

EXAM : TRIGONOMETRIC EQUATIONS

✦ Trigonometric Equations - Level 1

$$\pi - \frac{\pi}{6} = \frac{5\pi}{6}$$

☛ Solve: $\sin(x) = \frac{1}{2}$

☛ Solve: $\sin(x) = -1$

☛ Solve: $\cos(x) = 0$

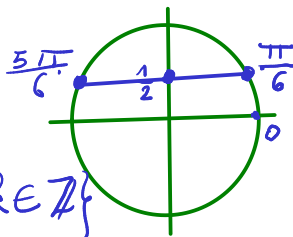
☛ Solve: $\cos(x) = \frac{\sqrt{3}}{2}$

☛ Solve: $\tan(x) = 1$

☛ Solve: $\tan(x) = -1$

$$x = \frac{\pi}{6} + 2k\pi \text{ ou } x = \frac{5\pi}{6} + 2k\pi \quad k \in \mathbb{Z}$$

$$\text{Sol} = \left\{ \frac{\pi}{6} + 2k\pi, \frac{5\pi}{6} + 2k\pi \mid k \in \mathbb{Z} \right\}$$



$$\sin x = -1$$

$$x = -\frac{\pi}{2} + 2k\pi$$

$$\text{Sol} = \left\{ -\frac{\pi}{2} + 2k\pi \mid k \in \mathbb{Z} \right\}$$



✦ Trigonometric Equations - Level 2

→ ☛ Solve: $\sin(2x) = \sqrt{3}/2$

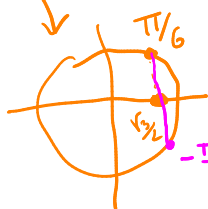
→ ☛ Solve: $2\sin^2(x) - 1 = 0$

☛ Solve: $\cos(2x) = -1$

☛ Solve: $\cos(x) = -\frac{1}{2}$

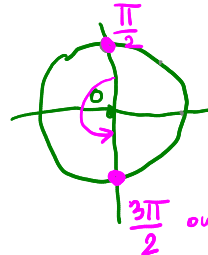
☛ Solve: $\tan(x - \frac{\pi}{4}) = \sqrt{3}$

☛ Solve: $\tan^2(x) = 3$



$$x = \frac{\pi}{6} + 2k\pi \text{ ou } x = -\frac{\pi}{6} + 2k\pi$$

$$\text{Sol} = \left\{ \frac{\pi}{6} + 2k\pi, -\frac{\pi}{6} + 2k\pi \mid k \in \mathbb{Z} \right\}$$



$$x = \frac{\pi}{2} + 2k\pi \text{ ou } x = \frac{3\pi}{2} + 2k\pi$$

Plus count

$$x = \frac{\pi}{2} + k\pi$$

$$\text{Sol} = \left\{ \frac{\pi}{2} + k\pi \mid k \in \mathbb{Z} \right\}$$

☛ Trigonometric Equations - Level 3 (Isolation + Shift/Multiple)

☛ Solve: $2\sin(2x) + 1 = 0$

☛ Solve: $3 - 4\sin(x - \frac{\pi}{3}) = 1$

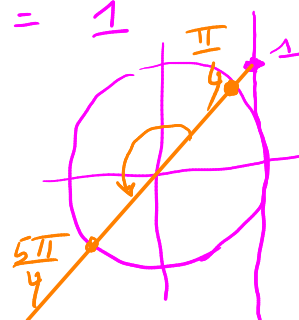
☛ Solve: $\cos(3x) - 1 = 0$

☛ Solve: $2\cos(x + \frac{\pi}{4}) - \sqrt{3} = 0$

☛ Solve: $3\tan(2x) + \sqrt{3} = 0$

☛ Solve: $\sqrt{3} - \tan(x - \frac{\pi}{6}) = 0$

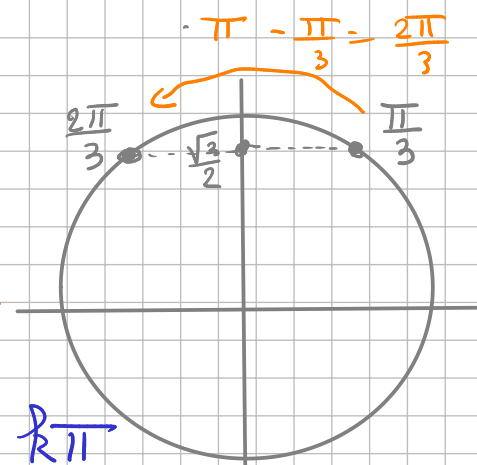
$$\tan x = 1$$



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

$$\text{Sol} = \left\{ \frac{\pi}{4} + k\pi \mid k \in \mathbb{Z} \right\}$$

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



$$2x = \frac{\pi}{3} + 2k\pi \text{ ou } 2x = \frac{2\pi}{3} + 2k\pi$$

$$\Rightarrow x = \frac{\pi}{6} + k\pi \text{ ou } x = \frac{\pi}{3} + k\pi$$

$$\text{sol} = \left\{ \frac{\pi}{6} + k\pi; \frac{\pi}{3} + k\pi \mid k \in \mathbb{Z} \right\}$$

