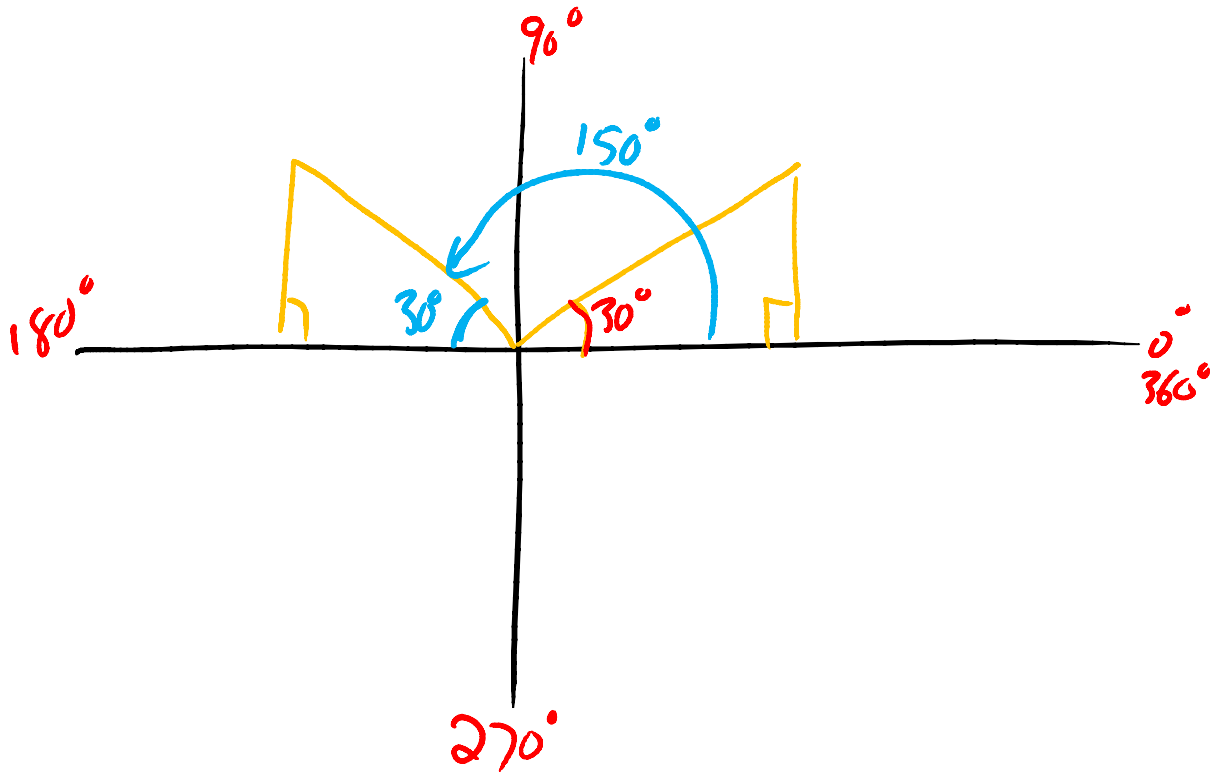
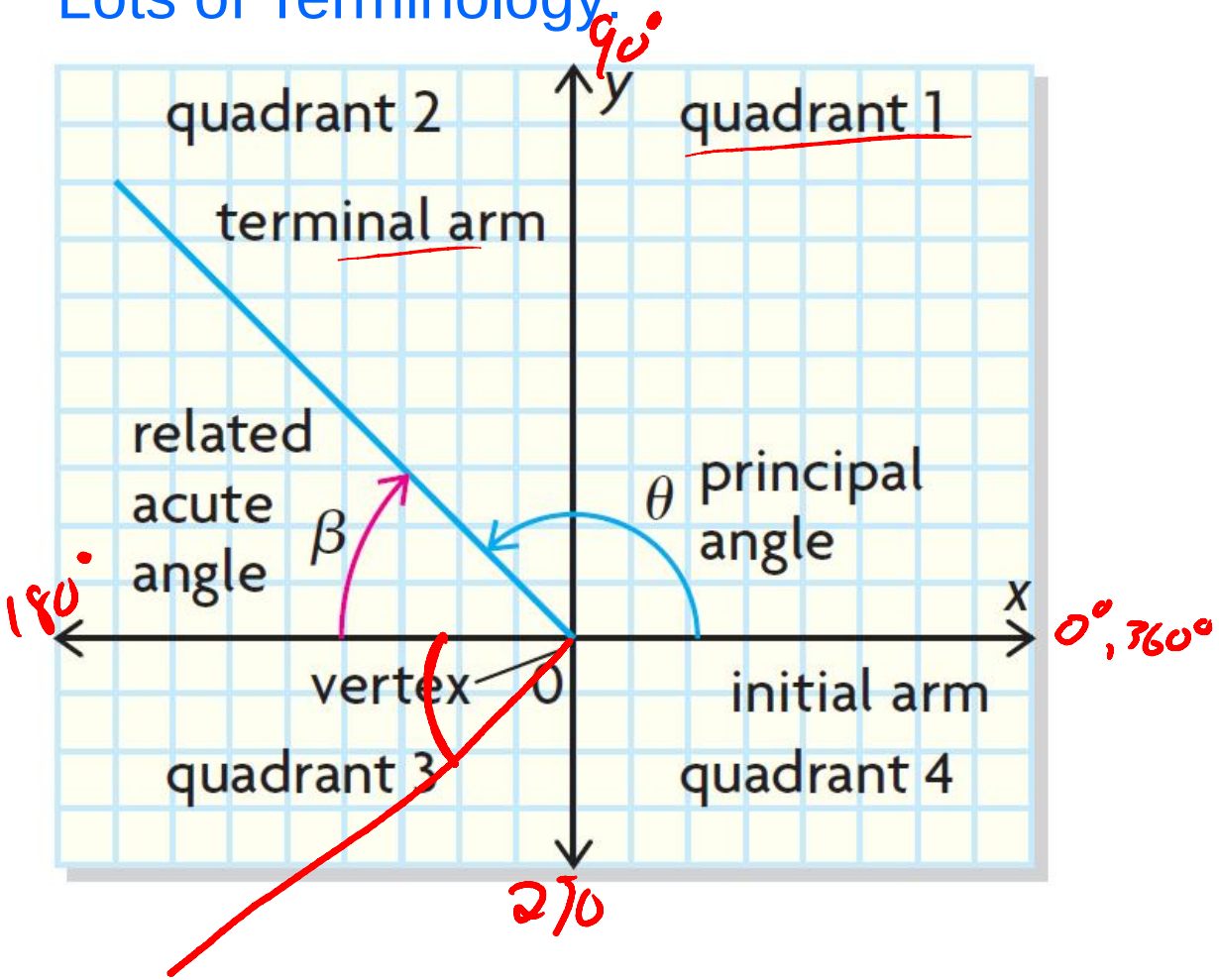
Chapter 5.3 & 5.4

