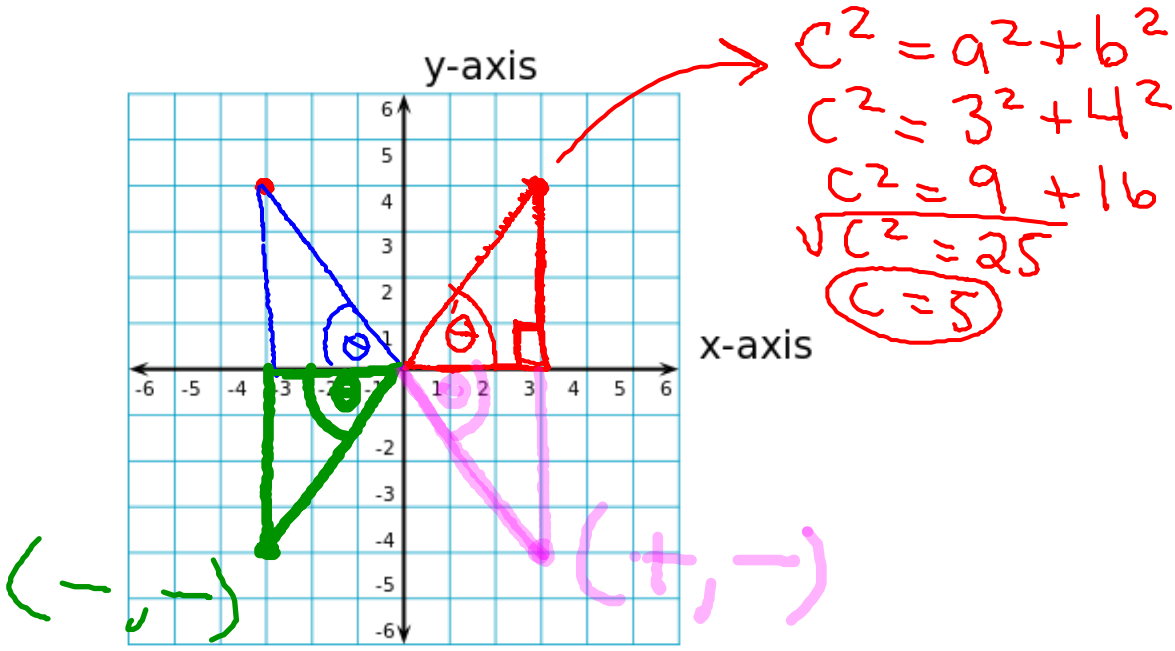
U2:L2 Trig Ratios

On the following plane, draw a terminal arm that connects to point (3,4).

Create a triangle with the x-axis.

Solve for:

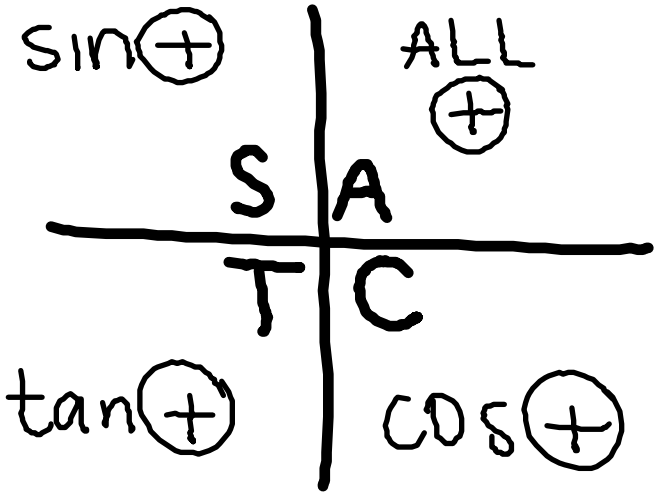
SIN	$\sin\theta = \frac{O}{H} = \frac{+4}{5} = 0.8$
COS	$\cos\theta = \frac{A}{H} = \frac{+3}{5} = 0.6$
TAN	$\tan\theta = \frac{O}{A} = \frac{4}{3} = 1.\overline{3}$