$$\text{Solve: } 2\sin^2(x) - 1 = 0$$

$$\begin{aligned} x^2 &= 4 \\ x &= 2 \text{ ou } x = -2 \end{aligned}$$

$$2 \cdot \sin^2 x = 1$$

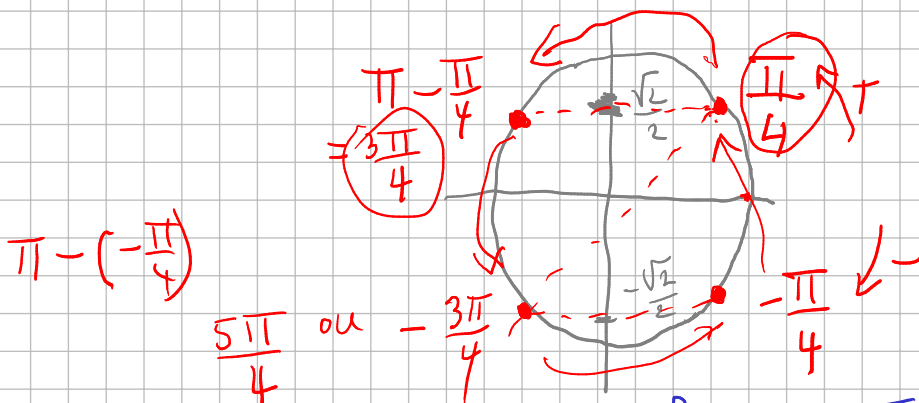
$$\sin^2 x = \frac{1}{2}$$

$$\sin x = \sqrt{\frac{1}{2}}$$

$$\text{ou } \sin x = -\sqrt{\frac{1}{2}}$$

$$\sqrt{\frac{1}{2}} = \frac{\sqrt{1}}{\sqrt{2}} = \frac{1 \cdot \sqrt{2}}{\sqrt{2} \cdot \sqrt{2}} = \frac{\sqrt{2}}{2}$$

$$\sin x = \frac{\sqrt{2}}{2} \text{ ou } \sin x = -\frac{\sqrt{2}}{2}$$



$$\frac{\sqrt{2}}{2} \approx 0,7$$

$$\arcsin \frac{\sqrt{2}}{2} =$$

$$\text{sol} = \left\{ \frac{\pi}{4} + 2k\pi, \frac{3\pi}{4} + 2k\pi, \frac{5\pi}{4} + 2k\pi, \frac{3\pi}{4} + 2k\pi \right\}$$

~~Ex 2.1~~

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$$-\frac{3\pi}{4} + 2k\pi, -\frac{\pi}{4} + 2k\pi$$

$$| k \in \mathbb{Z} \}.$$

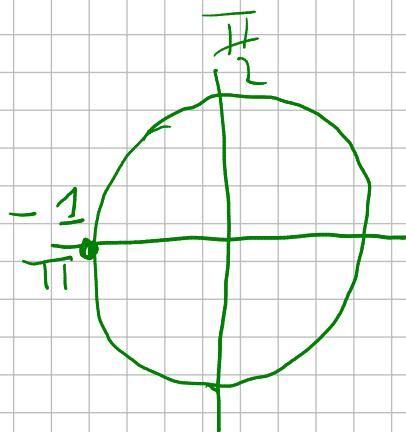
$$10/10 \quad \text{Sol} = \left\{ \frac{\pi}{4} + k \cdot \frac{\pi}{2} \mid k \in \mathbb{Z} \right\}$$

$$\cos(2x) = -1$$

$$\frac{2k\pi}{2}$$

$$2x = \pi + 2k\pi$$

$$x = \frac{\pi}{2} + k\pi$$



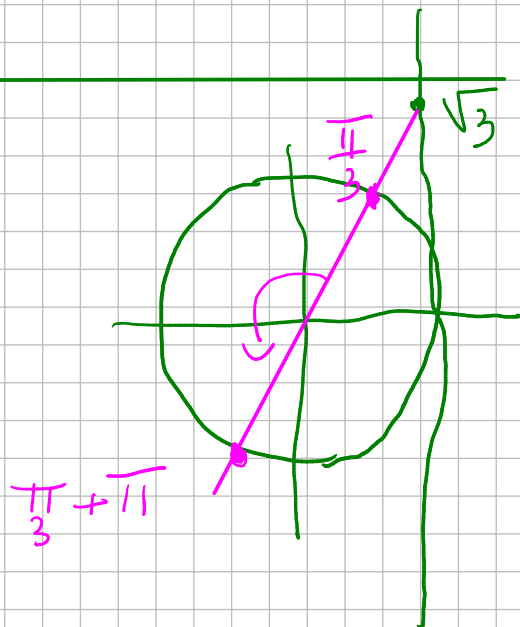
$$\text{Sol} = \left\{ \frac{\pi}{2} + k\pi \mid k \in \mathbb{Z} \right\}$$

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

$$x - \frac{\pi}{4} = \frac{\pi}{3} + k\pi$$

$$x = \frac{\pi}{3} + \frac{\pi}{4} + k\pi$$

$$x = \frac{7\pi}{12} + k\pi$$



$$\text{Sol} = \left\{ \frac{7\pi}{12} + k\pi \mid k \in \mathbb{Z} \right\}$$

$$\tan^2 x = 3$$

$$\tan x = \sqrt{3} \text{ or } \tan x = -\sqrt{3}$$

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