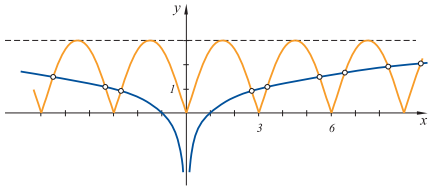
2) 6 rješenja (vidi sliku!)



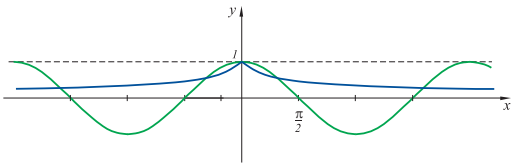
3) $\log_{\frac{1}{3}} |x| + 3 \left|\sin\left(\frac{\pi x}{3}\right)\right| = 0$

$$\log_{\frac{1}{3}} |x| = -3 \left|\sin\left(\frac{\pi x}{3}\right)\right|$$
$$-\frac{1}{3} \log_{\frac{1}{3}} |x| = \left|\sin\left(\frac{\pi x}{3}\right)\right|$$
$$-\frac{1}{3} \frac{\log_3 |x|}{\log_3 \frac{1}{3}} = \left|\sin\left(\frac{\pi x}{3}\right)\right|$$
$$\frac{1}{3} \log_3 |x| = \left|\sin\left(\frac{\pi x}{3}\right)\right|$$

34 rješenja (vidi sliku!)



4) beskonačno mnogo rješenja (vidi sliku!)


y
1
x
π/2