



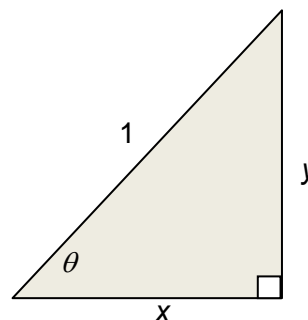
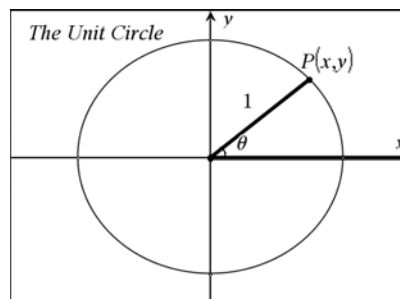
**Problem 1 – Introduction to the Unit Circle**

To the right, you will see a special circle known as the unit circle. It is centered at the origin and has a radius of one unit.

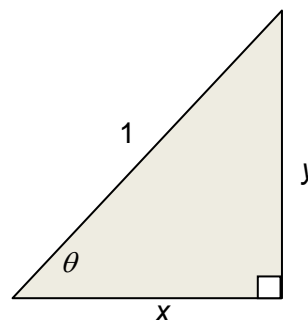
This circle is very important to the field of trigonometry. It is essential to develop an understanding of relationships between the angle theta,  $\theta$ , and the coordinates of point  $P$ , a corresponding point on the circle.

*Note that the angle  $\theta$  is measured from the positive x-axis.*

Right triangle trigonometry and knowledge of special right triangles can be applied to understanding the relationship between  $\theta$  and  $P$ . (Note that the hypotenuse of this triangle is 1 unit, corresponding to the radius of 1 unit on the unit circle.)

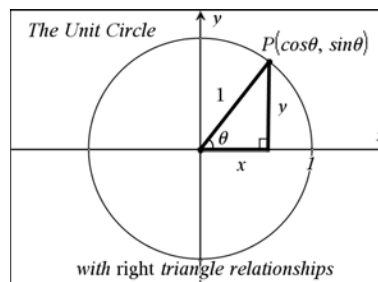


1. Using the right triangle diagram, write an equation for  $x$  in terms of  $\theta$ .

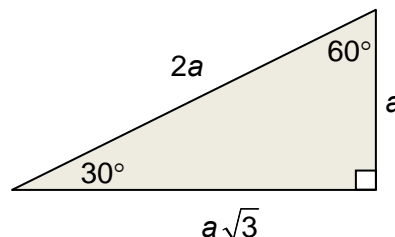


2. Using the right triangle diagram, write an equation for  $y$  in terms of  $\theta$ .

Using the answers to Exercises 1 and 2, the unit circle can be relabeled as shown to the right. Note that the  $x$ -value is  $\cos(\theta)$  and the  $y$ -value is  $\sin(\theta)$ .



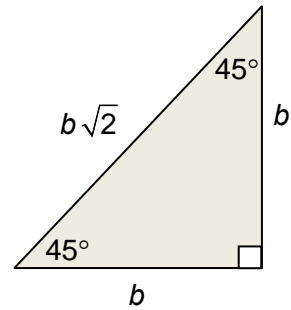
3. What is the value of  $a$  when the hypotenuse is 1 unit?



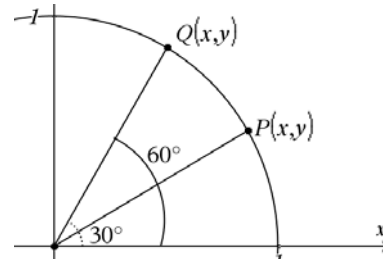


# Round and Round She Goes...

4. What is the value of  $b$  when the hypotenuse is 1 unit? Don't forget to rationalize the denominator!



5. Apply your knowledge of 30-60-90 right triangles and identify the coordinates of point  $P$ .



6. Again, using your knowledge of 30-60-90 right triangles, identify the coordinates of point  $Q$ .

7. The cosine of  $30^\circ$  is \_\_\_\_\_.

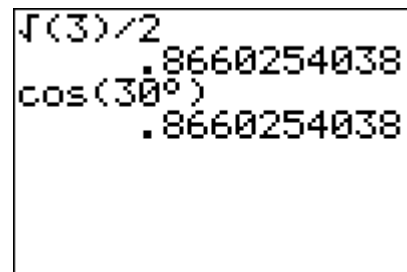
8. The sine of  $30^\circ$  is \_\_\_\_\_.

9. The cosine of  $60^\circ$  is \_\_\_\_\_.

10. The sine of  $60^\circ$  is \_\_\_\_\_.

Check your results to Exercises 7–8 using your graphing calculator as shown to the right.

Note the  $^\circ$  symbol can be found by pressing  $\boxed{2nd} + \boxed{[ANGLE]}$  and then press  $\boxed{ENTER}$ .

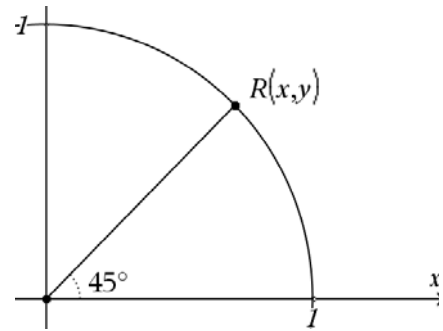




11. Using your knowledge of 45-45-90 right triangles, identify the coordinates of point  $R$ . \_\_\_\_\_

12. The cosine of  $45^\circ$  is \_\_\_\_\_.

13. The sine of  $45^\circ$  is \_\_\_\_\_.



Check your results to Exercises 11–13 using your graphing calculator.

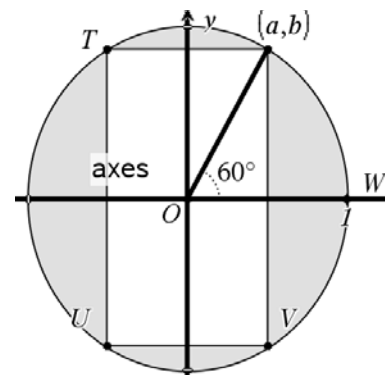
**Problem 2 – Extending the Pattern**

Identify the coordinates of the following points in terms of  $a$  and  $b$ .

14.  $T$  \_\_\_\_\_

15.  $U$  \_\_\_\_\_

16.  $V$  \_\_\_\_\_



Identify the measure of the following angles.

17.  $m\angle WOT =$  \_\_\_\_\_

18.  $m\angle WOU =$  \_\_\_\_\_

19.  $m\angle WOV =$  \_\_\_\_\_