

Today's Learning Goal(s):

Date: _____

By the end of the class, I will be able to:

- a) explain the relationship between the ratios of an angle in standard position, and the related acute angle (RAA).
- b) determine the trig ratios of angles between 0° and 360° .

Last day's work: pp. 286-287 # 1 – 9 [13 – 15]

p. 287

9. Show that $\tan 30^\circ + \frac{1}{\tan 30^\circ} = \frac{1}{\sin 30^\circ \cos 30^\circ}$.

$$\begin{aligned}
 \text{LS} &= \tan 30^\circ + \frac{1}{\tan 30^\circ} & \text{RS} &= \frac{1}{\sin 30^\circ \cos 30^\circ} \\
 &= \frac{1}{\sqrt{3}} + \frac{1}{\frac{1}{\sqrt{3}}} & &= \frac{1}{\left(\frac{1}{2}\right)\left(\frac{\sqrt{3}}{2}\right)} \\
 &= \frac{1}{\sqrt{3}} + \sqrt{3} & &= \frac{1}{\frac{\sqrt{3}}{4}} \\
 &= \frac{\sqrt{3}}{3} + \sqrt{3} & &= \frac{4}{\sqrt{3}} \\
 &= \frac{\sqrt{3}}{3} + \frac{3\sqrt{3}}{3} & &= \frac{4\sqrt{3}}{3} \\
 &= \frac{4\sqrt{3}}{3}
 \end{aligned}$$

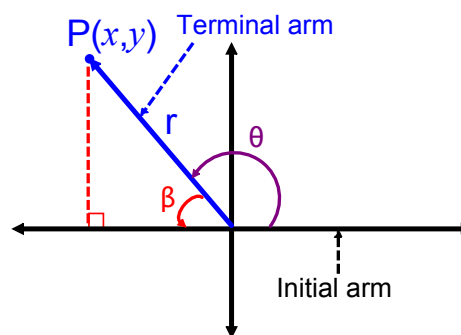
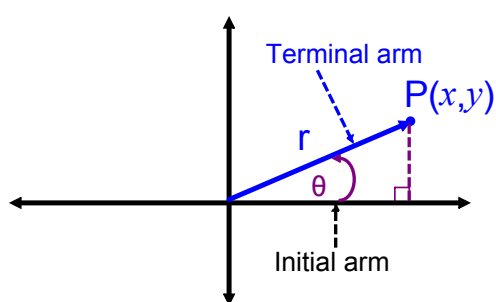
$$\therefore \text{LS} = \text{RS}$$

\therefore QED.

Defining an angle in "standard position".

θ = Principal Angle

β = Related Acute Angle (RAA)

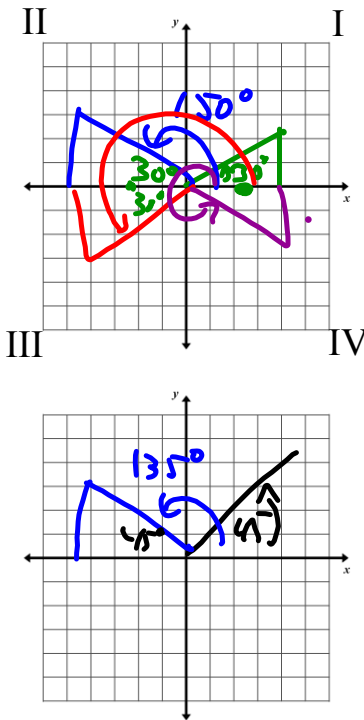


Note: In Quadrant I: $\theta = \beta$

5.3 Exploring Trigonometric Ratios for Angles Greater Than 90°

Date: Apr. 26/17

Explore the Math pp. 289-291 A - J



Angles	Quadrant	Sine Ratio	Cosine Ratio	Tangent Ratio
Related Acute Angle $\beta = 30^\circ (= \theta)$	I	$\frac{1}{2}$	$\frac{\sqrt{3}}{2}$	$\frac{1}{\sqrt{3}}$
Principal Angle $\theta = 150^\circ$	II	$\frac{1}{2}$	$-\frac{\sqrt{3}}{2}$	$-\frac{1}{\sqrt{3}}$
$\theta = 210^\circ$	III	$-\frac{1}{2}$	$-\frac{\sqrt{3}}{2}$	$\frac{1}{\sqrt{3}}$
$\theta = 330^\circ$	IV	$-\frac{1}{2}$	$\frac{\sqrt{3}}{2}$	$-\frac{1}{\sqrt{3}}$
$\beta = 45^\circ$	I	$\frac{1}{\sqrt{2}}$	$\frac{1}{\sqrt{2}}$	1
$\theta = 135^\circ$	II	$\frac{1}{\sqrt{2}}$	$-\frac{1}{\sqrt{2}}$	-1
$\theta =$				
$\theta =$				

