

Trigonometrikus egyenletek

1. Oldd meg a valós számok halmazán a következő egyenleteket!

a) $\sin x = \frac{\sqrt{2}}{2}$

$$\begin{cases} \pi \cdot x + \frac{\pi}{4} = \pi x \\ \pi \cdot x + \frac{\pi}{4} = \pi x \end{cases}$$

b) $\sin x = \frac{1}{2}$

$$\begin{cases} \pi \cdot x + \frac{\pi}{6} = \pi x \\ \pi \cdot x + \frac{5\pi}{6} = \pi x \end{cases}$$

c) $\cos x = -1$

$$\pi \cdot (1 + 2x) = x$$

d) $\cos x = -0,5$

$$\pi \cdot x + \frac{\pi}{3} = x$$

e) $\sin x = -\frac{\sqrt{3}}{2}$

$$\begin{cases} \pi \cdot x + \frac{\pi}{3} = \pi x \\ \pi \cdot x + \frac{2\pi}{3} = \pi x \end{cases}$$

2. Oldd meg a valós számok halmazán a következő egyenleteket!

a) $\sin 3x = 0$

$$\frac{\pi}{3} \cdot x = x$$

b) $\sin 2x = \frac{1}{2}$

$$\begin{cases} \pi \cdot x + \frac{\pi}{6} = \pi x \\ \pi \cdot x + \frac{5\pi}{6} = \pi x \end{cases}$$

c) $\cos 2x = \frac{1}{2}$

$$\begin{cases} \pi \cdot x + \frac{\pi}{3} = \pi x \\ \pi \cdot x + \frac{2\pi}{3} = \pi x \end{cases}$$

d) $\sin 2x = \frac{\sqrt{3}}{2}$

$$\begin{cases} \pi \cdot x + \frac{\pi}{3} = \pi x \\ \pi \cdot x + \frac{2\pi}{3} = \pi x \end{cases}$$

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

$$\begin{cases} \frac{\pi}{3} \cdot x + \frac{\pi}{3} = \pi x \\ \frac{2\pi}{3} \cdot x + \frac{\pi}{3} = \pi x \end{cases}$$

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

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

g) $\sin\left(5x - \frac{\pi}{4}\right) = -\frac{\sqrt{2}}{2}$

$$\begin{cases} \frac{\pi}{4} \cdot x + \frac{\pi}{4} = \pi x \\ \frac{3\pi}{4} \cdot x = \pi x \end{cases}$$

h) $\operatorname{tg}\left(x - \frac{\pi}{6}\right) = \sqrt{3}$

$$\pi \cdot x + \frac{\pi}{6} = x$$

i) $\sqrt{2} \cos 3x = 1$

$$\begin{cases} \frac{\pi}{4} \cdot x + \frac{\pi}{4} = \pi x \\ \frac{3\pi}{4} \cdot x + \frac{\pi}{4} = \pi x \end{cases}$$

j) $\sin \pi x = \frac{\sqrt{2}}{2}$

$$\begin{cases} \pi \cdot x + \frac{\pi}{4} = \pi x \\ \pi \cdot x + \frac{3\pi}{4} = \pi x \end{cases}$$

3. Oldd meg az alábbi egyenleteket!

a) $\sin^2 x = \frac{3}{4}$

$$\pi \cdot x + \frac{\pi}{4} = x$$

b) $\sin 4x = \sin 3x$

$$\begin{cases} \frac{\pi}{2} \cdot x + \frac{\pi}{4} = \pi x \\ \pi \cdot x = \pi x \end{cases}$$

c) $\cos 2x = \cos x$

$$\frac{\pi}{2} \cdot x = x$$

d) $\cos x = \sin 3x$

$$\begin{cases} \frac{\pi}{2} \cdot x + \frac{\pi}{4} = \pi x \\ \pi \cdot x + \frac{\pi}{4} = \pi x \end{cases}$$

