Warm up

Find the trig ratio for the following:

1. $\sin\frac{\pi}{3}$
2. $\cos\frac{\pi}{4}$
3. $\csc\frac{\pi}{6}$
4. $\tan 30°$
5. $\sec 45°$
6. $\cot 45°$

Find θ in degrees.

7. $\sin\theta = \frac{1}{\sqrt{2}}$ 45°, 135°
8. $\csc\theta = \frac{2}{\sqrt{3}}$ 60°
9. $\cot\theta = \sqrt{3}$ 30°
10. $\cos\theta = \frac{1}{2}$ 60°, 300°

Workbook Answers

1. 7.73 rad/min
2. 12.99 rad/sec
3. 1441.94 rev/min
4a. 14.29 m/sec
4b. 211.6 cm/sec
5a. 5.28 cm/sec
6. 104.72 rad/sec
5b. 8.73 cm/sec
7. 17.45 ft/sec
8. fastest - outside
9. 17222.54 mph
10. 728.29 rev/min

4.4 Trig Functions of any angle Day 1

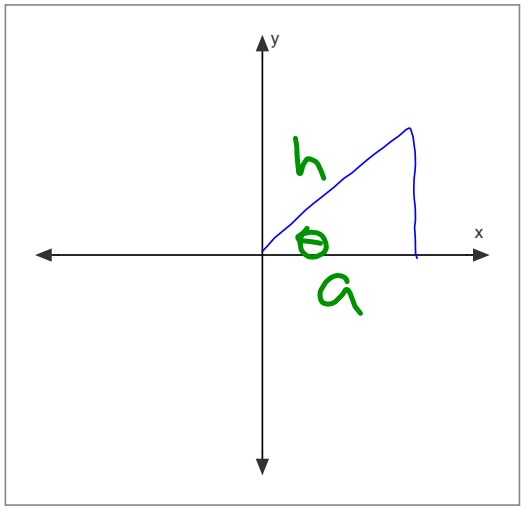
trig ratios for angles > 90 or $\frac{\pi}{2}$

ASTC

Quadrant values

What quadrant am I in?

So far we have talked only about trig ratios of acute angles. What if the angle I want to evaluate is obtuse?



Remember that on the unit circle

(x, y) = ($\cos\theta$, $\sin\theta$)

= (adj side, opp side)

$\cos 60° = \frac{1}{2}$

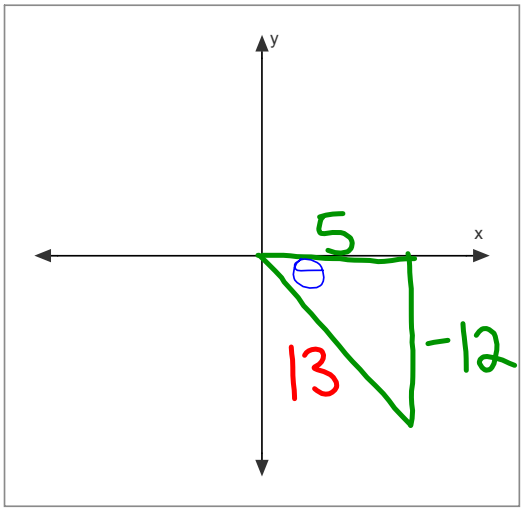
1

Example: Let (5, -12) be a point on the terminal side of angle θ, find $\sin\theta$, $\cos\theta$, $\tan\theta$

Step 1: Draw a triangle

Step 2: Find the third side

Step 3: Find the ratios



$$\sin\theta = \frac{-12}{13}$$

$$\cos\theta = \frac{5}{13}$$

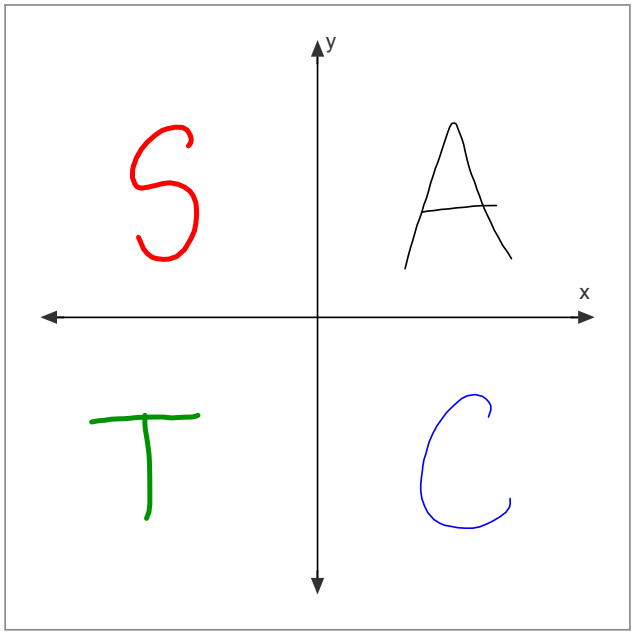
$$\tan\theta = \frac{-12}{5}$$

ASTC

$(x, y) = (\cos\theta, \sin\theta)$

= (adj side, opp side)