The Big Idea: Every ratio exists twice between 0^o and 360^o

$\sin 30 =$ 0.5 $\sin 150 =$ 0.5

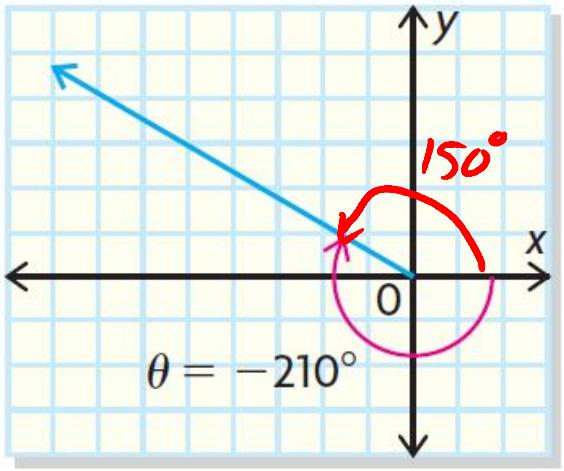


Lots of Terminology:

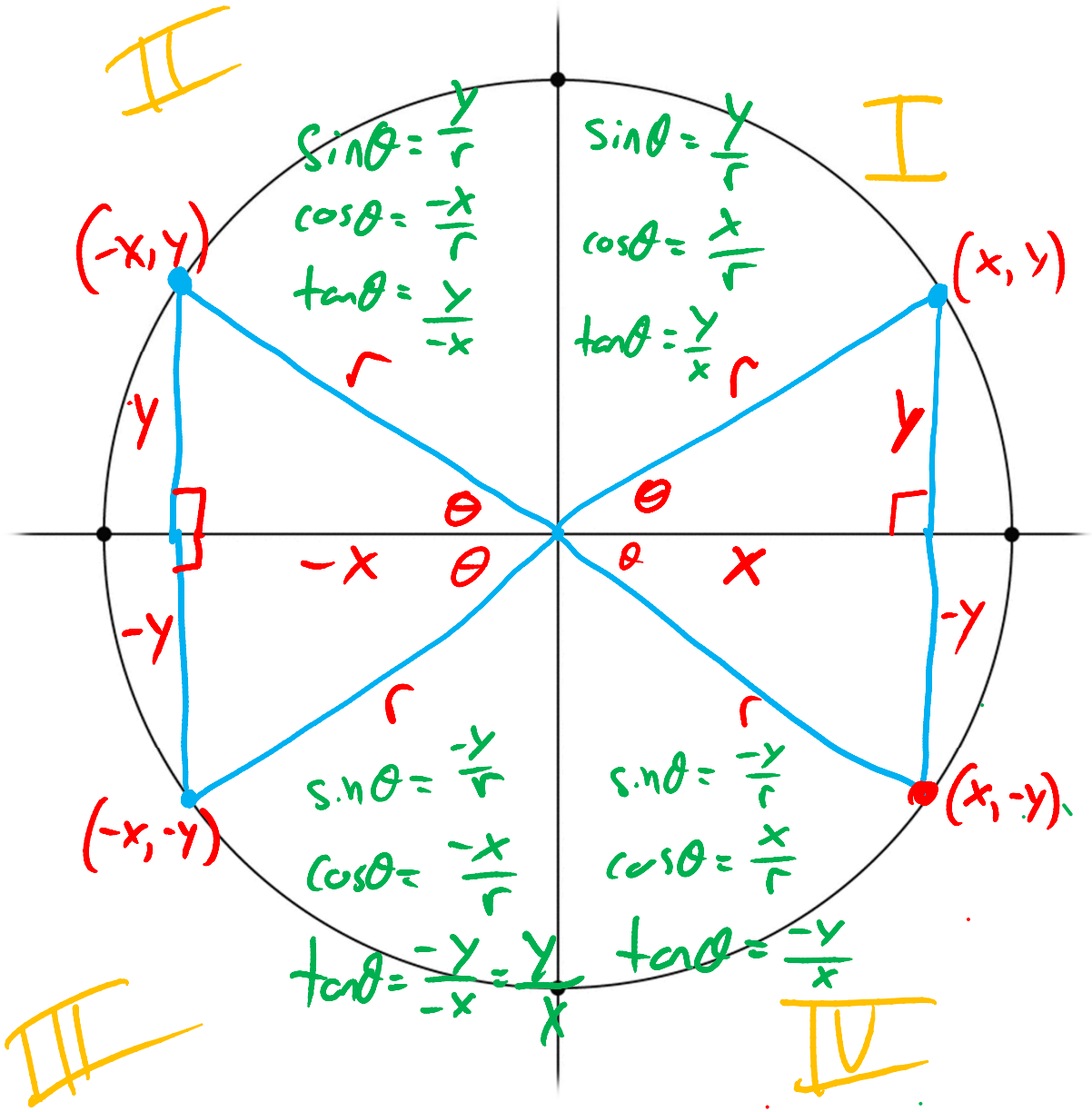


Negative angle
= clockwise

positive angle
= counterclockwise



Looking at trig ratios on a Cartesian Plane:



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

Equivalent Ratios

$\sin\theta = \sin(180 - \theta)$

$\cos\theta = \cos(360 - \theta)$

$\tan\theta = \tan(180 + \theta)$

CAST Rule

S	A
T	C

Find the second equivalent trig ratio:

