What's Going On?

Checking In

Minds on The CAST Rule

Action! Angle of Mine

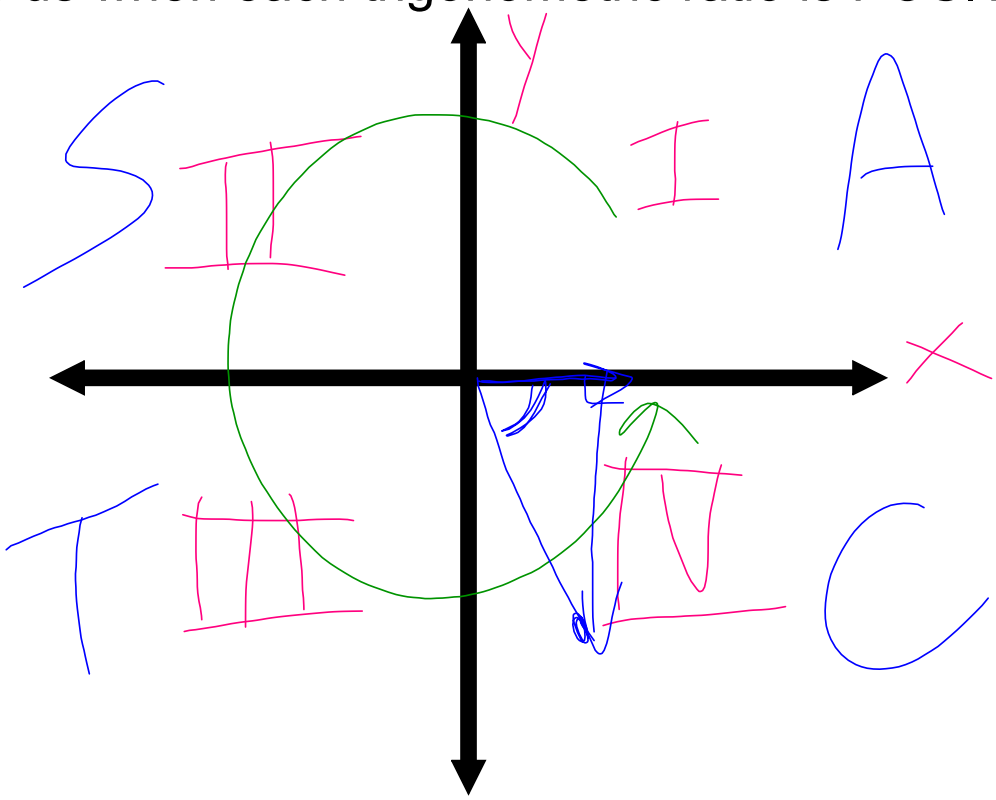
Consolidation Working Backward.

Learning Goal - I will be able to determine and evaluate the trig ratios of angles between 0 and 360.

Minds on

The CAST Rule

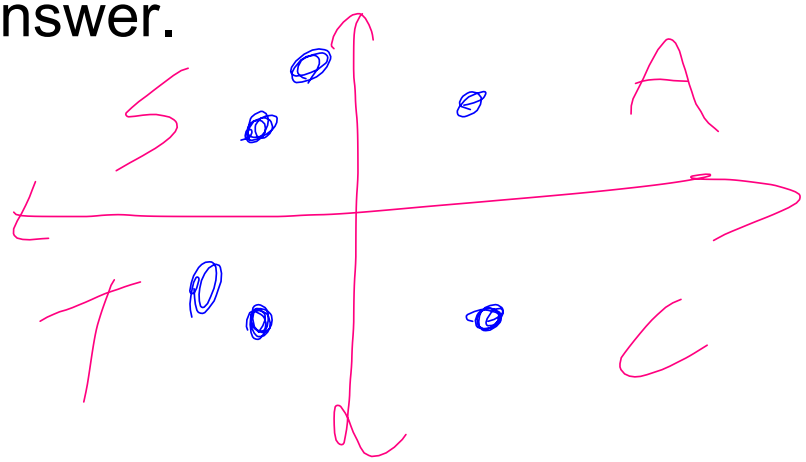
Tells us when each trigonometric ratio is POSITIVE



Minds on

The CAST Rule

Use the CAST Rule to determine the sign of each answer.



