

Jednotková kružnice

1.

Obrázky

2.

Obrázky

3.

Dá se jednoduše řešit podle toho, ve kterém kvadrantu ten úhel je:

- I. kvadrant, neboli $(0^\circ, 90^\circ)$: \cos kladný, \sin kladný
- II. kvadrant, neboli $(90^\circ, 180^\circ)$: \cos záporný, \sin kladný
- III. kvadrant, neboli $(180^\circ, 270^\circ)$: \cos záporný, \sin záporný
- IV. kvadrant, neboli $(270^\circ, 360^\circ)$: \cos kladný, \sin záporný

(a) $\cos(\alpha) < 0, \sin(\alpha) > 0$

(b) $\cos(\alpha) > 0, \sin(\alpha) < 0$

(c) $\cos(\alpha) > 0, \sin(\alpha) < 0$

(d) $\cos(\alpha) < 0, \sin(\alpha) < 0$

(e) $\cos(\alpha) > 0, \sin(\alpha) > 0$

4.

(a) $x_1 = 40^\circ, x_2 = 140^\circ$

(b) $x_1 = 230^\circ, x_2 = 310^\circ$

(c) $x_1 = 280^\circ, x_2 = 80^\circ$

(d) $x_1 = 105^\circ, x_2 = 255^\circ$

5.

(a)

$$\cos\left(\frac{5}{6}\pi\right) = -\cos\left(\frac{\pi}{6}\right) = -\frac{\sqrt{3}}{2}$$

$$\sin\left(\frac{5}{6}\pi\right) = \sin\left(\frac{\pi}{6}\right) = \frac{1}{2}$$

(b)

$$\begin{aligned}\cos\left(\frac{7}{6}\pi\right) &= -\cos\left(\frac{\pi}{6}\right) = -\frac{\sqrt{3}}{2} \\ \sin\left(\frac{7}{6}\pi\right) &= -\sin\left(\frac{\pi}{6}\right) = -\frac{1}{2}\end{aligned}$$

(c)

$$\begin{aligned}\cos\left(\frac{11}{6}\pi\right) &= \cos\left(\frac{\pi}{6}\right) = \frac{\sqrt{3}}{2} \\ \sin\left(\frac{11}{6}\pi\right) &= -\sin\left(\frac{\pi}{6}\right) = -\frac{1}{2}\end{aligned}$$

(d)

$$\begin{aligned}\cos(\pi) &= -\cos(0) = -1 \\ \sin(\pi) &= \sin(0) = 0\end{aligned}$$

(e)

$$\begin{aligned}\cos\left(\frac{3}{4}\pi\right) &= -\cos\left(\frac{\pi}{4}\right) = -\frac{\sqrt{2}}{2} \\ \sin\left(\frac{3}{4}\pi\right) &= \sin\left(\frac{\pi}{4}\right) = \frac{\sqrt{2}}{2}\end{aligned}$$

(f)

$$\begin{aligned}\cos\left(\frac{5}{4}\pi\right) &= -\cos\left(\frac{\pi}{4}\right) = -\frac{\sqrt{2}}{2} \\ \sin\left(\frac{5}{4}\pi\right) &= -\sin\left(\frac{\pi}{4}\right) = -\frac{\sqrt{2}}{2}\end{aligned}$$

(g)

$$\begin{aligned}\cos\left(\frac{7}{4}\pi\right) &= \cos\left(\frac{\pi}{4}\right) = \frac{\sqrt{2}}{2} \\ \sin\left(\frac{7}{4}\pi\right) &= -\sin\left(\frac{\pi}{4}\right) = -\frac{\sqrt{2}}{2}\end{aligned}$$

(h)

$$\begin{aligned}\cos\left(\frac{3}{2}\pi\right) &= \cos\left(\frac{\pi}{2}\right) = 0 \\ \sin\left(\frac{3}{2}\pi\right) &= -\sin\left(\frac{\pi}{2}\right) = -1\end{aligned}$$

(i)

$$\begin{aligned}\cos\left(\frac{1}{2}\pi\right) &= \cos\left(\frac{\pi}{2}\right) = 0 \\ \sin\left(\frac{1}{2}\pi\right) &= \sin\left(\frac{\pi}{2}\right) = 1\end{aligned}$$

(j)

$$\cos\left(\frac{2}{3}\pi\right) = -\cos\left(\frac{\pi}{3}\right) = -\frac{1}{2}$$

$$\sin\left(\frac{2}{3}\pi\right) = \sin\left(\frac{\pi}{3}\right) = \frac{\sqrt{3}}{2}$$

(k)

$$\cos\left(\frac{4}{3}\pi\right) = -\cos\left(\frac{\pi}{3}\right) = -\frac{1}{2}$$

$$\sin\left(\frac{4}{3}\pi\right) = -\sin\left(\frac{\pi}{3}\right) = -\frac{\sqrt{3}}{2}$$

(l)

$$\cos\left(\frac{5}{3}\pi\right) = \cos\left(\frac{\pi}{3}\right) = \frac{1}{2}$$

$$\sin\left(\frac{5}{3}\pi\right) = -\sin\left(\frac{\pi}{3}\right) = -\frac{\sqrt{3}}{2}$$

(m)

$$\cos(945^\circ) = \cos(225) = \cos\left(\frac{5}{4}\pi\right) = -\frac{\sqrt{2}}{2}$$

$$\sin(945^\circ) = \sin(225) = \sin\left(\frac{5}{4}\pi\right) = -\frac{\sqrt{2}}{2}$$