1. $\sin 20 = \sin(180-20) = \sin 160$
2. $\cos 280 = \cos(360-280) = \cos 80$
3. $\tan 110 = \tan(180+110) = \tan 290$
4. $\csc 192 = \csc(180-192) = \csc -12 = \csc 348$
5. $\sec 18 = \sec(360-18) = \sec(342)$
6. $\cot 215 = \cot(180+215) = \cot 395 = \cot 35$

-360

Each point lies on the terminal arm of angle θ in standard position.

i) Draw a sketch of each angle θ.

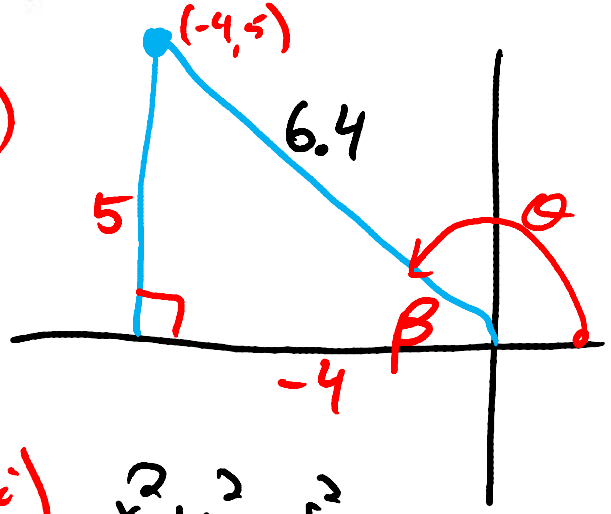
ii) Determine the value of r to the nearest tenth.

iii) Determine the primary trigonometric ratios for angle θ.

iv) Calculate the value of θ to the nearest degree.

