

# BLC 190

Name: \_\_\_\_\_

## Worksheet 5

1. Use the unit circle to evaluate the following trigonometric functions. Give exact answers.

(a)  $\cos\left(\frac{\pi}{6}\right)$

(d)  $\sin\left(\frac{5\pi}{6}\right)$

(b)  $\tan\left(\frac{\pi}{3}\right)$

(e)  $\csc\left(\frac{4\pi}{3}\right)$

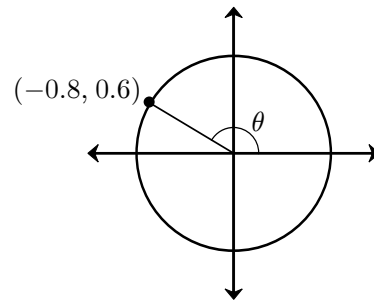
(c)  $\sin\left(\frac{9\pi}{4}\right)$

(f)  $\cos\left(\frac{7\pi}{3}\right)$

2. If  $\cos \theta = \frac{1}{2}$ , what are the possible values for  $\theta$ ? Use the unit circle, and give the exact answers.

3. If  $\tan \theta = 1$ , what are the possible values for  $\theta$ ? Use the unit circle, and give the exact answers.

4. The following circle has radius 1 and is centered at the origin:

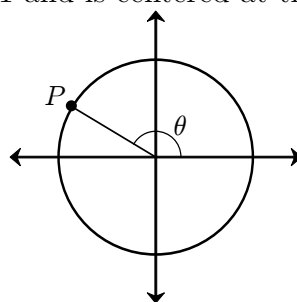


(a) What is  $\sin \theta$ ?

(b) What is  $\cos \theta$ ?

(c) What is  $\tan \theta$ ?

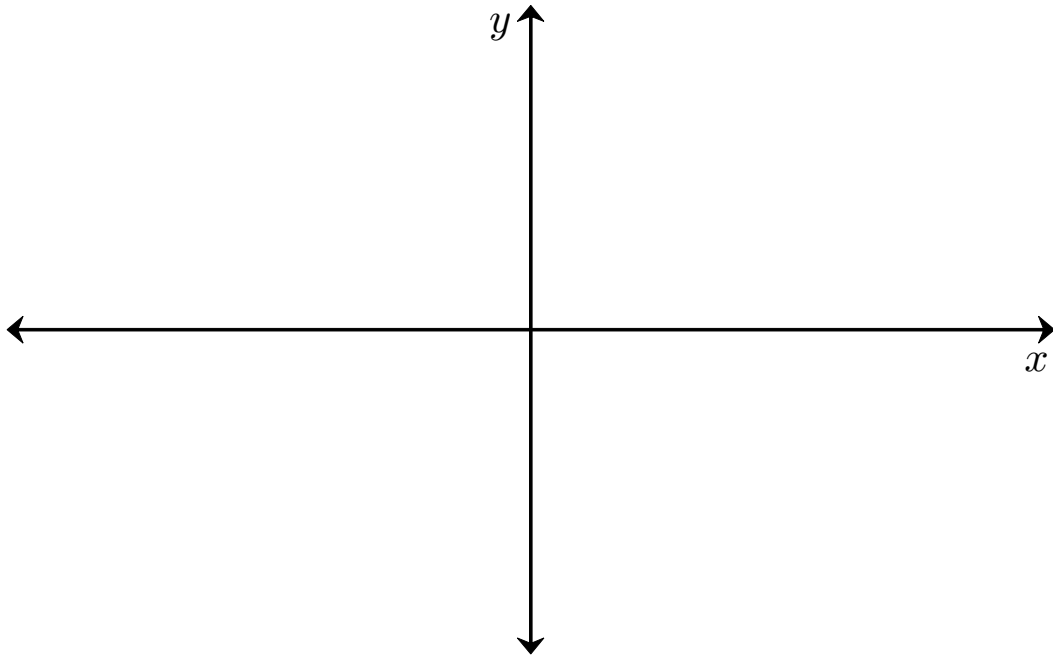
5. The following circle has radius 1 and is centered at the origin:



