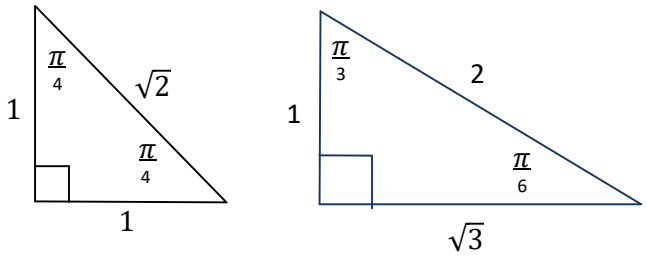
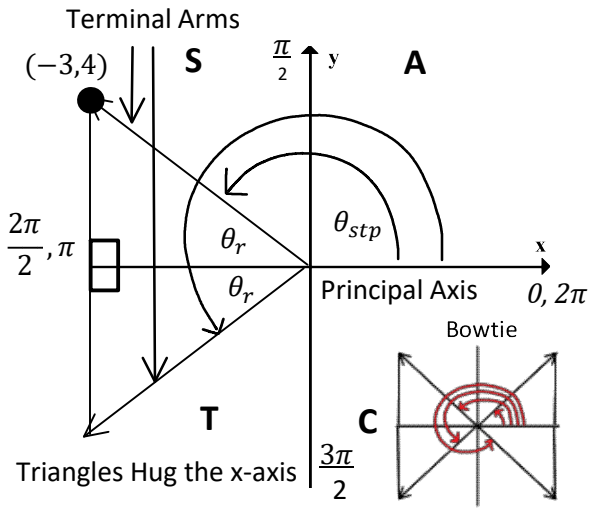
C12 - 4.0 - Trigonometry Review

Special Triangles. $\pi = 180^0$ $a^2 + b^2 = c^2$





SOH - CAH - TOA **CHO - SHA - CAO** **SYR - CXR - TYX**

$$\sin\theta = \frac{O}{H} \qquad \cos\theta = \frac{A}{H} \qquad \tan\theta = \frac{O}{A}$$

$$\csc\theta = \frac{1}{\sin\theta} = \frac{H}{O} \qquad \sec\theta = \frac{1}{\cos\theta} = \frac{H}{A} \qquad \cot\theta = \frac{1}{\tan\theta} = \frac{A}{O}$$

S flips with C C flips with S T flips with T

$\theta_r = \sin^{-1}(+\frac{O}{H})$

$\tan\theta = \frac{\sin\theta}{\cos\theta}$ $\cot\theta = \frac{\cos\theta}{\sin\theta}$

Only inverse positives $= \theta_r$

Quadrants

II | I

$\theta_{stp} = \pi - \theta_r$ (2nd) $\theta_{stp} = \theta_r$ (1st)

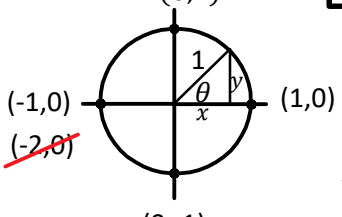
$\theta_r = \pi - \theta_{stp}$

$\theta_{stp} = \pi + \theta_r$ (3rd) $\theta_{stp} = 2\pi - \theta_r$ (4th)

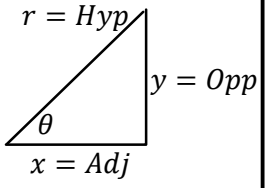
$\theta_r = \theta_{stp} - \pi$ $\theta_r = 2\pi - \theta_{stp}$

III | IV

Unit Circle



$x^2 + y^2 = r^2$



$\sin\theta = y$ $\cos\theta = x$ $\tan\theta = \frac{y}{x}$

$\theta_{cot} = \theta_{stp} \pm 2\pi$

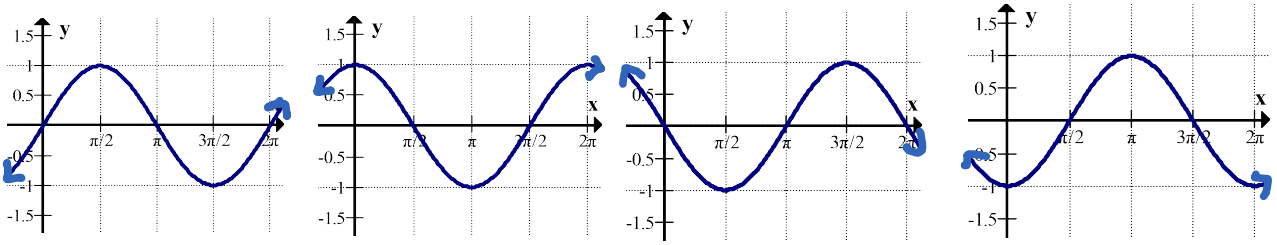
$General\ Solution: \theta_{gen} = \theta_{stp} + p^*n, n \in I$