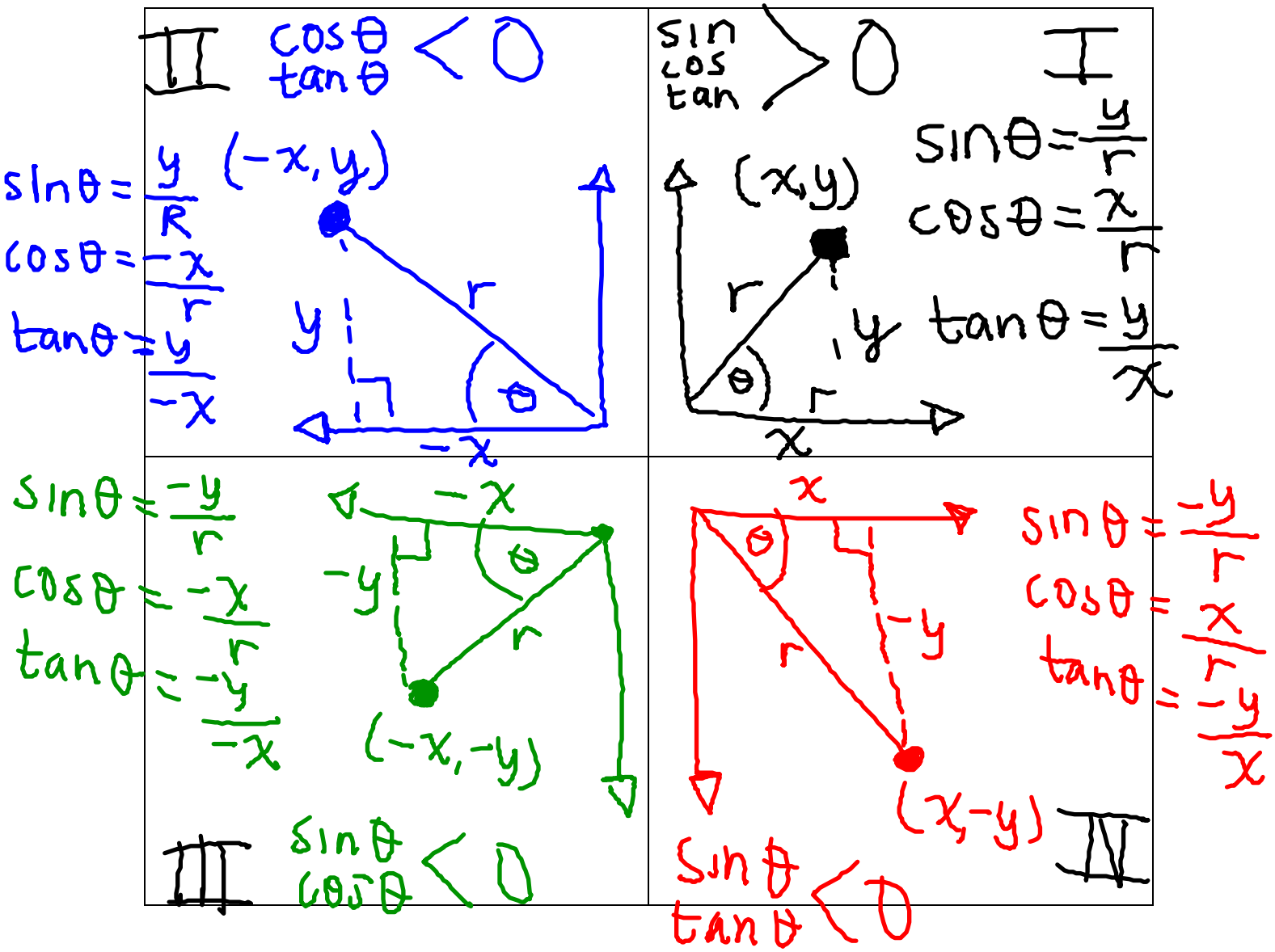
Rotate the triangle into the other three quadrants and complete the following table:

	QII	QIII	QIV
SIN	$\frac{4}{5} = 0.8$	$\frac{-4}{5} = -0.8$	$\frac{-4}{5} = -0.8$
COS	$\frac{-3}{5} = -0.6$	$\frac{-3}{5} = -0.6$	$\frac{3}{5} = 0.6$
TAN	$\frac{4}{-3} = -1.\overline{3}$	$\frac{-4}{-3} = 1.\overline{3}$	$\frac{-4}{3} = -1.\overline{3}$

From this table we can see the following patterns:



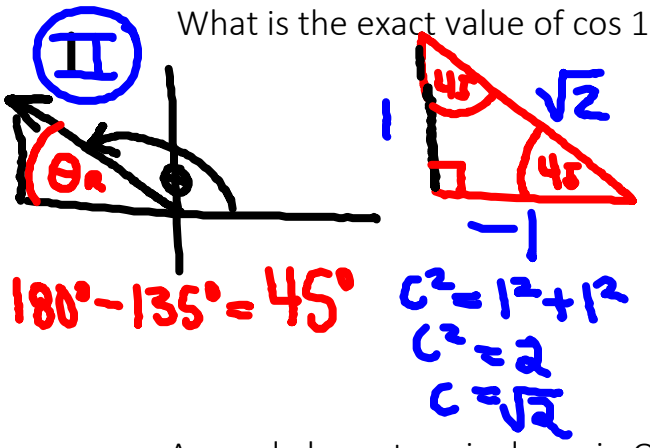
Quadrant info:



Examples:

- *Draw the angle and triangle in standard position*
- *Write out the trig ratio*
- *Solve*

What is the exact value of cos 135°?