sin (150°) +

cos (222°) −

tan (75°) +

sec (315°) + (cos) +

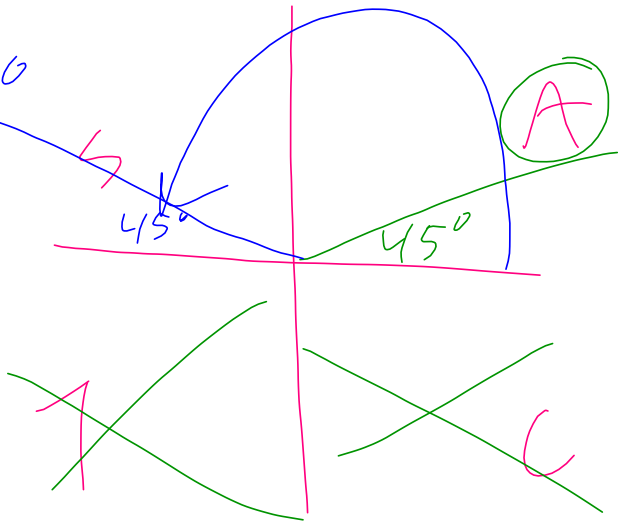
csc (200°) − (1/sin) −

cot (95°) − (1/tan) −

State all angles $0 < \theta < 360$ that make the equation true.

