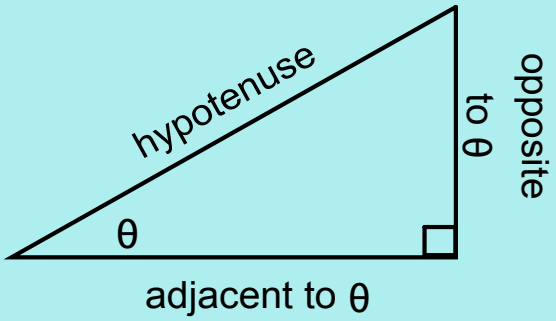
Recall:

For any angle of interest ($\theta$), there are three (3) primary trigonometric ratios.

$$\text{sine of } \theta = \frac{\text{opposite}}{\text{hypotenuse}}$$

$$\text{cosine of } \theta = \frac{\text{adjacent}}{\text{hypotenuse}}$$

$$\text{tangent of } \theta = \frac{\text{opposite}}{\text{adjacent}}$$



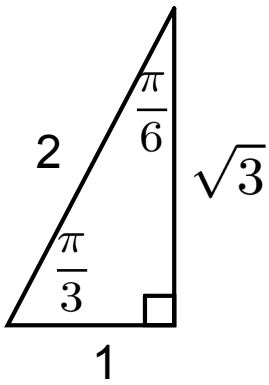

S o h C a h T o a

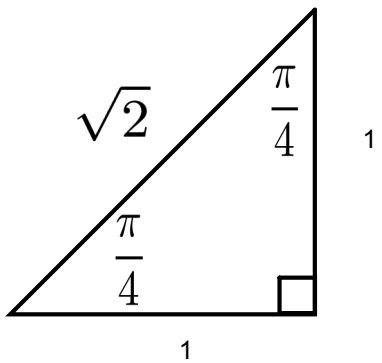
Apr 25-9:54 PM

Radian Angles on the Cartesian Plane

Oct 24/2014

The Special Triangles can be used to identify exact values for trigonometric ratios of special angles.

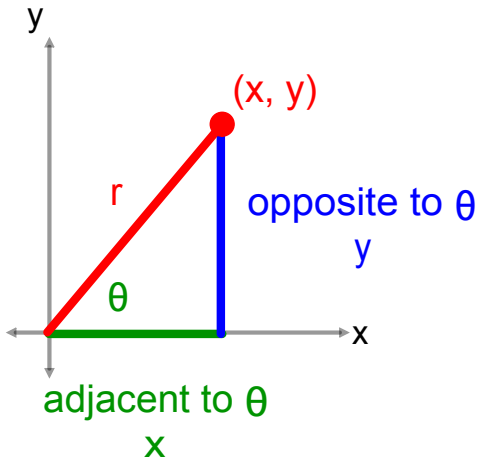



Oct 23-9:32 PM

An angle is in standard position if the vertex is at the origin and the initial arm is along the positive x-axis.

This angle can be described in terms of the point (x,y) at the end of the terminal arm,




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

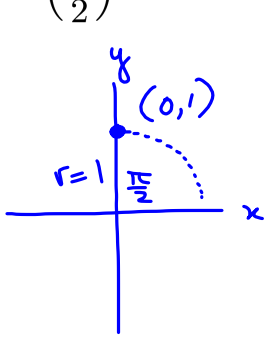
$$\sin\theta = \frac{y}{r} \qquad \cos\theta = \frac{x}{r} \qquad \tan\theta = \frac{y}{x}$$

$$\csc\theta = \frac{r}{y} \qquad \sec\theta = \frac{r}{x} \qquad \cot\theta = \frac{x}{y}$$

Apr 25-10:21 PM

Ex.1 Evaluate using Cartesian definitions & special triangles.

