5.3 Solving trig equations

Extra Credit due tomorrow (BEGINNING of class!)

Warm-up Tuesday

Isolate sinx

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

$$-1 \quad -1$$

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

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

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

About me:

1. Would you rather explore space or the ocean?

2. Would you rather be too busy or bored?

5.3 Solving trig equations

eq: How do I solve equations involving trig expressions?

1. $2\sin x - \sqrt{3} = 0$ $\quad x \in [0, 2\pi)$

radians

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

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

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

$(\cos\theta, \sin\theta)$

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

$\boxed{\frac{\pi}{3} \;\&\; \frac{2\pi}{3}}$

✓ ① Isolate trig function

② Inverse

③ Use unit circle to find ∠'s

④ 2 answers?

5.3 Solving trig equations

eq: How do I solve equations involving trig expressions?

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

degrees

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

$\frac{y}{x}$

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

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

$\boxed{294^\circ \text{ and } 114^\circ}$

$\sqrt{x+1} = 2$

5.3 Solving trig equations

eq: How do I solve equations involving trig expressions?

3. $4\cos^2\theta = 3$ $\quad \theta \in [0, 360°)$

↑ degrees

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

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

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

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

$\boxed{30°, 330°, 150°, 210°}$

5.3 Solving trig equations

eq: How do I solve equations involving trig expressions?

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

$-\cos x \qquad -\cos x$

radians

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

$$1 = \cos x$$

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

$$\boxed{0}$$

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

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

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

$$\theta \in [0, 360°)$$