

$$19) f(x) = -(x-2)^2 \quad x \leq 2$$

$$x = -(y-2)^2 \quad (f \circ g)(x) = -(2 \pm \sqrt{x-2})^2$$

$$-\sqrt{-x} = \sqrt{(y-2)^2}$$

$$-\sqrt{-x} = y-2$$

$$-(\sqrt{-x})^2$$

$$-(-x) = x$$

$$g(x) = 2 - \sqrt{-x} = y^{-1} f^{-1}(x)$$

$$(g \circ f)(x) = 2 - \sqrt{-[-(x-2)^2]}$$

$$2 + \sqrt{+(x-2)^2}$$

$$2 + x - 2$$

$$+x$$

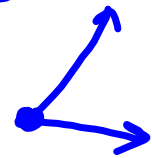
Date: 9/10/18

Chp : Chp 1:6 \rightarrow Trig Functions

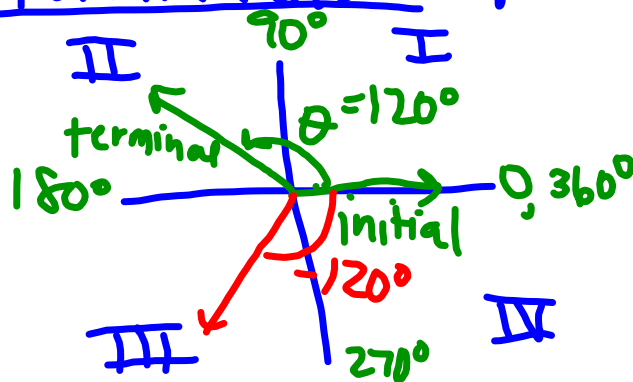
- Obj :
- Use trig defs. to do problems
 - SOH CAH TOA / trig reciprocals
 - Radians / Degrees
 - Graph trig. functions
 - Create Unit Circle

* Vertex = A pt. where 2 rays meet.

* Initial side = Fixed ray



* Terminal side = Rotating ray.



* Quadrant Angle = Terminal side falls on an axis.

Ex. 1 - Give each angle measure.

a) 9.5 rotations clockwise

$$\begin{array}{r} -360 \\ -360 \\ -360 \end{array} \quad (-360)(9\frac{1}{2}) = -3240$$

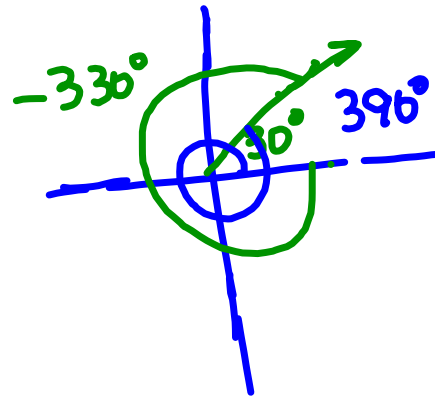
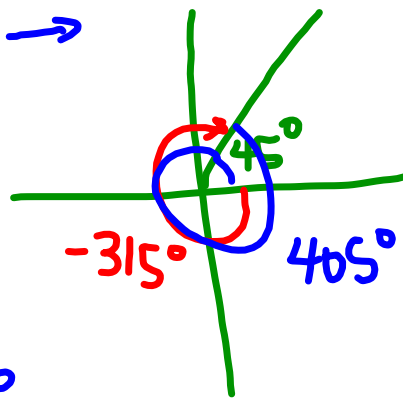
-180
 -3420°

b) 6.75 rotations (C = 2430°)

* Coterminal $\angle s = \angle s$ that use the
EX: $0^\circ, 360^\circ, 720^\circ, \dots$ Same initial & terminal
sides.

Ex. 2 - Identify a (+) & (-) angle that is coterminal w/ the given \angle .

