

5.3 SOLVING TRIG EQUATIONS

Extra Credit due tomorrow (BEGINNING of class!)

WARM-UP TUESDAY

Isolate $\sin x$

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

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

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

about me: $\sin^{-1}(\sin x) = \left(-\frac{1}{2}\right)$

1. Would you rather explore space or the ocean?
2. Would you rather be too busy or bored?

5.3 SOLVING TRIG EQUATIONS

Q: How do I solve equations involving trig expressions?

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

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

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

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

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

(cosine, sine)

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

↑ radians

- ✓ ① Isolate trig function
- ② Inverse
- ③ Use unit circle to find L's
- ④ 2 answers?

$$\frac{\pi}{3} \quad ; \quad \frac{2\pi}{3}$$

5.3 SOLVING TRIG EQUATIONS

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

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

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

↑ degrees

$\frac{1}{x}$

$$\theta + 21 = 315^\circ$$

$$\theta + 21 = 135^\circ$$

294° and
114°

$$\sqrt{x+1} = 2$$

5.3 SOLVING TRIG EQUATIONS

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

$$3. \quad 4 \cos^2 \theta = 3$$

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

~ degrees

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

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

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

$$(30^\circ, 330^\circ, 150^\circ, 210^\circ)$$

5.3 SOLVING TRIG EQUATIONS

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

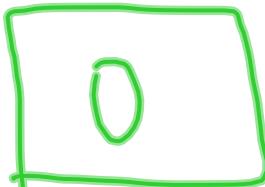
$$4. \cancel{\cos x} + 2 = 3 \cancel{\cos x} \quad x \in [0, 2\pi) \\ -\cancel{\cos x} \qquad \qquad \qquad -\cancel{\cos x}$$

↑ radians

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

$$1 = \cos x$$

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



5.3 Solving Trig Equations (Day 1)**Name:** _____

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

1. $\tan \theta + \sqrt{3} = 0$

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

2. $2\cos x + \sqrt{3} = 0$

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

3. $2\sin(\theta + 82^\circ) = -1$

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

4. $\sec(\theta + 74^\circ) = -2$

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

5. $4\cos^2 x = 1$

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

6. $4\sin^2 x = 3$

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

7. $\tan x - \sqrt{3} = 2\tan x$

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

8. $\cos \theta + 2 = 3\cos \theta$

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



9. $\sin^2 x + 3\cos^2 x = 0$

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

5.3 SOLVING TRIG EQUATIONS

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

CLOSING

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

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

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