$P(-4, 5)$

i)



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

$(-4)^2 + 5^2 = r^2$

$16 + 25 = r^2$

$\sqrt{41} = r^2$

$6.4 = r$

iii) $\sin\theta = \frac{5}{6.4}$ $\quad \tan\theta = \frac{5}{-4}$

$\cos\theta = \frac{-4}{6.4}$

only use one!

iv) $\theta = \sin^{-1}\left(\frac{5}{6.4}\right)$

$\theta = 51°$

$\theta = 180 - 51$

$\theta = 129°$

$\theta = \cos^{-1}\left(\frac{-4}{6.4}\right)$

$\theta = 129°$

$\theta = \tan^{-1}\left(\frac{5}{-4}\right)$

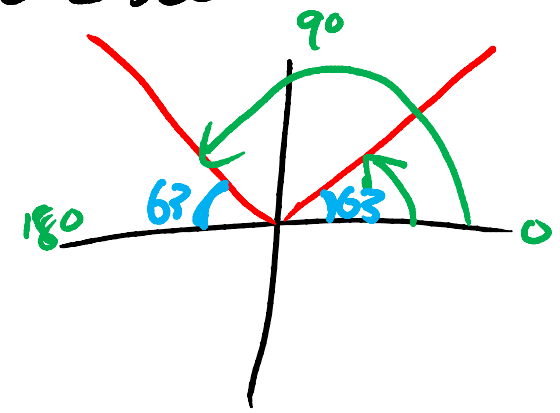
$\theta = -51$

$\theta = 180 + -51$

$\theta = 129°$

Use each trigonometric ratio to determine BOTH values of θ between 0^o and 360^o.

$0 \leq \theta \leq 360°$



1. $\sin\theta = 0.8942$

$\theta = \sin^{-1}(0.8942)$

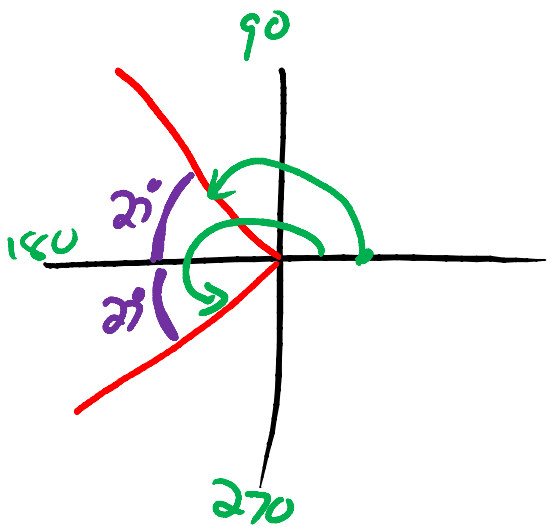
$\theta = 63°$

$\theta = 180 - 63$

$= 117°$

Use each trigonometric ratio to determine BOTH values of θ between 0^o and 360^o.

S | A
T | C



2. $\cos\theta = -0.8931$

$\theta = \cos^{-1}(-0.8931)$

$\theta = 153°$

$\theta = 360 - 153$

$= 207°$

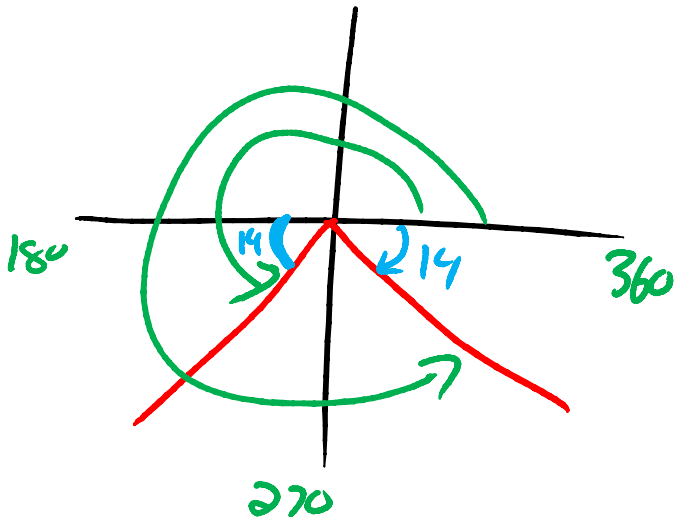
Use each trigonometric ratio to determine BOTH values of θ between 0^o and 360^o.

3. $\csc\theta = -4.2013$

$\frac{}{1}$

$\sin\theta = \frac{1}{-4.2013}$

$\theta = \sin^{-1}\left(\frac{1}{-4.2013}\right)$



$\theta = -14° = 360 - 14 = 346°$

$\theta = 180 - -14 = 180 + 14 = 194°$