e) $\cos x^2 = 1$

$$\frac{1}{2} \cdot y^2 = x$$

f) $\operatorname{tg} x = -1$

$$\frac{1}{2} \cdot y + \frac{1}{2} = x$$

g) $\operatorname{tg} x = -\frac{\sqrt{3}}{3}$

$$\frac{1}{2} \cdot y + \frac{9}{2} = x$$

h) $\operatorname{tg} 5x = \operatorname{tg} x$

$$\begin{aligned} \frac{1}{2} \cdot y + \frac{0.1}{2} &\neq x \\ \frac{1}{2} \cdot y + \frac{7}{2} &\neq x \\ \frac{1}{2} \cdot y &= x \end{aligned}$$

i) $\cos 5x = \cos \left(x - \frac{\pi}{4}\right)$

$$\begin{aligned} \frac{7}{2} \cdot y + \frac{9.1}{2} &= z x \\ \frac{6}{2} \cdot y + \frac{1}{2} &= 1 x \end{aligned}$$

j) $2 \cdot \cos \left(4x - \frac{\pi}{2}\right) = -\sqrt{3}$

$$\begin{aligned} \frac{7}{2} \cdot y + \frac{7.1}{2} &= z x \\ \frac{7}{2} \cdot y + \frac{6}{2} &= 1 x \end{aligned}$$

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

$$\begin{aligned} \frac{1}{2} \cdot y + \frac{1}{2} &= z x \\ \frac{1}{2} \cdot y + \frac{1}{2} &= 1 x \end{aligned}$$

4. Oldd meg a valós számok halmazán a következő, másodfokúra visszavezethető egyenleteket!

a) $\sin^2 x - 2 \sin x = 0$

$$\frac{1}{2} \cdot y = x$$

b) $2 \sin^2 x - 7 \sin x + 3 = 0$

$$\begin{aligned} \frac{1}{2} \cdot y + \frac{9}{2} &= z x \\ \frac{1}{2} \cdot y + \frac{9}{2} &= 1 x \end{aligned}$$

c) $8 \sin^2 x - 7 \cos^2 x = 8$

$$\frac{1}{2} \cdot y + \frac{7}{2} = x$$

d) $\cos^2 x - \sin^2 x = \frac{1}{2}$

$$\begin{aligned} \frac{1}{2} \cdot y + \frac{9}{2} &= z x \\ \frac{1}{2} \cdot y + \frac{9}{2} &= 1 x \end{aligned}$$

e) $\sin^2 x - \cos^2 x = \cos x$

$$\begin{aligned} \frac{1}{2} \cdot y + \frac{6}{2} &= z x \\ \frac{1}{2} \cdot y + \frac{1}{2} &= 1 x \end{aligned}$$

f) $2 \sin^2 x + 3 \cos x = 0$

$$\frac{1}{2} \cdot y + \frac{6}{2} = x$$

g) $\cos^2 x - \sin x = 1$

$$\begin{aligned} \frac{1}{2} \cdot y + \frac{7}{2} &= z x \\ \frac{1}{2} \cdot y &= 1 x \end{aligned}$$

h) $\sin^2 x + \cos x = 1$

$$\begin{aligned} \frac{1}{2} \cdot y + 0 &= z x \\ \frac{1}{2} \cdot y + \frac{7}{2} &= 1 x \end{aligned}$$

i) $2 \sin^2 x + 5 \cdot \cos x - 4 = 0$

$$\begin{aligned} \frac{1}{2} \cdot y + \frac{6}{2} &= z x \\ \frac{1}{2} \cdot y + \frac{6}{2} &= 1 x \end{aligned}$$

j) $4 \cos^2 x + 17 \sin x = 8$

$$\begin{aligned} 0.96 \cdot (1 + y^2) + 17.591 &= z x \\ 0.96 \cdot y + 17.591 &= 1 x \end{aligned}$$

k) $\operatorname{tg}^2 x = 2 \operatorname{tg} x$

$$\begin{aligned} 0.81 \cdot y + 0.81 &= z x \\ \frac{1}{2} \cdot y &= 1 x \end{aligned}$$