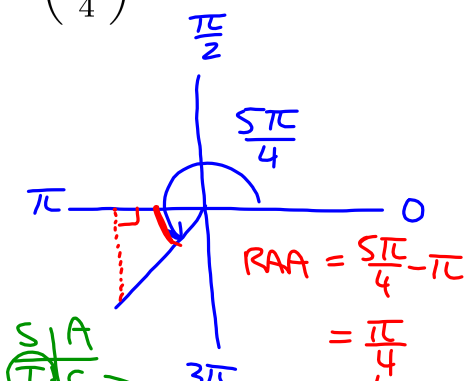
(a) $\sin\left(\frac{\pi}{2}\right)$ (b) $\cos\left(\frac{5\pi}{4}\right)$




$\sin\theta = \frac{y}{r}$

$\sin\left(\frac{\pi}{2}\right) = \frac{1}{1}$

$= 1$



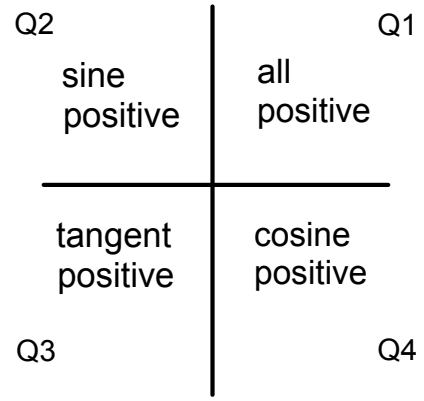

$\cos\left(\frac{5\pi}{4}\right) = -\cos\left(\frac{\pi}{4}\right)$

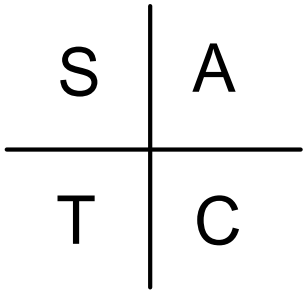
$= -\frac{1}{\sqrt{2}} \times \frac{\sqrt{2}}{\sqrt{2}}$

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

Oct 23-11:07 PM

The CAST rule allows us to quickly determine the sign of each trig ratio for any quadrant.



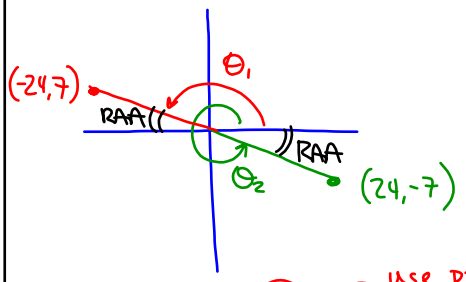




Use the CAST rule, along with the Related Acute Angle (RAA) to solve for the angle.

May 3-9:19 AM

Ex.2 Solve $\tan\theta = \frac{-7}{24}$ for $0 \le \theta < 2\pi$

$\tan\theta = \frac{y}{x}$ $y=-7$, $x=24$ or $y=7$, $x=-24$




$\tan RAA = \frac{7}{24}$ → use positive ratio for RAA!

$RAA = \tan^{-1}\left(\frac{7}{24}\right)$

$\doteq 0.2838$

$\theta_1 = \pi - RAA$ $\doteq 2.86$

$\theta_2 = 2\pi - RAA$ $\doteq 5.999$

Oct 23-11:11 PM

Assigned Work:

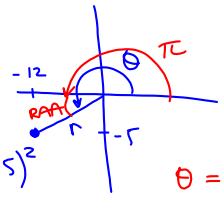
p.330 # 1-4, 5ace, 6ace, 7ace, 8ace, 9, 11, 13

4c

3d

26

26)




$r^2 = (-12)^2 + (-5)^2$

$r = 13$

$\theta = \pi + RAA$

$\sin\theta = \frac{y}{r} = \frac{-5}{13}$ $\cos\theta = \frac{x}{r} = \frac{-12}{13}$ $\tan\theta = \frac{y}{x} = \frac{-5}{-12} = \frac{5}{12}$

$\sin RAA = \frac{5}{13}$ $\cos RAA = \frac{12}{13}$ $\tan RAA = \frac{5}{12}$

$RAA = \sin^{-1}\left(\frac{5}{13}\right)$

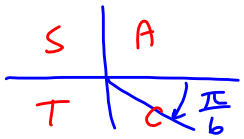
$\doteq 0.3948$

$\theta \doteq \pi + 0.3948$

$\doteq 3.54$

Oct 23-10:59 PM

3(d) $\theta = -\frac{\pi}{6}$

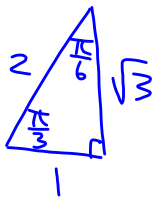



$\sin\left(-\frac{\pi}{6}\right) = -\sin\left(\frac{\pi}{6}\right) = -\frac{1}{2}$