5.4 Evaluating Trigonometric Ratios for $0^\circ \leq \theta \leq 360^\circ$ (Day1)

Ex.1

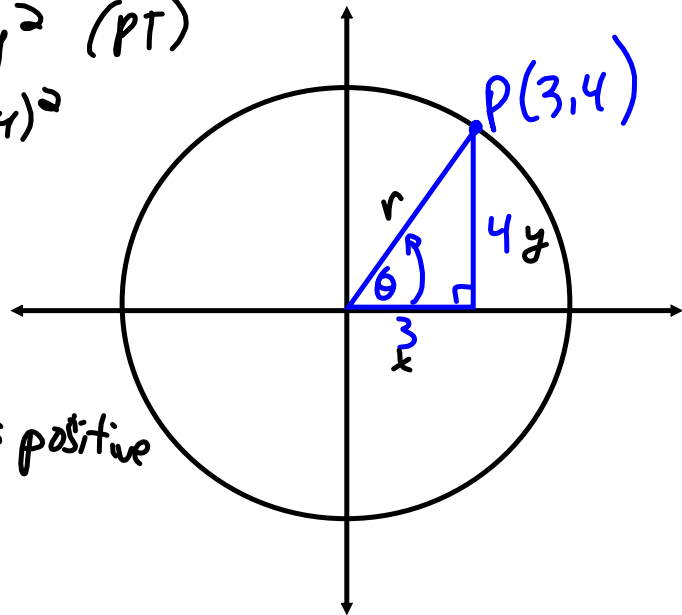
a) The point P(3,4) lies on the terminal arm of an angle θ .Determine the primary trig ratios for θ .

$$\begin{aligned}\sin \theta &= \frac{\text{opp}}{\text{hyp}} \\ &= \frac{y}{r} \\ &= \frac{4}{5}\end{aligned}$$

$$\begin{aligned}\cos \theta &= \frac{\text{adj}}{\text{hyp}} \\ &= \frac{x}{r}\end{aligned}$$

$$\begin{aligned}\tan \theta &= \frac{y}{x} \\ &= \frac{4}{3}\end{aligned}$$

$$\begin{aligned}r^2 &= x^2 + y^2 \quad (\text{PT}) \\ &= (3)^2 + (4)^2 \\ &= 9 + 16 \\ &= 25 \\ r &= \pm \sqrt{25} \\ &= \pm 5 \\ r &\text{ is always positive} \\ \therefore r &= 5\end{aligned}$$



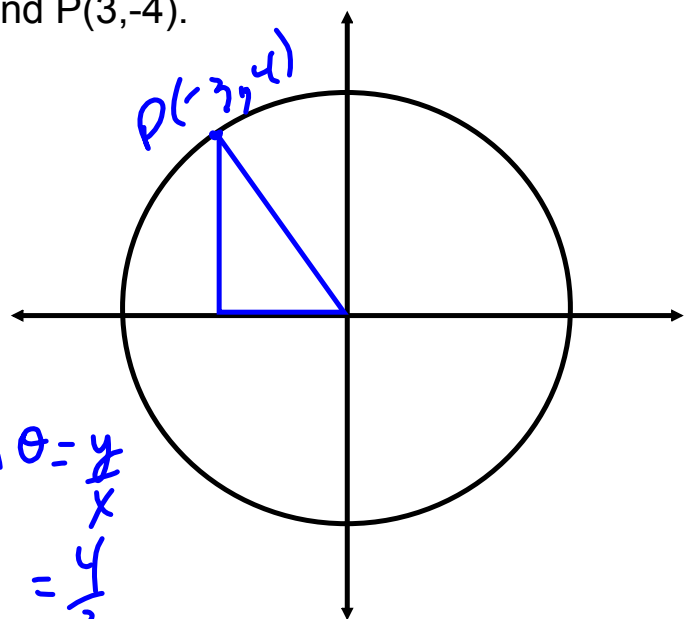
SYR CXR TYX

b) Repeat for P(-3,4), P(-3,-4) and P(3,-4).