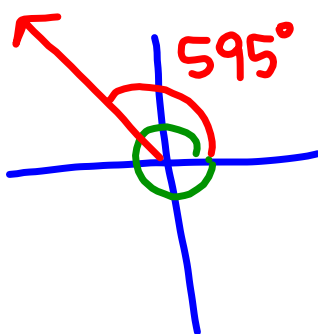
a) $45^\circ \rightarrow$



b) 225°

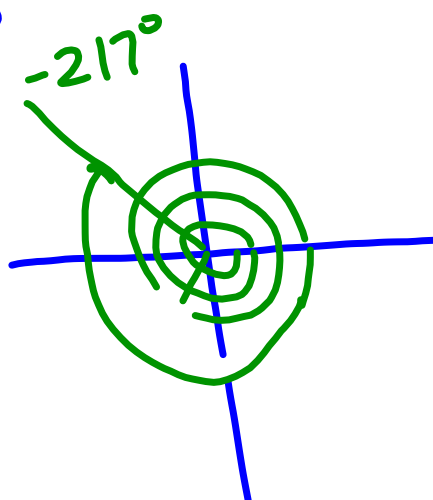
Ex. 3 - Find the coterminal \angle s
between 0 & 360.

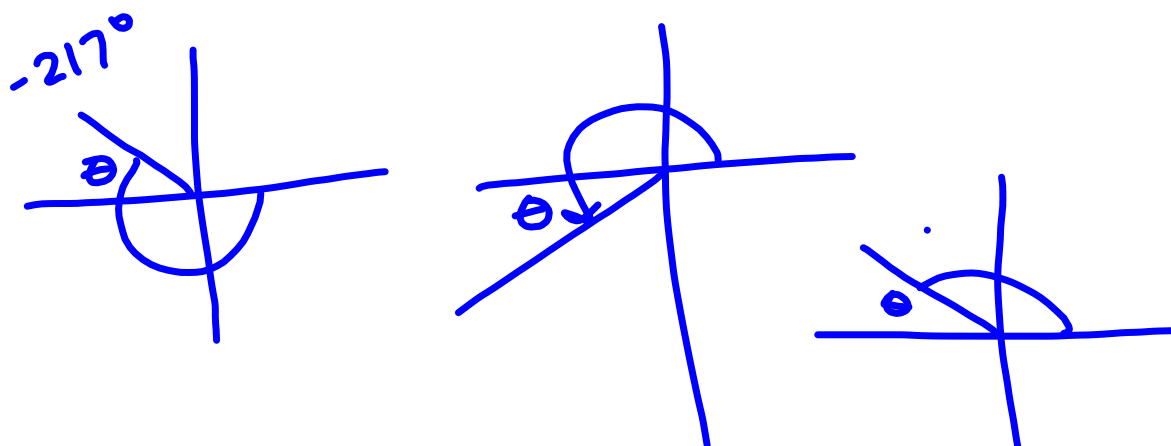
a) 595°



235° , II

b) -1297°





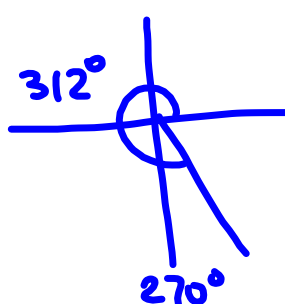
* Reference \angle = The \angle less than 90° that gets you back to x-axis.

3 Types of Reference \angle s

- 1) Terminal side in Quad II = $180^\circ - \theta$
- 2) Terminal side in Quad III = $\theta - 180^\circ$
- 3) Terminal side in Quad IV = $360^\circ - \theta$

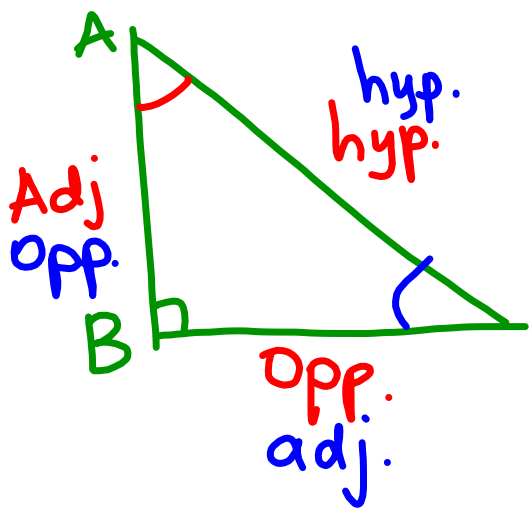
Ex. 4 - Find the measure of each reference \angle .