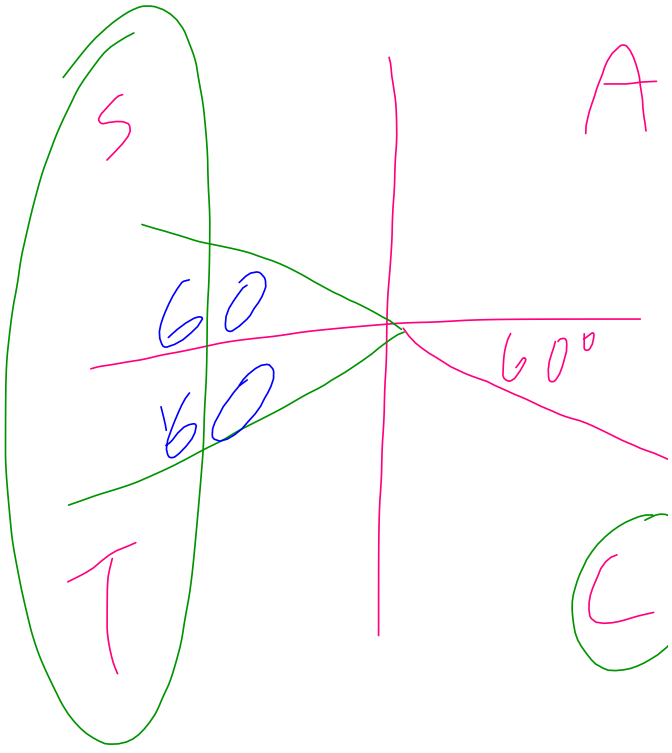
a) $\sin 45^\circ = \sin 135^\circ$

$\theta = 135^\circ$



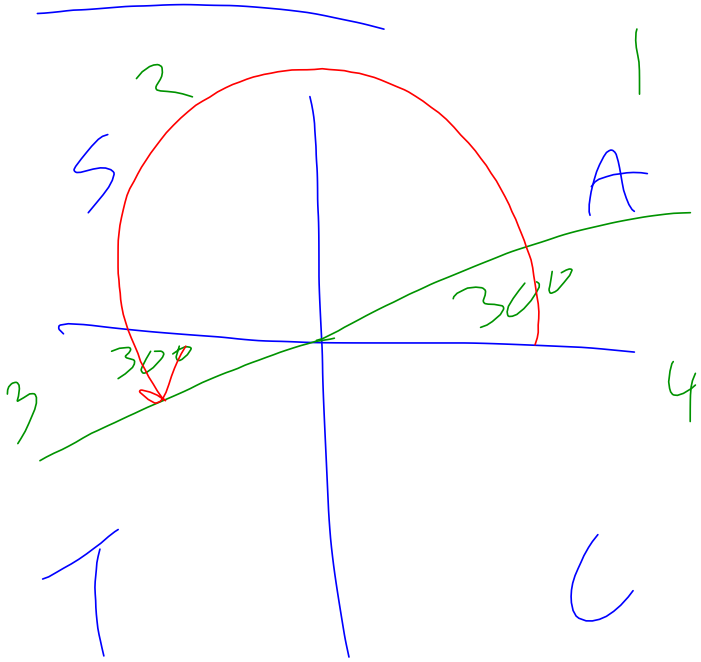
b) $\cos\_\_\_\_\_ = -\cos(-60)$

$\theta = 120^\circ, 240^\circ$



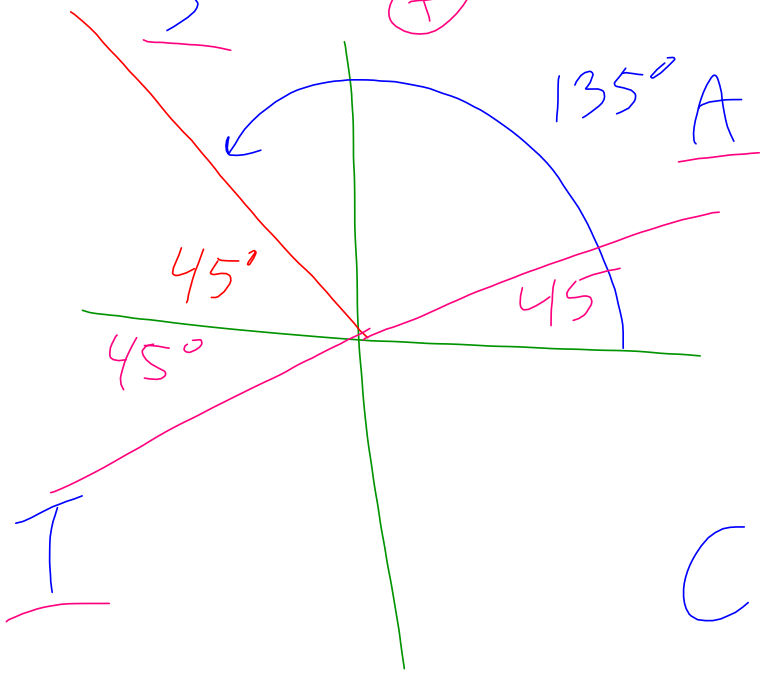
$\tan 30^\circ = \tan$ _____

$\theta = 210^\circ$



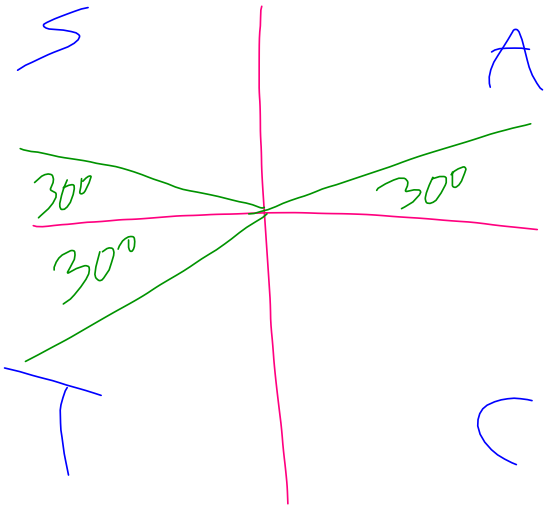
$\tan 135^\circ = -(\tan$

$\theta = 45^\circ, 225^\circ$



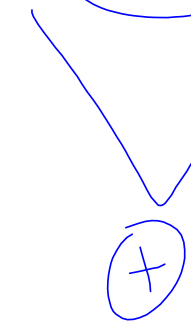
$\sin 210^\circ = -\sin$

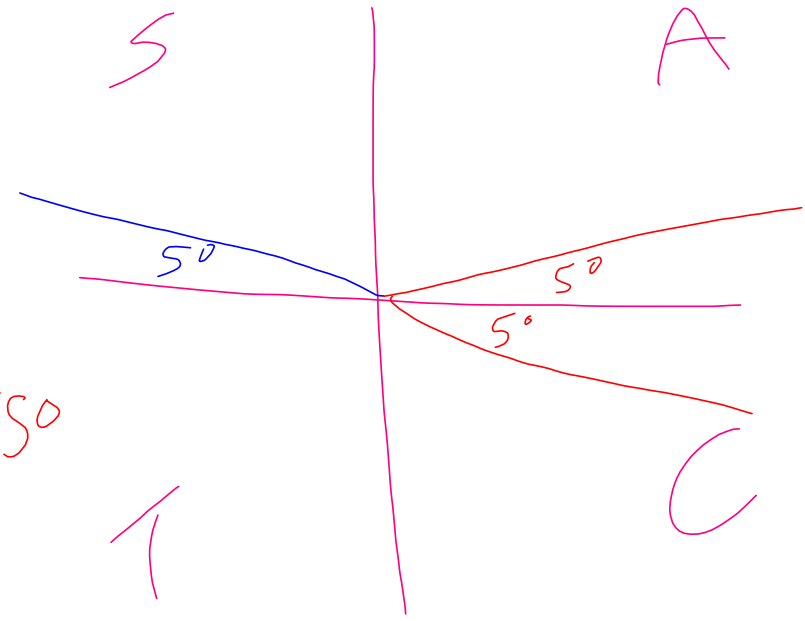
(−) (+)



$\theta = 30^\circ, 150^\circ$

$-\cos 175^\circ = \cos$ _____





$\theta = 5^\circ$, 355°

Action!

Angle of Mine

1) Sketch a circle with its centre at the origin that goes through the point P(3, 4).

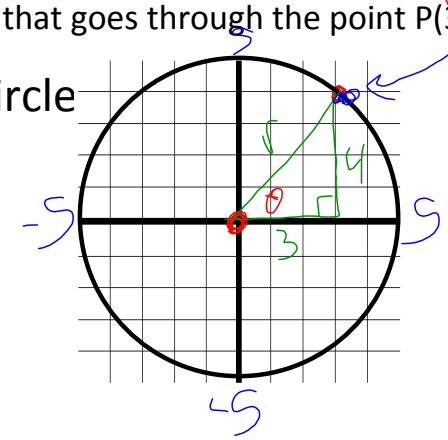
a) Determine the radius of the circle