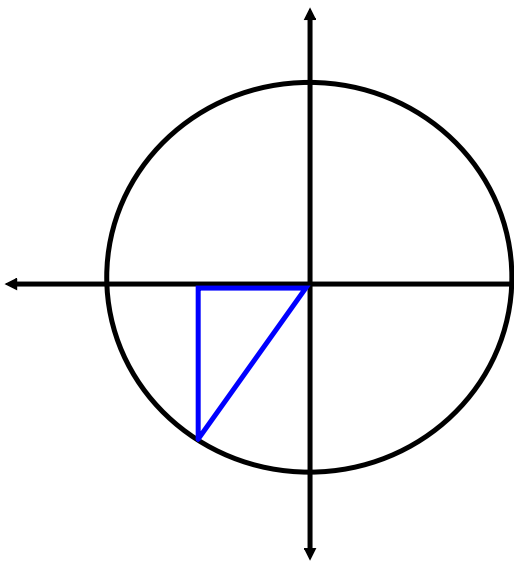
$$\begin{aligned}r^2 &= x^2 + y^2 \quad (x,y) \\ &\vdots \\ r &= 5\end{aligned}$$

SYR CXR TYX

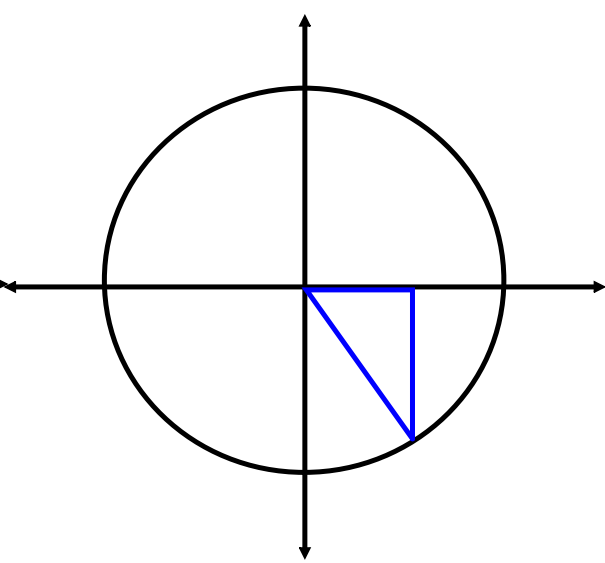
$$\begin{aligned}\sin \theta &= \frac{y}{r} & \cos \theta &= \frac{x}{r} & \tan \theta &= \frac{y}{x} \\ &= \frac{4}{5} & &= \frac{-3}{5} & &= \frac{4}{-3}\end{aligned}$$

