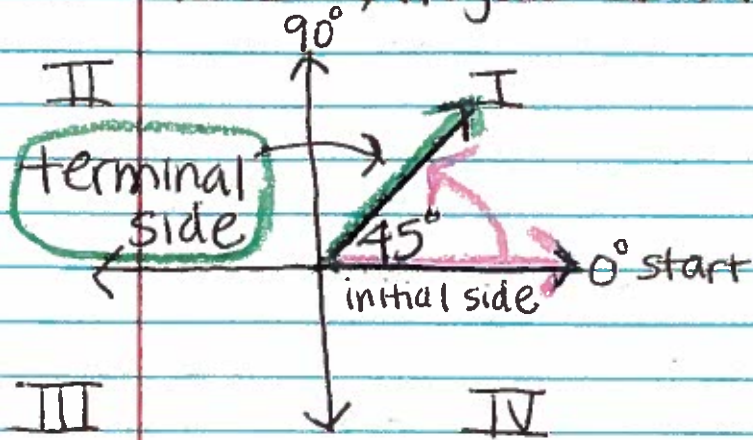


Day 59

13.2 Angles and the Unit Circle



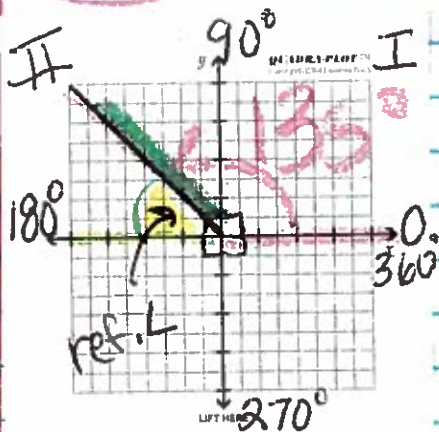
positive angles:
counterclockwise

negative angles:
clockwise

Reference angles are always formed between the x-axis and the terminal side. If an \angle is not in quadrant I, you will have to find it for sine and cosine.

135°

Ref. \angle for 135° is 45° .



$$\begin{array}{r} 180 \\ -135 \\ \hline 45 \end{array}$$

S only sine is positive 90° to 180°

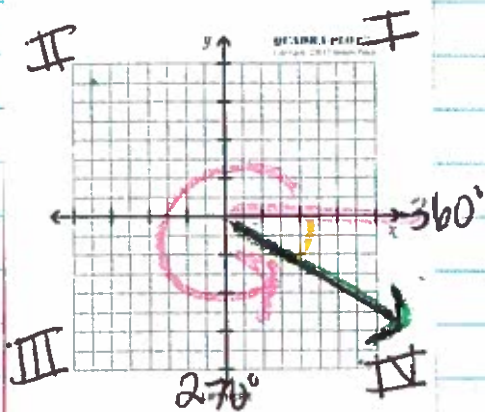
T only tangent is positive 180° to 270°

A **I** (0° to 90°)
All Trig Functions are positive in quadrant I.

C **IV**
only cosine is positive 270° to 360°

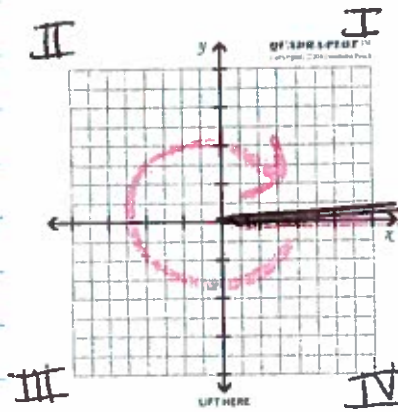
counterclockwise

(ex) 330° $\begin{array}{r} 360 \\ -330 \\ \hline \end{array}$
 \downarrow
 ref. $\angle = 30^\circ$



(ex) -355° $\begin{array}{r} \text{neg} \\ \swarrow \\ \text{clockwise} \end{array}$

ref. $\angle = 5^\circ$ $\begin{array}{r} 360 \\ -355 \\ \hline \end{array}$



Two angles in standard position are coterminal if they have the same terminal side.