a) 312°



$$360 - 312 = 48^\circ$$

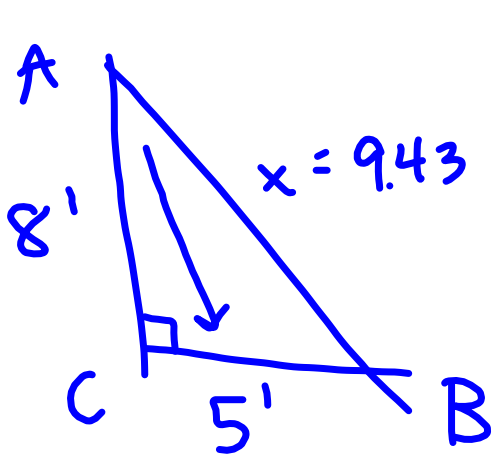
b) $-195^\circ = 15^\circ$



SOH CAH TOA
 \downarrow
 $\sin \theta = \frac{O}{H}$ $\cos \theta = \frac{A}{H}$ $\tan \theta = \frac{O}{A}$

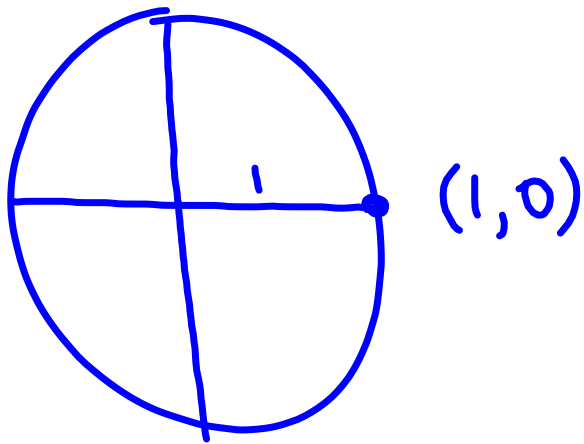
SHO CHA TAO
 \downarrow recip. of sin \downarrow recip. of cos \downarrow recip. of tan
 $\text{Cosecant } \theta = \frac{H}{O}$ $\text{sec } \theta = \frac{H}{A}$ $\text{coto } \theta = \frac{A}{O}$
 (csc)

Ex. 5 - Find all 6 trig. ratios.



$$\begin{aligned} \sin A^\circ &= \frac{5}{9.43} & \csc A^\circ &= \frac{9.43}{5} \\ \cos A^\circ &= \frac{8}{9.43} & \sec A^\circ &= \frac{9.43}{8} \\ \tan A^\circ &= \frac{5}{8} & \cot A^\circ &= \frac{8}{5} \end{aligned}$$

$$\frac{5}{\sqrt{89}} \cdot \frac{\sqrt{89}}{\sqrt{89}} = \frac{5\sqrt{89}}{89}$$



Switch Deg to Rad $\rightarrow \theta \cdot \frac{\pi}{180^\circ}$

Arc Length = Length of an arc.
 $= S = r\theta$
 arc length = radius (\angle)

Ex. 6

Find the arc length on a circle of radius 3 by a central \angle measure of $\frac{2\pi}{3}$.

$$S = r\theta$$

$$S = 3\left(\frac{2\pi}{3}\right)$$

$$S = 2\pi$$

Go to
Unit Circle
Notes

Sine Graph

$$y = \pm A \sin\left(\frac{B}{k}\theta - C\right) + h$$

height period $\begin{matrix} \uparrow \\ \downarrow \end{matrix}$ $\begin{matrix} + \uparrow \\ - \downarrow \end{matrix}$

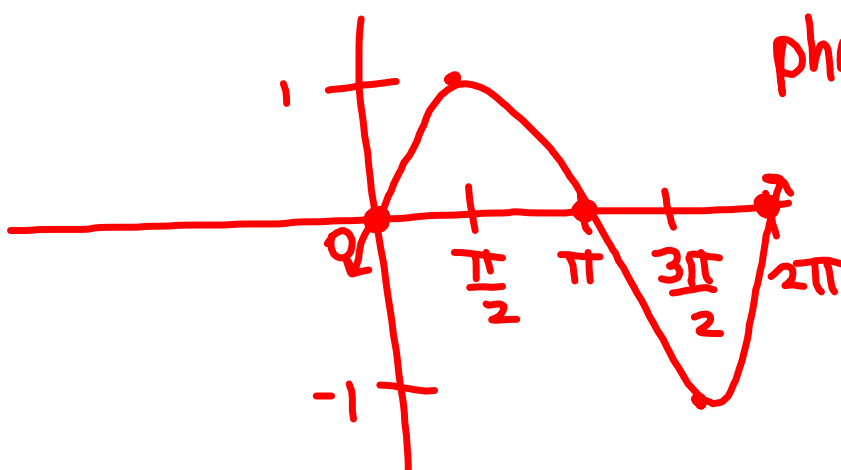
$\frac{2\pi}{\frac{B}{k}}$ $\frac{C}{k}$