$\cos\left(-\frac{\pi}{6}\right) = +\cos\left(\frac{\pi}{6}\right)$

$\tan\left(-\frac{\pi}{6}\right) = -\tan\left(\frac{\pi}{6}\right)$

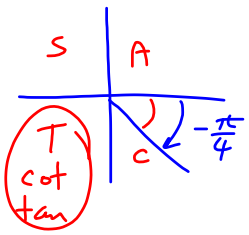
$\csc\left(-\frac{\pi}{6}\right) = -\csc\left(\frac{\pi}{6}\right) = -\frac{1}{\sin\left(\frac{\pi}{6}\right)} = \frac{-1}{\frac{1}{2}} = -2$




Oct 30-2:00 PM

4 (c) $\cot\left(-\frac{\pi}{4}\right)$

$= -\cot\left(\frac{\pi}{4}\right)$ RAA




6 (a) $\cos\theta = -\frac{1}{2}$


$\cos RAA = \frac{1}{2}$

① $RAA = \frac{\pi}{3}$

② S A T C

in Q2: $\theta = \pi - \frac{\pi}{3}$

$= \frac{2\pi}{3}$

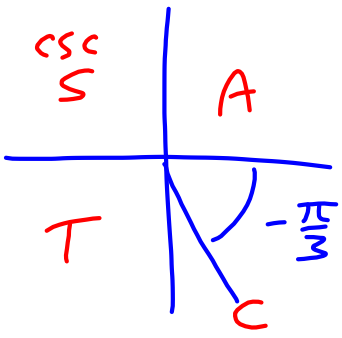
in Q3: $\theta = \pi + \frac{\pi}{3}$

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

Oct 30-2:04 PM

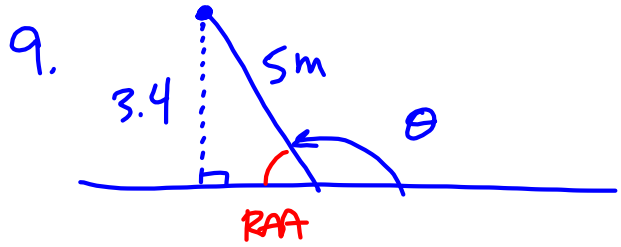
8 (c) $\csc\left(-\frac{\pi}{3}\right)$

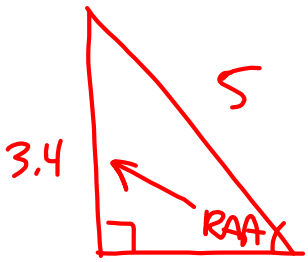
$= -\csc\left(\frac{\pi}{3}\right)$




Oct 30-2:09 PM

9.




$\sin RAA = \frac{3.4}{5}$

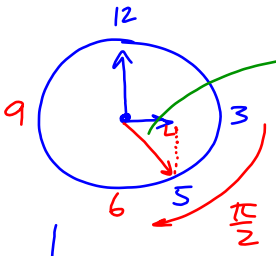
$RAA =$ _____

$\theta = \pi - RAA$

$=$ _____

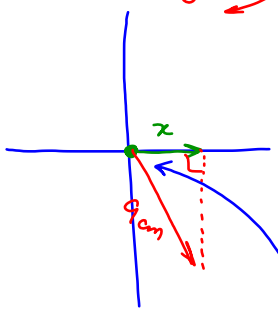
Oct 30-2:10 PM

11.




$\frac{2}{3} \times \frac{\pi}{2} = \frac{\pi}{3}$

$\frac{\pi}{2}$




3 → 5 : 10 min

$\frac{10\text{min}}{60\text{min}} \times 2\pi$

$= \frac{1}{6} \times 2\pi$

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

$\cos \frac{\pi}{3} = \frac{x}{9}$

$x = 9 \cos \frac{\pi}{3}$

$= 4.5$

Oct 30-2:12 PM