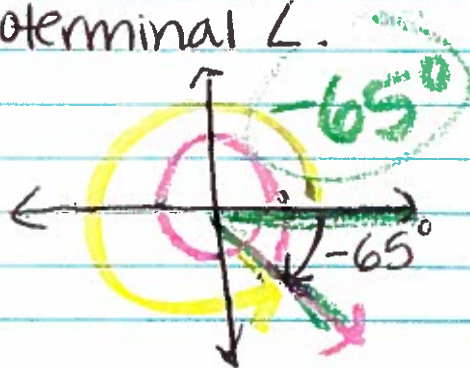
Find a coterminal \angle between 0 and 360° .

(ex) 390° $\begin{array}{r} 360 \\ -360 \\ \hline 30^\circ \end{array}$

(ex) -215° $\begin{array}{r} 360 \\ -215 \\ \hline 145^\circ \end{array}$

Find a positive and negative coterminal \angle .

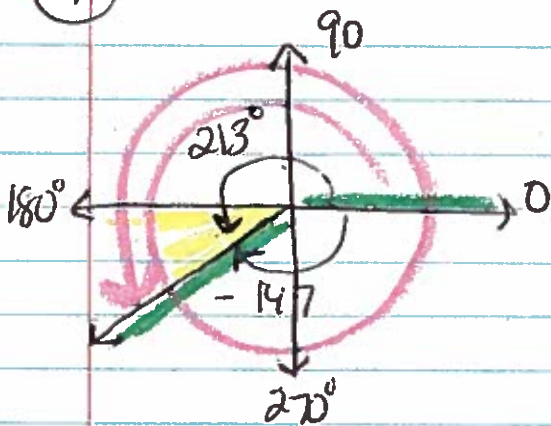
(ex) -425° $\begin{array}{r} 425 \\ -360 \\ \hline 65^\circ \end{array}$



$\begin{array}{r} 360 \\ -65 \\ \hline \text{positive } 295^\circ \end{array}$

ex 213°

Coterminal \angle



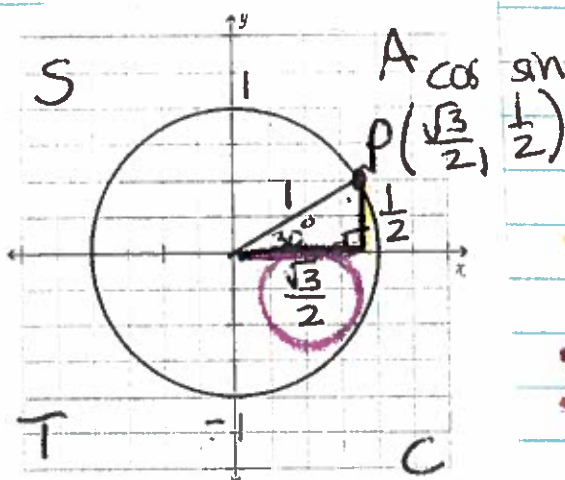
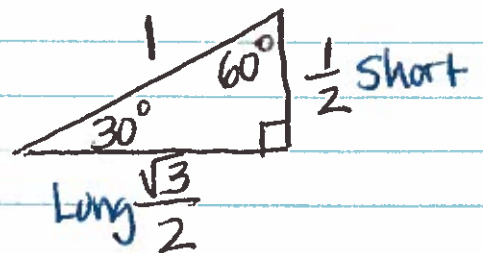
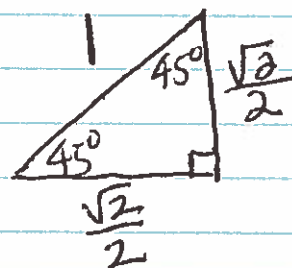
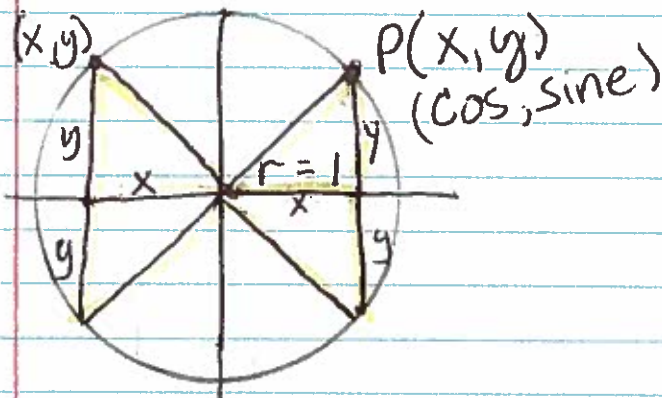
$$\begin{array}{c} -147^\circ \\ 573^\circ \end{array}$$