$\frac{B}{k} \neq$ $- = \text{rt}$

\neq $+ = \text{lt}$

Ex.T

$$y = \sin(x) \quad \text{Amp} = 1, \text{ per} = \frac{2\pi}{1} = 2\pi$$



$$\text{phase shift} = \frac{0}{1} = 0$$

$$\text{vert. shift} = 0$$

$$D = (-\infty, \infty)$$

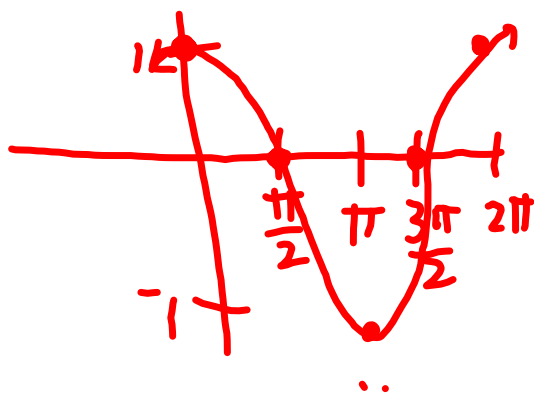
$$R = [-1, 1]$$

Cosine Graph

$$y = \pm A \cos(k\theta - c) + h$$

Ex. B

$$y = \cos(x)$$



$$\text{Amp} = 1$$

$$\text{Per} = \frac{2\pi}{1} = 2\pi$$

$$\text{PS} = 0$$

$$\text{VS} = 0$$

$$D = (-\infty, \infty)$$

$$R = [-1, 1]$$

Ex. 9

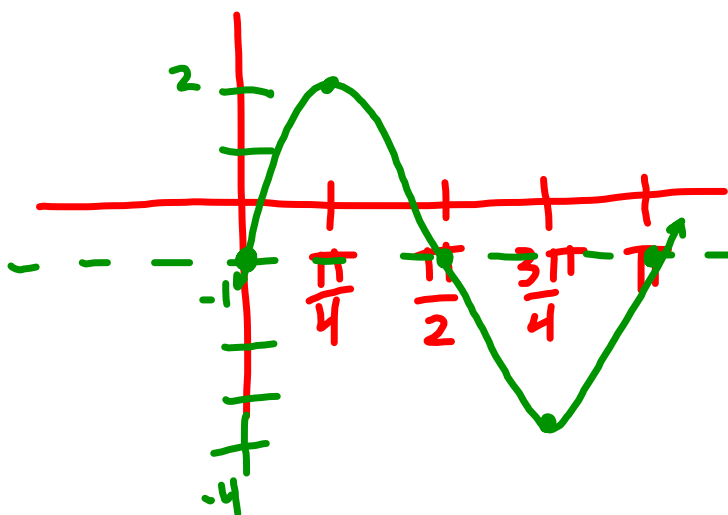
$$y = 3 \sin(2\theta) - 1$$

$$\text{Amp} = 3$$

$$\text{Per} = \pi$$