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

$r^2 = 3^2 + 4^2$

$r^2 = 25$

$r = 5$



b) Determine the primary trig raos for the principal angle.

$\sin\theta = \frac{4}{5}$ $\cos\theta = \frac{3}{5}$ $\tan\theta = \frac{4}{3}$

$\csc\theta = \frac{5}{4}$ $\sec\theta = \frac{5}{3}$ $\cot\theta = \frac{3}{4}$

c) Determine the principal angle to the nearest degree.

$\sin\theta = \frac{4}{5}$ | $\cos\theta = \frac{3}{5}$ | $\tan\theta = \frac{4}{3}$

$\theta = \sin^{-1}(0.8)$ | $\theta = \cos^{-1}(0.6)$ | $\theta = \tan^{-1}(1.33)$

$\theta = 53°$ $\theta = 53°$ $\theta = 53°$

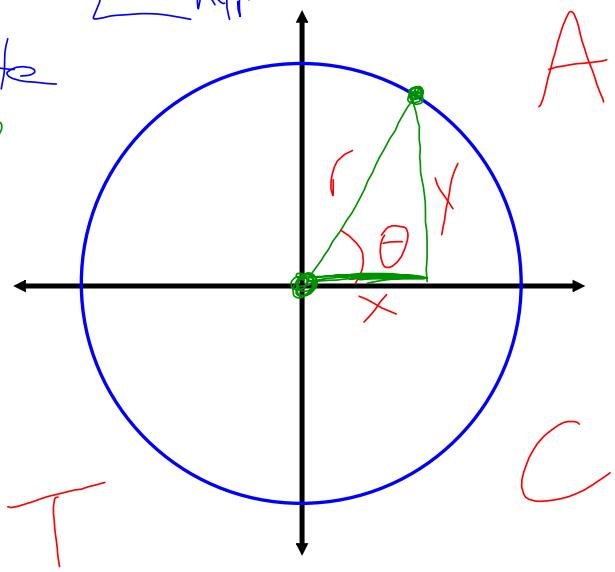
For any point P(*x*, *y*) in the Cartesian plane, the trigonometric ratios for angles in standard position can be expressed in terms of *x*, *y* and *r*.

