Pre-Calculus

Write your questions and thoughts here!

10.4 Inverse Trig Functions

Name:_____

RECALL:

How do we solve the following equations?

$x + 5 = 13$ $\quad -5 \quad -5$ $\quad x = 8$

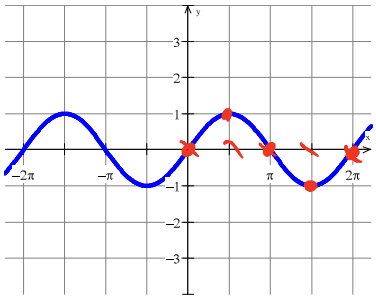
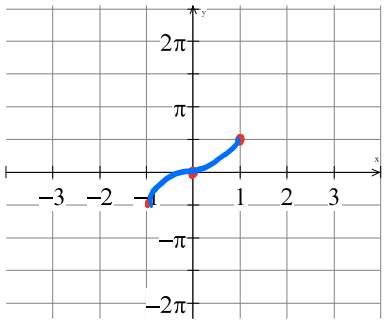
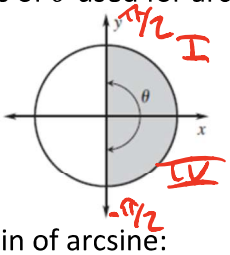
$7x = 35$ $\quad \frac{7}{7} \quad \frac{35}{7}$ $\quad x = 5$

$2^x = 24$ $\quad \log_2 24 = x$

$\sin\theta = 1$ $\quad \theta = \sin^{-1}(1)$

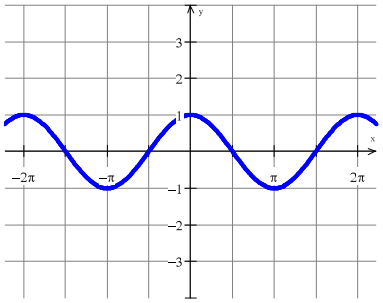
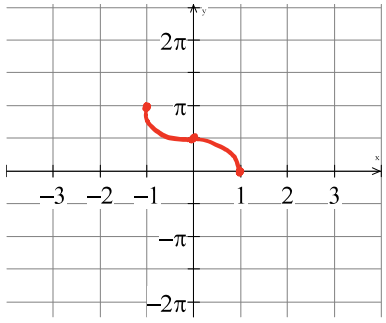
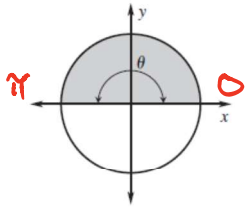
Arcsine: (Sine Inverse)

$\sin\theta = c \Rightarrow \sin^{-1}(c) = \theta$ **OR** $\arcsin(c) = \theta$

Graph of $y = \sin\theta$	Graph of $\theta = \sin^{-1} c$	Values of θ used for arcsine:
	 not a function	 Domain of arcsine: $[-1, 1]$ Range of arcsine: $[-\pi/2, \pi/2]$

Arccosine: (Cosine Inverse)

$\cos\theta = c \Rightarrow \cos^{-1} c = \theta$ **OR** $\arccos c = \theta$

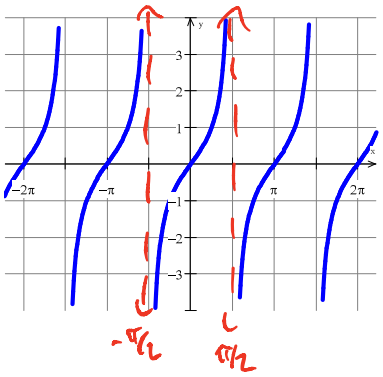
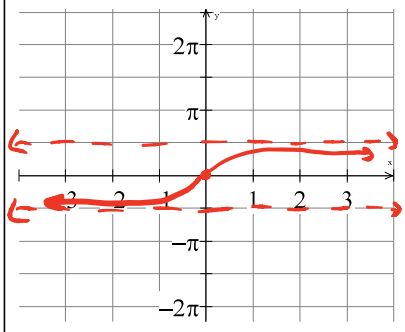
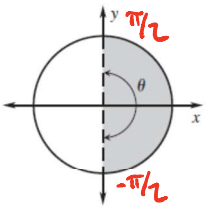
Graph of $y = \cos\theta$	Graph of $\theta = \cos^{-1} c$	Values of θ used for arccosine:
		 Domain of arccosine: $[-1, 1]$ Range of arccosine: $[0, \pi]$

Write your questions and thoughts here!

10.4 Inverse Trig Functions

Arctangent: (Tangent Inverse)

$\tan\theta = c \rightarrow \tan^{-1} c = \theta$ **OR** $\arctan c = \theta$

Graph of $y = \tan\theta$	Graph of $\theta = \tan^{-1} c$	Values of θ used for arctangent:
		

Domain of arctangent: $(-\infty, \infty)$

Range of arctangent: $\left(-\frac{\pi}{2}, \frac{\pi}{2}\right)$

Angle vs. two sides of a triangle

$\sin(\theta) = \frac{\text{opp leg}}{\text{hyp}}$ (Angle; Ratio of two sides)

$\csc(\theta) = \frac{1}{\sin\theta} = \frac{\text{hyp}}{\text{opp leg}}$

$\sin^{-1}\left(\frac{\text{opp leg}}{\text{hyp}}\right) = \theta$ (angle)

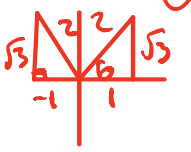
$\csc^{-1}\left(\frac{\text{hyp}}{\text{opp leg}}\right) = \sin^{-1}\left(\frac{\text{hyp}}{\text{opp leg}}\right) = \theta$

1) $\csc^{-1}(2.67) = \sin^{-1}\left(\frac{1}{2.67}\right) \approx 22.000°$

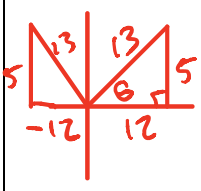
2) $\sec(0.15) = \frac{1}{\cos(0.15)} = 1.011$ RAD

3) Find the exact value of the expression WITHOUT the use of a calculator.

$\tan\left(\arcsin\left(\frac{\sqrt{3}}{2}\right)\right) = \tan\theta = \frac{\sqrt{3}}{\pm 1} = \pm\sqrt{3}$ (θ)

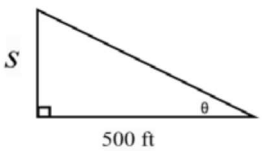


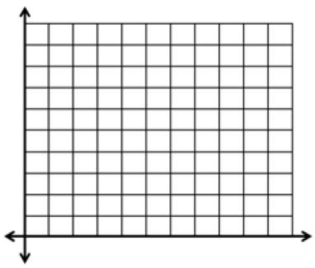
4) Use a reference triangle to find the exact value of $\tan\left(\sin^{-1}\left(\frac{5}{13}\right)\right)$. $= \tan\theta = \frac{5}{\pm 12}$



Pythag Trip 5-12-13

5) A photographer wants to photo a hot air balloon launch. Write an equation to model the angle θ of his camera as a function of the height s of the balloon.





$\tan\theta = \frac{s}{500}$

$\theta = \tan^{-1}\left(\frac{s}{500}\right)$

Now summarize what you learned!