

# 5.1 SOLVING TRIG EQUATIONS

WARM-UP IN YOUR NOTES

Isolate  $\sin x$

$$2 \sin x + 1 = 0$$

$$-1 -1$$

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

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

# 5.1 SOLVING TRIG EQUATIONS

Q: How do I solve equations involving trig expressions?

$$1. \quad 2\sin x - \sqrt{3} = 0$$

$$+ \sqrt{3} \quad + \sqrt{3}$$

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

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

$$x = \sin^{-1}\left(\frac{\sqrt{3}}{2}\right)$$

on unit circle find  
y-coord. of  $\pm \frac{\sqrt{3}}{2}$

$$\frac{\pi}{3}, \frac{2\pi}{3}$$

$$x \in [0, 2\pi)$$

↑ radians

- ① Isolate trig function
- ② inverse both sides

- ③ Find value of angle  
(use unit circle or draw A)

# 5.1 SOLVING TRIG EQUATIONS

Eq.: How do I solve equations involving trig expressions?

$$2 \cdot \tan(\theta + 21^\circ) = -1 \quad \theta \in [0, 360^\circ]$$

$$\theta + 21^\circ = \tan^{-1}(-1)$$

Unit circle  same x & y coordinate  
diff. signs

$$135^\circ \text{ & } 315^\circ$$

$$\theta + 21 = 135$$

$$\theta + 21 = 315$$

$$\theta = 114^\circ$$

$$\theta = 294^\circ$$

# 5.1 SOLVING TRIG EQUATIONS

Eq.: How do I solve equations involving trig expressions?

$$3. \frac{4 \cos^2 \theta}{4} = \frac{3}{4} \quad \theta \in [0, 360^\circ]$$

$$\sqrt{\cos^2 \theta} = \sqrt{\frac{3}{4}}$$

$$\cos \theta = \pm \frac{\sqrt{3}}{2}$$

\* if you take a square root,  
    ±

$$\theta = \cos^{-1} \left( \pm \frac{\sqrt{3}}{2} \right)$$

$$\theta = \cos^{-1} \left( \frac{\sqrt{3}}{2} \right)$$

$$\theta = \cos^{-1} \left( -\frac{\sqrt{3}}{2} \right)$$

x-coord

$$30^\circ, 330^\circ$$

$$150^\circ, 210^\circ$$

$$\boxed{30^\circ, 150^\circ, 210^\circ, 330^\circ}$$

# 5.1 SOLVING TRIG EQUATIONS

Eq.: How do I solve equations involving trig expressions?

$$4. \cos x + 2 = 3 \cos x \quad x \in [0, 2\pi)$$

~~$\cos x$~~

~~$\cos x$~~

Radians

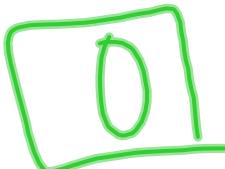
$$\begin{aligned} a + 2 &= 3a \\ -a & \quad -a \\ 2 &= 2a \end{aligned}$$

$$\frac{2}{2} = \frac{2 \cos x}{2}$$

$$1 = \cos x$$

$$\cos^{-1}(1) = x$$

U.C.  
 $x\text{-coord} = 1$



**5.1 Solving Trig Equations (Day 1)****Name:** \_\_\_\_\_

Solve each equation in the indicated domain. Use a separate sheet of paper.

$$1. \tan \theta + \sqrt{3} = 0 \quad \theta \in [0^\circ, 360^\circ)$$

$$2. 2 \cos x + \sqrt{3} = 0 \quad x \in [0, 2\pi)$$

$$3. 2 \sin(\theta + 82^\circ) = -1 \quad \theta \in [0^\circ, 360^\circ)$$

$$4. \sec(\theta + 74^\circ) = -2 \quad \theta \in [0^\circ, 360^\circ)$$

$$5. 4 \cos^2 x = 1 \quad x \in [0, 2\pi)$$

$$6. 4 \sin^2 x = 3 \quad x \in [0, 2\pi)$$

$$7. \tan x - \sqrt{3} = 2 \tan x \quad x \in [0, 2\pi)$$

$$8. \cos \theta + 2 = 3 \cos \theta \quad \theta \in [0^\circ, 360^\circ)$$

-

# 5.3 SOLVING TRIG EQUATIONS

Q: How do I solve equations involving trig expressions?

CLOSING

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

$$2 \sin^2 \theta - 1 = 0$$

$$\theta \in [0, 360^\circ)$$