adjacent

opposite

hypotenuse

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



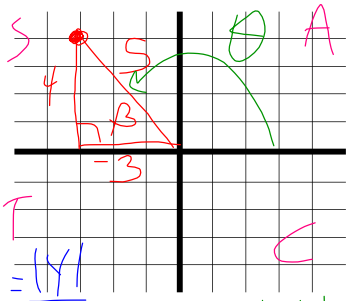
$$\sin\theta = \frac{y}{r} \qquad \cos\theta = \frac{x}{r} \qquad \tan\theta = \frac{y}{x}$$

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

2) Now, choose the point P(-3, 4) on the circumference of the circle.

a) Determine the primary trig raos for the principal angle. ⇒ θ

θ is always our principal angle
We will use β as the related acute.



$\sin\beta = \frac{|y|}{r}$ $\cos\beta = \frac{|x|}{r}$ $\tan\beta = \frac{|y|}{|x|}$

* the absolute value symbols are used because we don't care about the sign for the related acute

$\sin\beta = \frac{4}{5}$ $\cos\beta = \frac{3}{5}$ $\tan\beta = \frac{4}{3}$

* we are in Q2 so.....

$\sin\theta = \sin\beta$ $\cos\theta = -\cos\beta$ $\tan\theta = -\tan\beta$

$\sin\theta = \frac{4}{5}$ $\cos\theta = \frac{-3}{5}$ $\tan\theta = -\frac{4}{3}$

b) Determine the principal angle to the nearest degree.

* we are in Q2, so...

$\theta = 180 - \beta$

First find β

$\sin\beta = \frac{4}{5}$

$\beta = \sin^{-1}\left(\frac{4}{5}\right)$

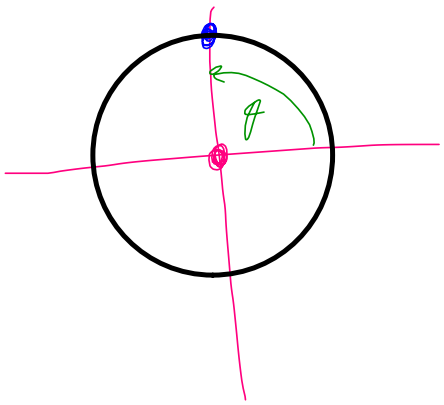
$\beta = 53°$

$\therefore \theta = 180 - 53°$

$\theta = 127°$

Example 1: Sketch a circle with its centre at the origin that goes through the point P(0, 1).

Determine the radius of the circle.



$r = 1$

$x = 0$

$y = 1$

Determine the primary trig raos for the principal angle.

$\sin\theta = \frac{1}{1} = 1$ $\quad \cos\theta = \frac{0}{1} = 0$ $\quad \tan\theta = \frac{1}{0} = \text{undefined}$

Determine the principle angle to the nearest degree.

$90°$

Consolidation

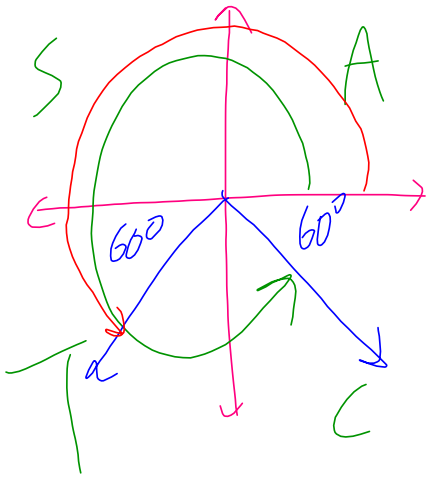
Working Backwards

Example 2: Determine the values of θ if $\csc\theta = -\frac{2\sqrt{3}}{3}$ and $0^\circ \le \theta \le 360^\circ$.

$\sin\theta = -\frac{3}{2\sqrt{3}}$

$\theta = \sin^{-1}\left(-\frac{3}{2\sqrt{3}}\right)$

$\theta = -60$



We know that sin theta is negative... therefore we are in quadrants III and IV!

The relative acute angle is 60.

$\theta = 300, 240^\circ$

Homework

Pg 294

1 - 12