

Quiz tomorrow 7.6

Test Thurs

6.3-6.6, 6.8, 7.1-7.8

Sugg HW and Practice Problems www.teahoward.com

Bring music or earplugs

8.2 Inverse Trig Functions Gnt'd

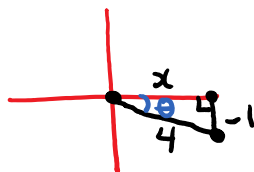
Ex: Find $\cos(\sin^{-1} -\frac{1}{4})$

$$\theta = \sin^{-1} -\frac{1}{4}$$

$$\sin \theta = -\frac{1}{4}$$

$$\frac{y}{r} = -\frac{1}{4}$$

$$y = -1, r = 4$$



θ is in QIV

$$x^2 + (-1)^2 = 4^2$$

$$x^2 + 1 = 16$$

$$x^2 = 15$$

$$x = \pm \sqrt{15}$$

$$\boxed{x = \sqrt{15}}$$

$$\begin{aligned} \text{Want } \cos \theta &= \frac{x}{r} \\ &= \frac{\sqrt{15}}{4} \end{aligned}$$

Ex: Find $\csc^{-1}(-\sqrt{2})$

$$\theta = \csc^{-1}(-\sqrt{2})$$

Apply the csc function :

$$\csc \theta = -\sqrt{2}$$

Take reciprocals :

$$\frac{1}{\csc \theta} = \frac{1}{-\sqrt{2}}$$

$$\sin \theta = -\frac{1}{\sqrt{2}}$$

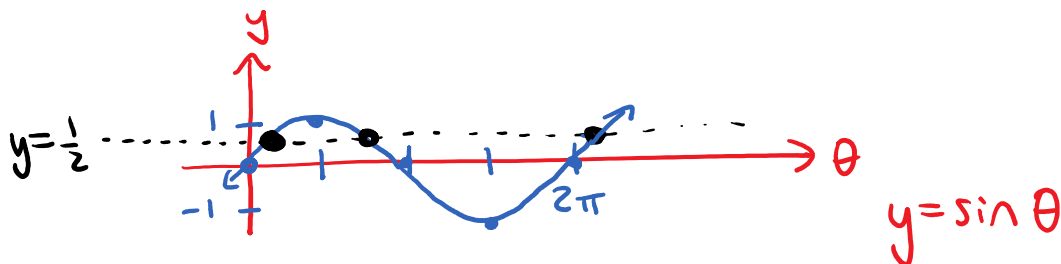
$$\theta = -\frac{\pi}{4} \text{ or } -45^\circ$$



8.3 Trig Equations

Ex: Solve $\sin \theta = \frac{1}{2}$

1) How many solutions?

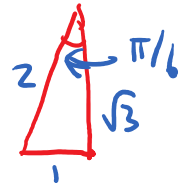


Infinitely-many solutions

2) Reference Angle

$$\sin \theta = \frac{1}{2}$$

$$\theta = \frac{\pi}{6}$$

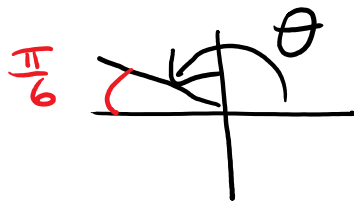
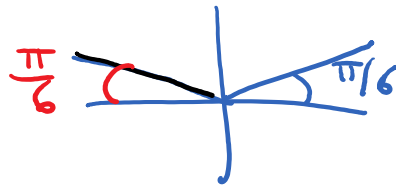


3) CAST Rule

(S)	A
T	C

$$\sin \theta = \frac{1}{2}$$

$$\sin \theta > 0$$



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

4) Period

Period of $\sin \theta$ is 2π

We can add/subtract any multiple of 2π

$$\theta = \frac{\pi}{6} + 2\pi k$$

$$\theta = \frac{5\pi}{6} + 2\pi k$$

k : any integer

Ex: Solve $\sin 2\theta = \frac{\sqrt{3}}{2}$ on the interval $0 \leq \theta \leq 2\pi$

1) How many solutions?

Let $x = 2\theta$

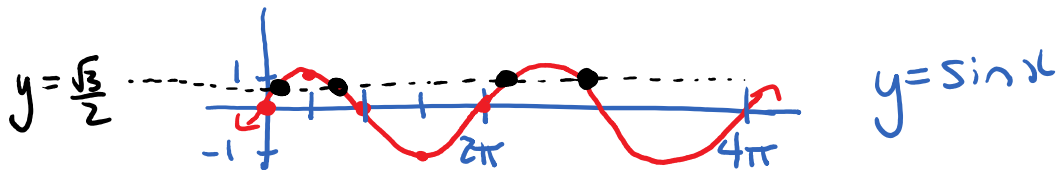
$$\text{Solve } \sin x = \frac{\sqrt{3}}{2}$$

$$0 \leq \theta \leq 2\pi$$

Double: $0 \leq 2\theta \leq 4\pi$

$$0 \leq x \leq 4\pi$$

$$\text{Solve } \sin x = \frac{\sqrt{3}}{2} \text{ on } 0 \leq x \leq 4\pi$$



4 solutions

S	A
T	C

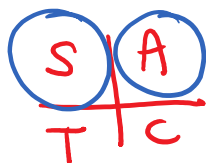
 2 periods

2) Reference Angle

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

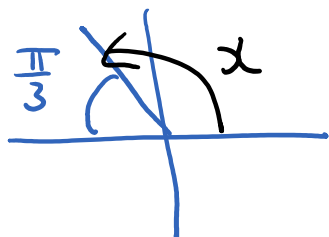
$$x = \frac{\pi}{3}$$

3) CAST Rule



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

$$\sin x > 0$$



$$\begin{aligned} x &= \pi - \frac{\pi}{3} \\ &= \frac{2\pi}{3} \end{aligned}$$

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

4) Period

Period of $\sin x$ is 2π

$$x = \frac{\pi}{3}, \frac{2\pi}{3}, \frac{7\pi}{3}, \frac{8\pi}{3}$$

$\xrightarrow{+2\pi}$
 $\xrightarrow{+2\pi}$

Recall: $0 \leq x \leq 4\pi$

$$x = \frac{\pi}{3}, \frac{2\pi}{3}, \frac{7\pi}{3}, \frac{8\pi}{3}$$

$$2\theta = \frac{\pi}{3}, \frac{2\pi}{3}, \frac{7\pi}{3}, \frac{8\pi}{3}$$

$$\theta = \frac{\pi}{6}, \frac{\pi}{3}, \frac{7\pi}{6}, \frac{4\pi}{3}$$