$Period$ $p = \frac{2\pi}{|b|}\ (sin, cos)$ $p = \frac{\pi}{|b|}\ (tan)$

Arc Length Sector Area $1\ rev = 2\pi$

$a = \theta r$ $A = \frac{ar}{2}$ $A = \frac{\theta r^2}{2}$ $w = \frac{\theta}{t}$

Sine Graph $y = sinx$ Cosine Graph $y = cosx$ $y = -sinx$ $y = -cosx$



$y = a\sin(b(x - c)) + d$

GRAPH tan(x)

Tan is Zero when sin is zero
Tan is und when cos is zero

C12 - 4.0 - Trig Checklist

Calculator: Radians/Degrees

LOGIC
Check Answer

Radians $\xrightarrow{\times \frac{\pi}{180^o}}$ Degrees $\xrightarrow{\times \frac{180^0}{\pi}}$

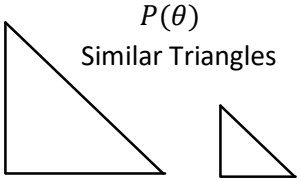
Arc Length/Sector Area
$a = \theta r$ | $A = \frac{ar}{2}$

Angles
Ratios
Triangles
Unit Circle
Algebra
Period $m = 2x$
Factoring $m = sinx$
NPV's
General Solution
Arc/Area
Angular Velocity

Special Triangles
ASTC/QI,II,III,IV
Unit Circle $r = 1$
$x^2 + y^2 = 1$

(x, y)

$P(\theta)$
Similar Triangles



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

Mark 0
Mark π *and* 2π

$\frac{\#\pi}{\#}$ — $0, 2\pi$

Change π & 2π *to have denominator you are working with or a Decimal*

Domain
$0 \leq \theta < 360$
$0 \leq \theta < 2\pi$
$\# \leq \theta < \#$

$\pm\theta, \theta_{stp}, \theta_{pri}, \theta_r, \theta_{cot}, \theta_{gen}$

$+\theta$: Counter Clockwise
$-\theta$: Clockwise

θ_{stp}: *Arrows*

θ_r: $0 \leq \theta \leq 90$

$\theta_{cot} = \theta \pm 2\pi$

$\theta_{gen} = \theta + p^*n, n \in \mathrm{I}$

$0 \leq \theta_{pri} < 360$

$sin\theta, cos\theta, tan\theta$
SOH-CAH-TOA
$csc\theta, sec\theta, cot\theta$
CHO-SHA-CAO