$$\frac{\sin\theta}{\cos\theta} \quad \tan\theta$$



ALL trig ratios are positive

Sin ratio is positive

tan ratio is positive

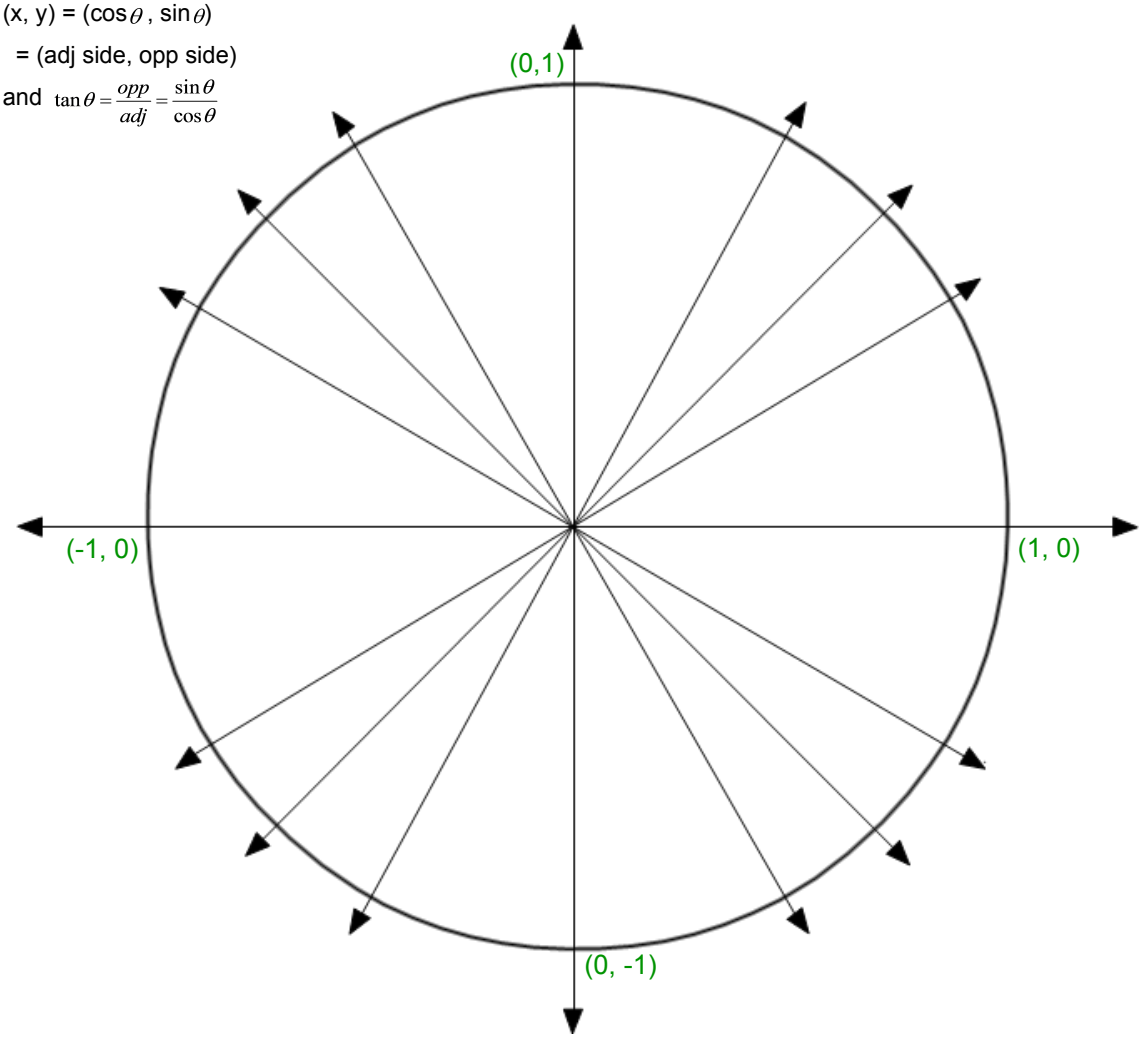
cos ratio is positive

Remember:

(x, y) = ($\cos\theta$, $\sin\theta$)