$$\text{PS} = 0$$

$$\text{VS} = -1$$



Ex. 10

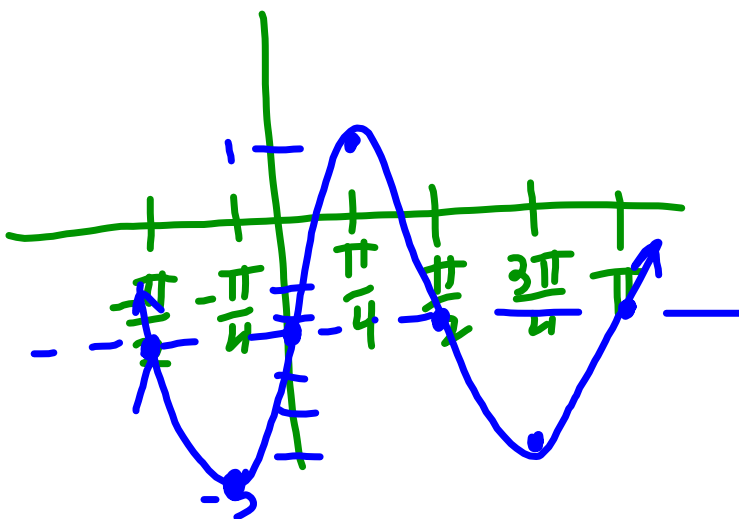
$$y = -3\sin(2x + \pi) - 2$$

$$\text{Amp} = -3$$

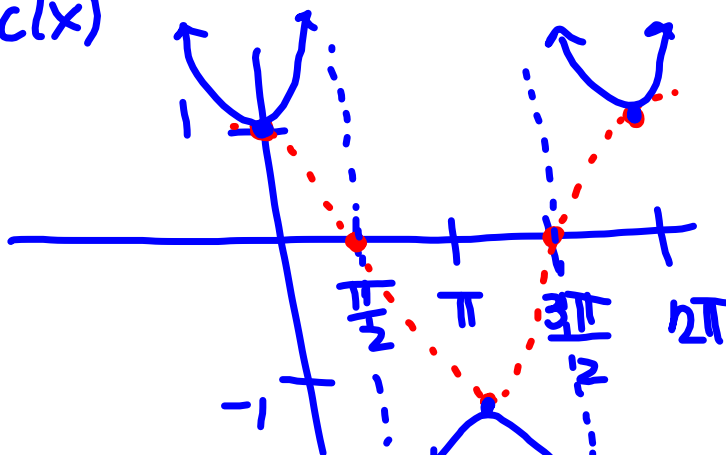
$$\text{Per} = \pi$$

$$\text{PS} = -\frac{\pi}{2}$$

$$\text{VS} = -2$$



Secant Graph \mathbb{R} \mathbb{Z}^+
 • reciprocal of cosine
 • vert. asymptotes @ every $\frac{k\pi}{2}, k \in \mathbb{Z}$
 $y = \sec(x)$



$D = (-\infty, \infty)$ except $\frac{k\pi}{2}, k \in \mathbb{Z}$
 $R = (-\infty, -1] \cup [1, \infty)$

Cosecant Graph

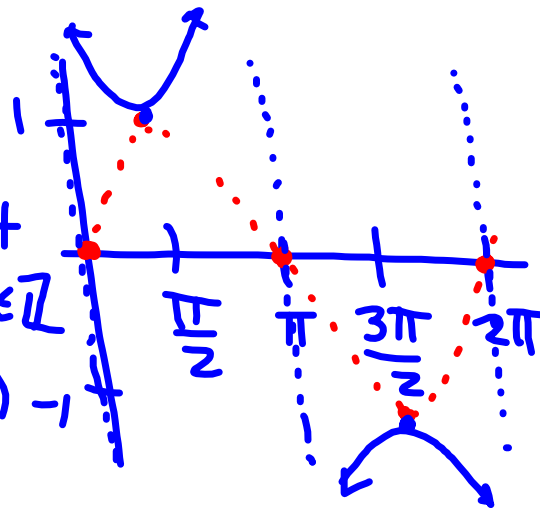
- reciprocal of sine
- vert. asymptotes @ $k\pi$ where $k \in \mathbb{Z}$