Range
$-1 \leq sin\theta \leq 1$
$-1 \leq cos\theta \leq 1$

Solving Equations

$sin2x = \frac{1}{2}$ *let* $m = 2x$

$\sin^2 x - sinx = 0$ *let* $m = sinx$

Linear/Angular Velocity $1\ rev = 2\pi$

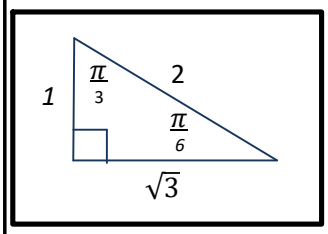
C12 - 4.0 - Trig Summary

$$\sec\left(\frac{5\pi}{3}\right) \neq \cos\left(\frac{3}{5\pi}\right)$$

1

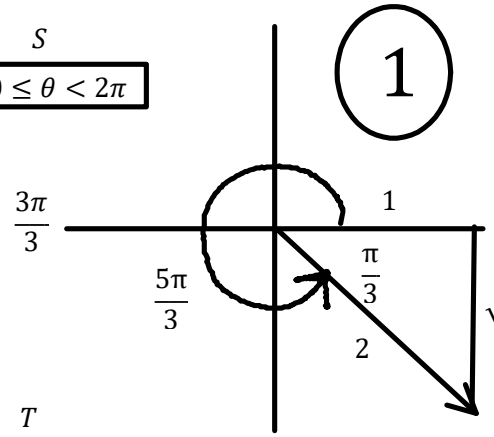
$\sec\left(\frac{5\pi}{3}\right) = ?$

$\sec\left(\frac{5\pi}{3}\right) = +\frac{2}{1}$



S

$0 \leq \theta < 2\pi$



T A C

$$sec\theta = \frac{1}{cos\theta}$$

$$sec\theta = \frac{H}{A} \uparrow \frac{A}{H} = cos\theta$$

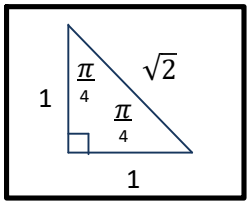
$$\frac{6\pi}{3} - \frac{5\pi}{5} = \frac{\pi}{3}$$

2

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

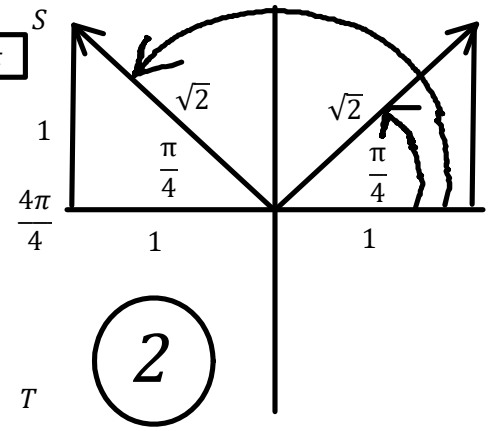
$sin\theta = \frac{\sqrt{2}}{2} = \frac{1}{\sqrt{2}}$

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



S

$0 \leq \theta < 2\pi$



T A C

$$csc\theta = \frac{H}{O} \downarrow \frac{O}{H} = sin\theta$$

Rationalize

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

$$tan\theta = 1$$
$$cot\theta = 1$$

3

$sin\theta = 0$

$sin\theta = y$

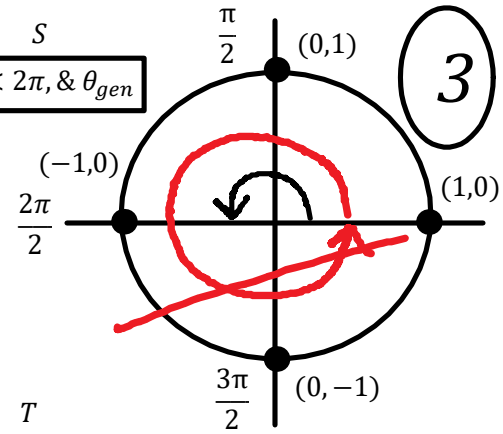
$y = 0$

$\theta = 0, \pi, 2\pi$

$\theta = n\pi, n \in I$

S

$0 \leq \theta < 2\pi, \& \theta_{gen}$



T A C

$@@@^{*}\theta = 0, \pm 1^{*}, und$

$$x^2 + y^2 = r^2$$
$$x^2 + y^2 = 1$$

$$sin\theta = y$$
$$cos\theta = x$$
$$tan\theta = \frac{y}{x}$$

4

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

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

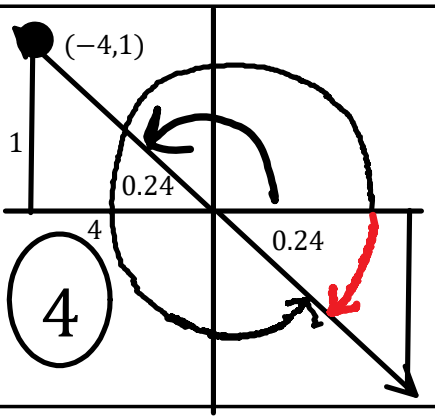
$\theta = \tan^{-1}(+\frac{1}{4})$

$\theta = 0.24$

$\theta = -0.24, 2.89, 6.03$

S

$-\pi \leq \theta < 2\pi$



T A C

$$cot\theta = \frac{A}{O} \uparrow \frac{O}{A} = tan\theta$$

Only inverse positives $= \theta_r$

$\pi - 0.24 = 2.89$
$2\pi - 0.24 = 6.03$