Assignment

Write

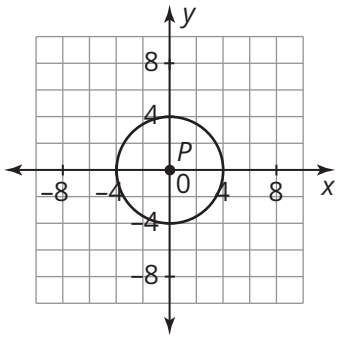
Explain how to determine the locations of other points on a circle given the coordinates of one point. Draw an example.

Remember

You can use the Pythagorean Theorem, the Distance Formula, and symmetry to determine whether a point lies on a circle given the coordinates of the center point at the origin or not at the origin and the coordinates of a point on the circle.

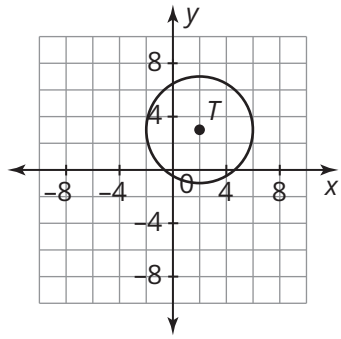
Practice

1. Consider circle P centered at the origin with a radius of 4 units as shown.



   a. Verify that point $K(1, \sqrt{15})$ lies on circle P.
   b. Use symmetry to determine three more points on circle P.

2. Consider circle T with its center point located at (2, 3) with a radius of $3\sqrt{2}$ units as shown.



   a. Verify that point R (5, 0) lies on circle T.
   b. Use symmetry to determine three more points on circle T.

3. Maddie brought home a new puppy, Ralph, which she needs to introduce to her current dog, Ellie. She ties Ellie in the middle of her backyard. She ties a shorter rope, exactly 4 feet to the east and 4 feet north of Ellie's rope, for her new puppy, Ralph. Based upon the graph, the dogs can meet at the point (3, 4).
   a. Graph the range each dog will be able to travel on their rope. Use the origin as the place where Ellie is tied down. Show your work.
   b. Use symmetry to describe the location of the other point that is on the very edge of both of the dogs' ranges.

4. Determine the intersection point(s) for each system.

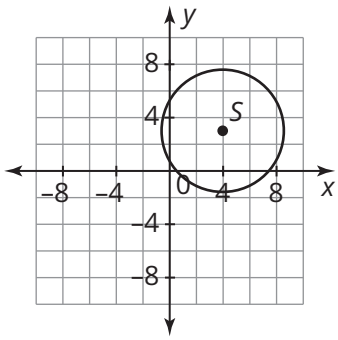
   a. $\begin{cases} (x-3)^2 + (y-1)^2 = 25 \\ y = x + 3 \end{cases}$

   b. $\begin{cases} (x+4)^2 + (y)^2 = 100 \\ y = 2x \end{cases}$

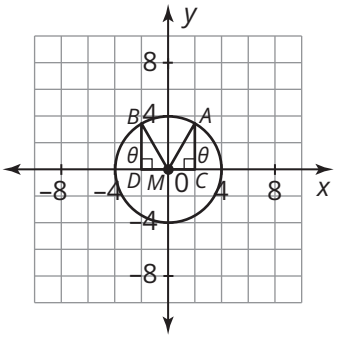
   c. $\begin{cases} x^2 + y^2 = 41 \\ y = x + 4 \end{cases}$

Stretch

1. Consider circle S with its center point located at (4, 3) with a radius of $2\sqrt{5}$ units as shown. If the x-coordinate of a point on the circle is 6, what are the possible values for the y-coordinate?



2. The circle shown is centered at the origin with a radius of 4.
   a. Determine the coordinates of the vertices for $\triangle AMC$.
   b. Determine sin θ, cos θ, and tan θ for $\triangle AMC$ using the coordinates of the vertices.
   c. Determine the coordinates of the vertices for $\triangle BMD$.
   d. Determine sin θ, cos θ, and tan θ for $\triangle BMD$ using the coordinates of the vertices.
   e. What do you notice about the values of sin θ, cos θ, and tan θ for the two triangles?



Review

1. Write an equation in standard form for each description.
   a. A circle with a center at M (1,−4) and a radius of 7
   b. A circle with the same center as circle M, but whose circumference is 10 times that of circle M
2. Determine whether $x^2 + y^2 + 6x + 8y + 9 = 0$ represents a circle. If so, write the equation in standard form and then describe the location of the center and radius.
3. Factor each trinomial.
   a. $2x^2 + 7x - 15$
   b. $8y^2 + 2y - 3$