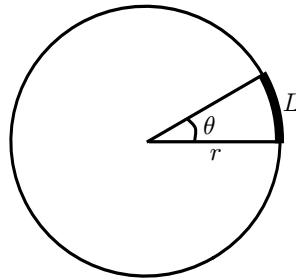


## Worksheet 4

1. Convert  $135^\circ$  to radians. Give your answer as a fraction involving  $\pi$ .

2. Convert  $\frac{\pi}{15}$  radians to degrees.

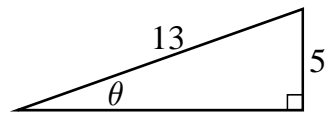
3. In the following circle,  $r$  is the radius of the circle,  $\theta$  is the indicated angle, and  $L$  is the length of the corresponding arc of the circle.



If  $L = 3$  and  $\theta = 30^\circ$ , what is  $r$ ?

4. The hour hand of a clock is 8 inches long and moves from 12 to 2 o'clock. How far (in inches) does the tip of the hour hand move?

5. Consider the following right triangle:



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

(d) What is  $\sec \theta$ ?

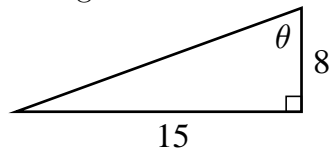
(b) What is  $\cos \theta$ ?

(e) What is  $\csc \theta$ ?

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

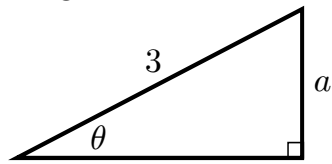
(f) What is  $\cot \theta$ ?

6. Consider the following right triangle:



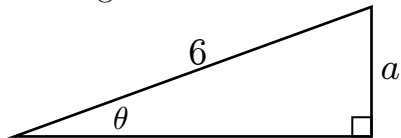
Determine the value of  $\theta$  measured in radians.

7. Consider the following right triangle:



Write an equation expressing the relationship between  $a$  and  $\theta$ .

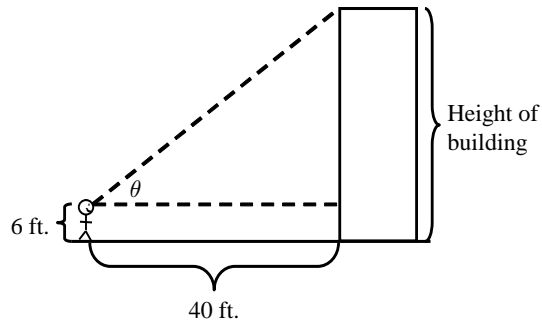
8. Consider the following right triangle:



(a) If  $\theta = \frac{\pi}{6}$  radians, what is  $a$ ?

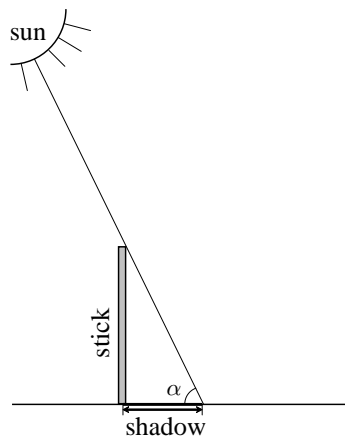
(b) If  $a = 2$ , what is  $\theta$ ? Give your answer in radians.

9. Thomas wishes to determine the height of a building. He stands 40 feet away from the building as shown below:



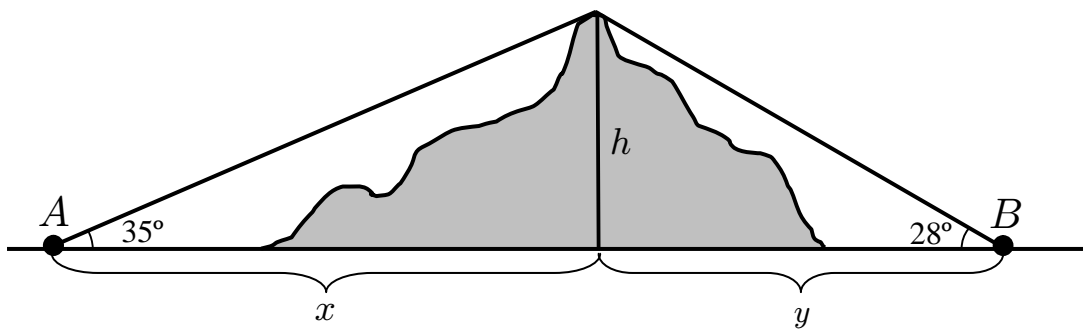
If  $\theta = 37^\circ$ , what is the height of the building?

10. A stick casts a shadow as shown in the following picture:



If the stick is 5 feet tall, and the shadow is 2 feet long, what is the angle  $\alpha$  in degrees?

11. A mountain is between two cities A and B as shown in the following picture:



If the two cities are 5 miles apart, determine the height of the mountain. (*Hint:* Start by writing equations that relate  $x$  and  $h$  and that relate  $y$  and  $h$ .)