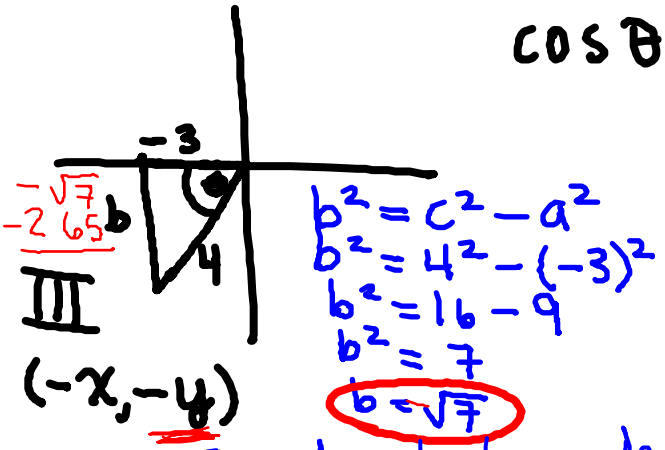
$\cos\theta = \frac{A}{H}$

$\cos\theta = \frac{-1}{\sqrt{2}}$

$\cos\theta = -0.707$

An angle has a terminal arm in QIII. $\cos\theta = -\frac{3}{4}$. Find $\sin\theta$ and $\tan\theta$.

$\cos\theta = \frac{-3}{4}$ or $\frac{3}{-4} = \frac{A}{H}$



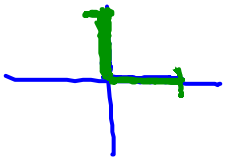
$\sin\theta = \frac{O}{H} = \frac{-\sqrt{7}}{4}$

$\tan\theta = \frac{O}{A} = \frac{-\sqrt{7}}{-3}$

Quadrantal angles are angles with terminal arms on an axis.

What angles are these?

0°, 90°, 180°, 270°, 360°



sin = y
cos = x
tan = $\frac{x}{y}$

Fill in the following table:

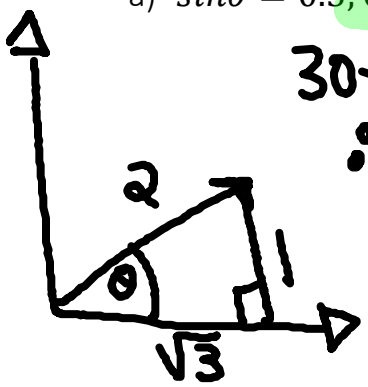
	0°	90°	180°	270°	360°
sin	0	1	0	-1	0
cos	1	0	-1	0	1
tan	$\frac{0}{1}=0$	$\frac{1}{0}$=ERR	0	ERR	0

Sometimes you will know the sine, cosine or tangent of angles. If so…

STEP 1	Find Quadrant based on +/−
STEP 2	Solve for θ_R
STEP 3	Sketch + solve

Solve for the angle…

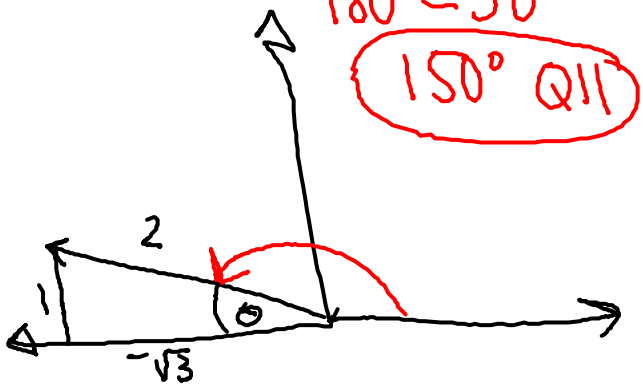
a) $sin\theta = 0.5; 0° < \theta < 360°$ Q1 or QII



30-60-90

$\therefore \theta = 30°$

Q1



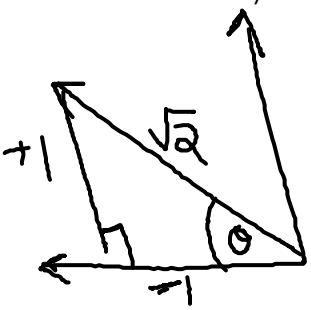
180°−30°

150° QII

b) $cos\theta = -0.6753; 0° < \theta < 360°$

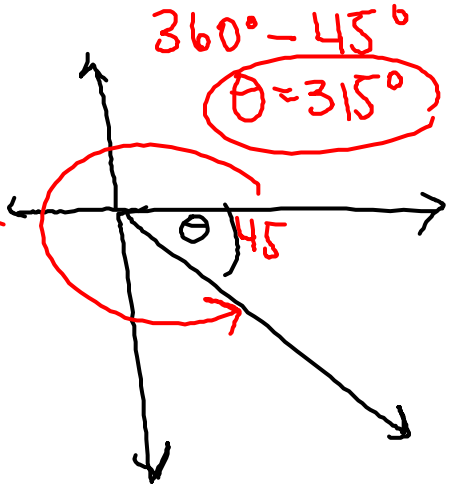
II S | A X
X T | C IV

c) $tan\theta = -1; 0° < \theta < 360°$ QII or QIV



45-45-90

$\theta = 45°$



360°−45°

θ=315°

PRACTICE: Pages 96-99 (Q 3, 4, 5,6, 8, 11,18, 25)