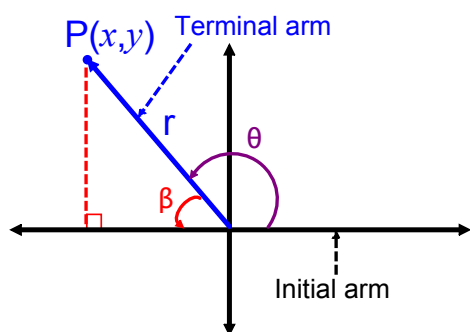


$P(-3,-4)$

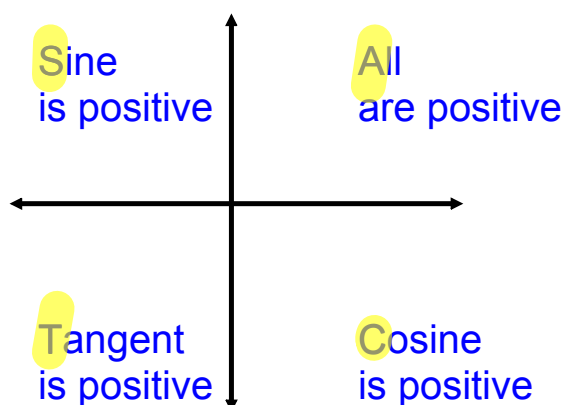


$P(3,-4)$



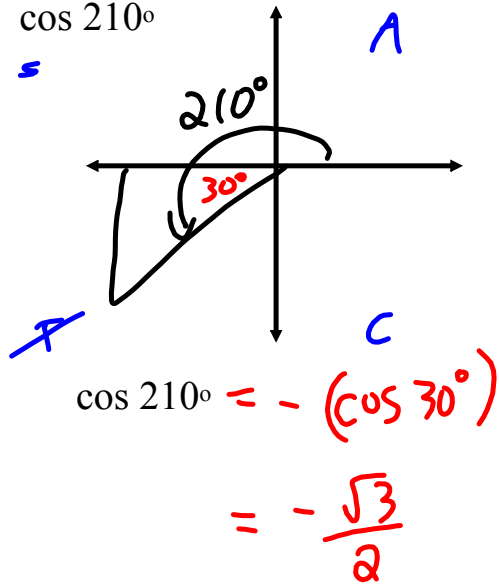


Circle Definitions for the
Primary Trig Ratios

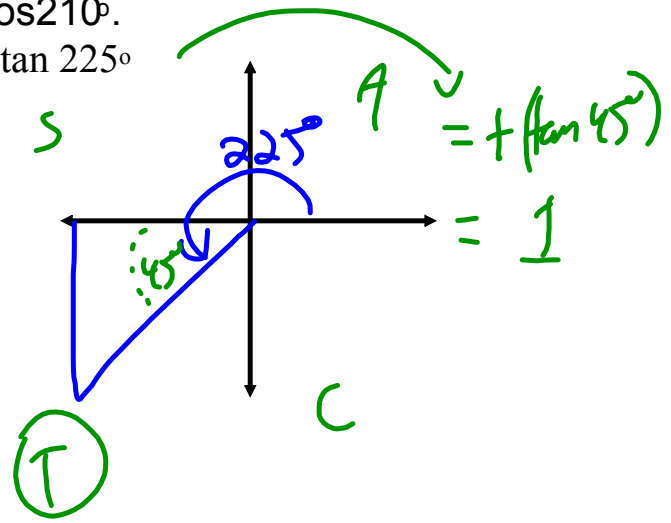


Ex.2 Determine the exact value for $\cos 210^\circ$.

a) $\cos 210^\circ$



b) $\tan 225^\circ$

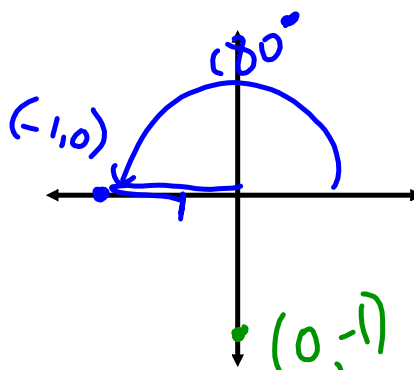


Ex.3 Determine the primary trig ratios for 180° and 270° .

$$\sin 180^\circ = \frac{0}{1} = 0$$

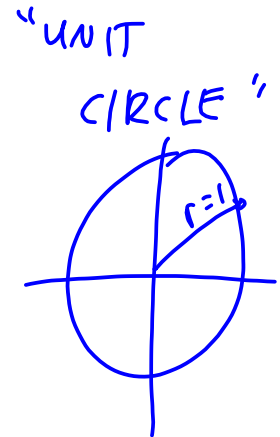
$$\cos 180^\circ = \frac{-1}{1} = -1$$

$$\tan 180^\circ = \frac{0}{1} = 0$$



$$\sin 270^\circ = \frac{-1}{1} = -1$$

$$\cos 270^\circ = \frac{0}{1} = 0$$



$$\tan 270^\circ = \frac{-1}{0}$$

undefined

Are there any Homework Questions you would like to see on the board?

Last day's work: pp. 286-287 # 1 – 9 [13 – 15]

Today's Homework Practice includes:

pp. 289-291 A – J (done)

p. 292 #1 – 4

pp. 299-300 #(1 – 5)ac