$$\begin{array}{r} 360 \\ -213 \\ \hline 147 \end{array}$$

$$213 + 360 = 573^\circ$$

$$\text{REF. } \angle = 33^\circ$$

The unit circle has a radius of 1 unit.

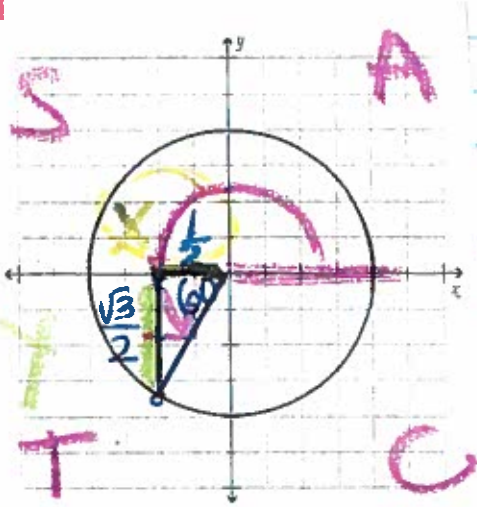


γ $\sin 30^\circ = \frac{1}{2} \leftarrow .5$

\times $\cos 30^\circ = \frac{\sqrt{3}}{2} \leftarrow .866$

ex

240°



$$\frac{240 - 180}{60}$$

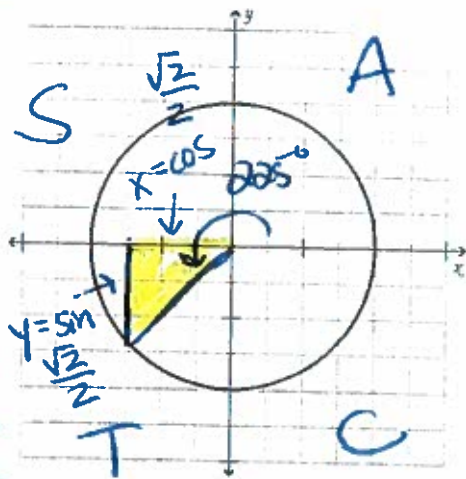
✓ $\sin 240^\circ = -\frac{\sqrt{3}}{2}$
 ✗ $\cos 240^\circ = -\frac{1}{2}$

225°

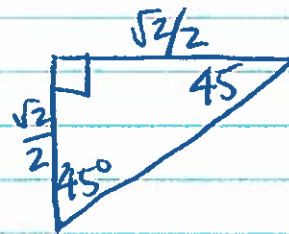
#22 HW

$$\cos 225 = -\frac{\sqrt{2}}{2}, -0.707$$

$$\sin 225 = -\frac{\sqrt{2}}{2}, -0.707$$



ref. L = 45°



21-25, 28 sin, cos w/ pic

29-32 calculator