= (adj side, opp side)

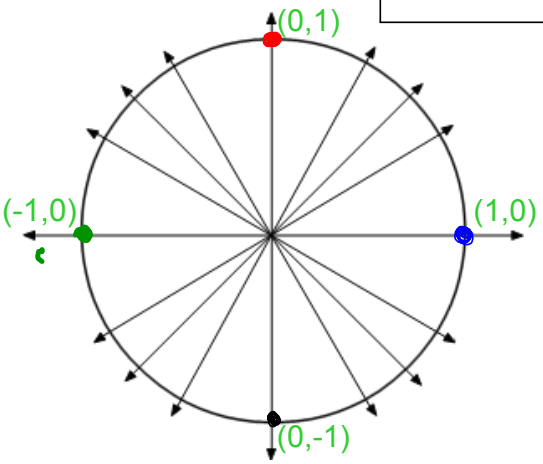
and $\tan\theta = \frac{opp}{adj} = \frac{\sin\theta}{\cos\theta}$



	0, 360 or 0, 2π	90 or π/2	180 or π	270 or 3π/2
sin θ	$0/1 = 0$	$1/1 = 1$	$0/1 = 0$	$-1/1 = -1$
cos θ	$1/1 = 1$	$0/1 = 0$	$-1/1 = -1$	$0/1 = 0$
tan θ	$0/1 = 0$	$1/0 =$ und	$0/-1 = 0$	$-1/0 =$ und
csc θ	$1/0 =$ und	$1/1 = 1$	$1/0 =$ und	$1/-1 = -1$
sec θ	$1/1 = 1$	$1/0 =$ und	$1/-1 = -1$	$1/0 =$ und
cot θ	$1/0 =$ und	$0/1 = 0$	$-1/0 =$ und	$0/-1 = 0$

sin 2π

csc 2π

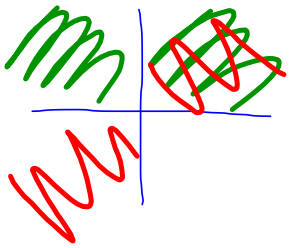


$\sin\pi = \frac{y}{h} \quad \frac{0}{1}$

$\csc\pi = \frac{h}{y} = \frac{1}{0}$

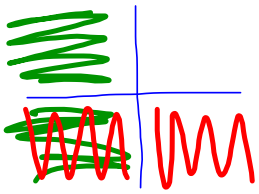
What quadrant am I in??

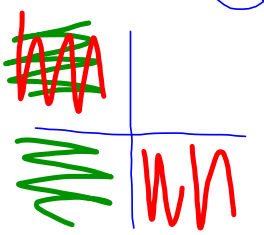
$\sin\theta > 0$ $\tan\theta > 0$ Q1



$\cos\theta < 0$ $\sin\theta < 0$ Q3

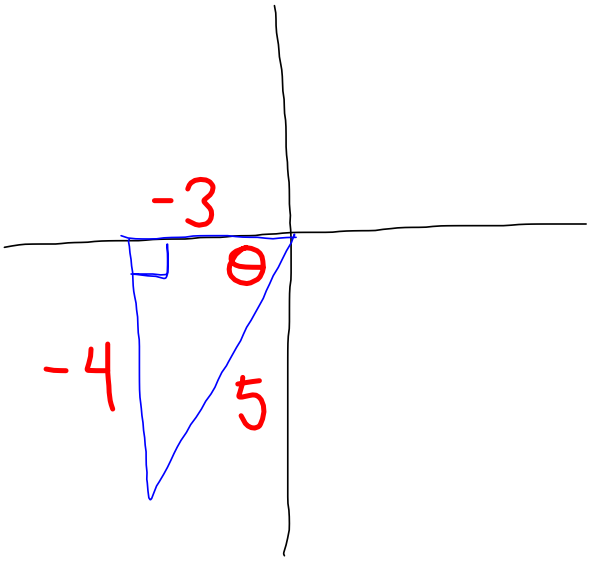
$\sec\theta < 0$ $\cot\theta < 0$ Q2





find the remaining 5 trig ratios (values) given:

$\sin\theta = -\frac{4}{5}, \quad \cos\theta < 0$



$\cos\theta = -3/5$

$\tan\theta = 4/3$

$\csc\theta = 5/-4$

$\sec\theta = 5/-3 \quad \cot\theta = \frac{3}{4}$

Homework

p 294 due tues.

1-21 odd, 29-36 all

Optional Quiz Review

p 265

1-19 odd, 23-73 odd, 77, 78, 96-100

p 284

1-4, 9-33, 57-66, 78, 79