Zadatak 5.

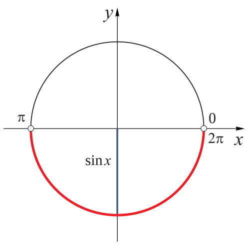
1) $\sin^2 x + 2\sin x < 0$;
2) $\cos^2 x - 2\cos x > 0$;
3) $2\cos^2 x + \cos x < 1$;
4) $2\cos^2 x + 5\cos x + 2 \geqslant 0$;
5) $2\sin^4 x - 3\sin^2 x + 1 > 0$;
6) $6\sin^2 x - \sin x \cdot \cos x - \cos^2 x > 2$.

Rješenje.

1) $\sin^2 x + 2\sin x < 0$,

$$\sin x\,\underbrace{(\sin x + 2)}_{>0} < 0 \implies \sin x < 0;$$

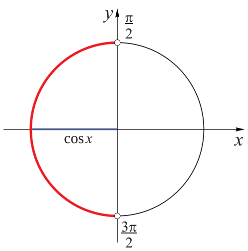
$$\pi + 2k\pi < x < 2\pi + 2k\pi,\ k \in \mathbf{Z};$$
$$(2k+1)\pi < x < 2(k+1)\pi,\ k \in \mathbf{Z}.$$



2) $\cos^2 x - 2\cos x > 0$,

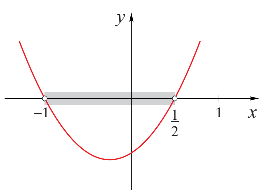
$$\cos x\,\underbrace{(\cos x - 2)}_{<0} > 0 \implies \cos x < 0;$$

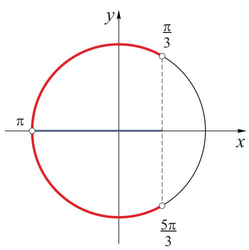
$$\frac{\pi}{2} + 2k\pi < x < \frac{3\pi}{2} + 2k\pi,\ k \in \mathbf{Z}.$$



3) $2\cos^2 x + \cos x < 1$,

$$2\cos^2 x + \cos x - 1 < 0,$$
$$(\cos x)_{1,2} = \frac{-1 \pm \sqrt{1+8}}{4} = \frac{-1 \pm 3}{4},$$
$$(\cos x)_1 = -1, \quad (\cos x)_2 = \frac{1}{2},$$
$$2\cos^2 x + \cos x < 1 \ \ \forall \cos x \in \left\langle -1, \frac{1}{2} \right\rangle;$$

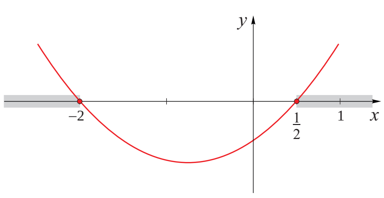




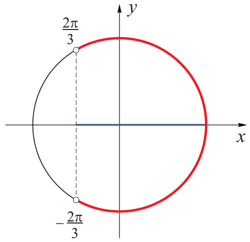
$$\frac{\pi}{3} + k \cdot 2\pi < x < \frac{5\pi}{3} + k \cdot 2\pi,$$
$$x \neq (2k+1)\pi,\ k \in \mathbf{Z};$$

4) $2\cos^2 x + 5\cos x + 2 \geqslant 0$;

$$(\cos x)_{1,2} = \frac{-5 \pm \sqrt{25-16}}{4} = \frac{-5 \pm 3}{4},$$
$$(\cos x)_1 = -2, \quad (\cos x)_2 = -\frac{1}{2},$$
$\cos x \leqslant -2$ nema rješenja,



$\cos x \geqslant -\dfrac{1}{2}$;



$$-\frac{2\pi}{3} + 2k\pi \leqslant x \leqslant \frac{2\pi}{3} + 2k\pi, \ k \in \mathbf{Z};$$