$$y = \csc(x)$$

$$D = (-\infty, \infty) \text{ except}$$

$$k\pi, k \in \mathbb{Z}$$

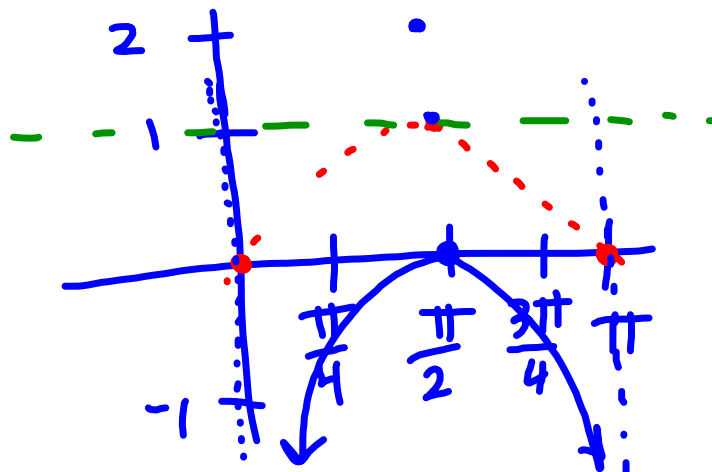
$$R = (-\infty, -1] \cup [1, \infty)$$



Ex. 11

$$y = -\csc(2\theta) + 1$$

- Flipped
- Per = $\frac{2\pi}{2} = \pi$
- PS = 0
- VS = +1



Ex. 12

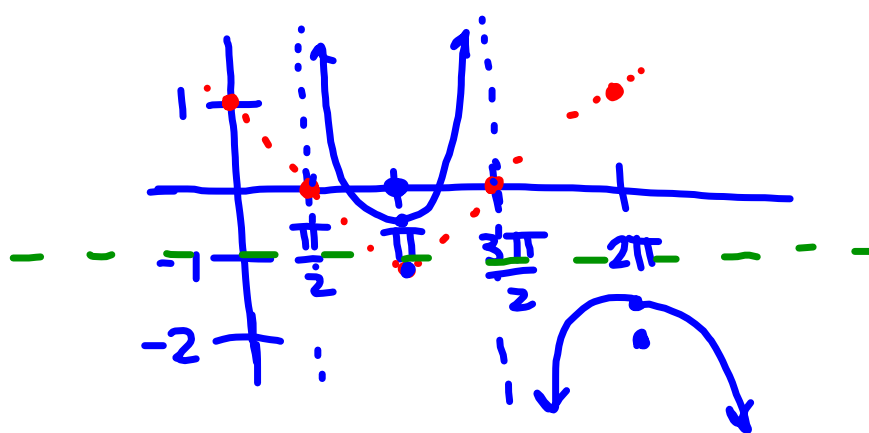
$$y = \frac{1}{2} \sec(\theta + \pi) - 1$$

$$\text{Amp} = \frac{1}{2}$$

$$\text{Per} = 2\pi$$

$$\text{PS} = \pi$$

$$\text{VS} = -1$$



Tangent Graph

- $\frac{\sin x}{\cos x} = y$

EX. 13

$$y = -2 \tan x$$

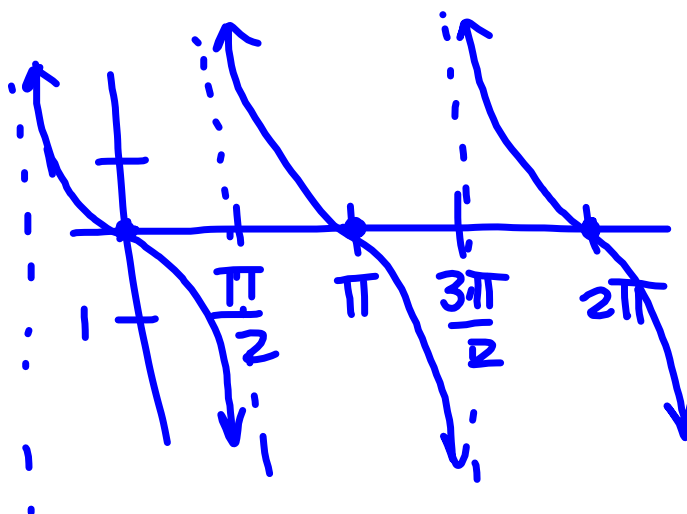
$$\text{Amp} = 2$$

$$\text{Per.} = 2\pi$$

$$\text{PS} = 0$$

$$\text{VS} = 0$$

$$\text{Ref} = \text{yes}$$



Cotangent Graph

- $\frac{\cos x}{\sin x} = y$

Ex. 14

$$y = 2 \cot(4x)$$

Amp = 2

Per = $\frac{\pi}{2}$

PS = 0

VS = 0

Ref = none