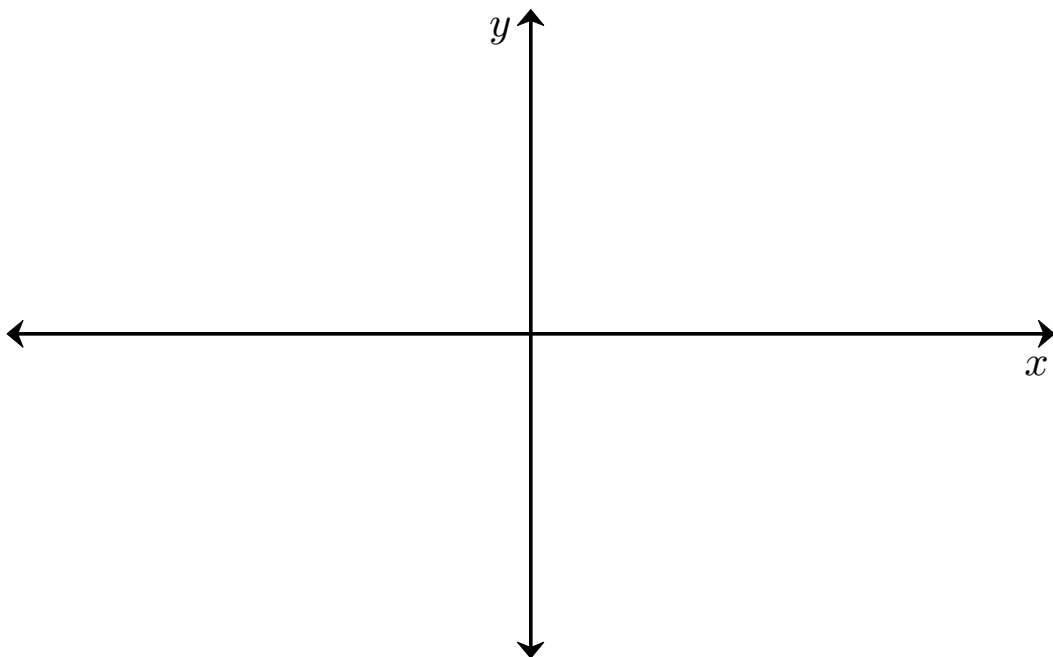
If the  $y$ -coordinate of the point  $P$  is 0.5, what is  $\cos \theta$ ?

6. Sketch the graphs of the following functions:

(a)  $y = -4\sin x + 3$



(b)  $y = 3\cos(2x)$



7. Find all solutions to the following equations. Give the exact answers in radians.

(a)  $2 \sin \theta + 1 = 0$

(b)  $3 \cos \theta = \cos \theta + 1$

(c)  $\frac{\tan \theta}{\sec \theta} = \frac{1}{2}$

In problems 8 and 9, use the following trig identities:

$\cos^2 \theta + \sin^2 \theta = 1$	$\sin^2 \theta = \frac{1}{2} - \frac{1}{2} \cos 2\theta$
$\sec^2 \theta - \tan^2 \theta = 1$	$\cos^2 \theta = \frac{1}{2} + \frac{1}{2} \cos 2\theta$
$\csc^2 \theta - \cot^2 \theta = 1$	$\sin 2\theta = 2 \sin \theta \cos \theta$

8. Show that  $(\sin x + \cos x)^2 = 1 + \sin 2x$ .

9. Show that  $\sin^2 x + \cos 2x = \cos^2 x$ .

10. Suppose that the following function is used to model the outside temperature on a certain day of the week:

$$T(t) = 50 + 10 \sin \left( \frac{\pi}{12}t - \frac{2\pi}{3} \right)$$

where  $t$  is the number of hours past midnight, the temperature is measured in Fahrenheit, and radians are used to evaluate sine.

- (a) What is the temperature at 8am?
- (b) At what time(s) does the temperature equal 45 °F?
- (c) Find the minimum temperature.
- (d) Find the maximum temperature.