7.03 Applications of Circles

The equation of a circle was created using the
_____ Theorem.

Remember that the Pythagorean Theorem is $a^2 + b^2 = c^2$,
where a and b are _____ of a right triangle and c is the
_____.
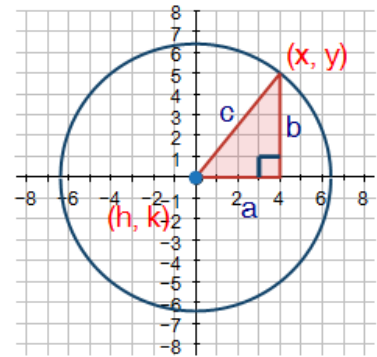
Equation of a circle
where (h, k) is the _____ and r is the _____:

$$(x - h)^2 + (y - k)^2 = r^2$$

Given an equation of a circle, such as
$(x - 3)^2 + (y - 4)^2 = 8^2$, the center is
(_____, _____) and the radius is _____.

NOTICE: The equation in its original form uses
_____ signs. This makes the point coming
from that _____. If the equation has a
positive sign, then that would make h or k negative.

An equation of a circle is given: $(x + 6)^2 + (y - 7)^2 = 81$. Find the center and radius of the circle.	Write the equation of a circle with center at (−3, −5) and a radius of 5 units.	Write the equation of a circle with center at (−3, −5) and a point on the circle at (1, −2).

Completing the Square Video Click Here	
The center and radius of a circle can be found when a partial equation is given. Here are the steps to _____ _____ _____:	

Step 1 [original equation]:

$x^2 - 4x + y^2 - 2y = 4$

Step 2 [group like terms]:

(_____ − _____) + (_____ − _____) = 4

Step 3 [complete the quadratics]:

$(x^2 - 4x + \_\_\_\_\_) + (y^2 - 2y + \_\_\_\_\_) = 4 + (\_\_\_\_ + \_\_\_\_)$

Step 4 [simplify the equation]:

$(x^2 - 4x + 4) + (y^2 - 2y + 1) = _____$

Step 5 [factor each quadratic]:

(_____)^2 + (_____)^2 = 9

Step 6 [identify the center and radius]:

Center = _____

Radius = _____

Practice 2 Video Click Here

Using the following equation, find the center and radius of the circle: $x^2 + y^2 + 2x - 4y - 20 = 0$
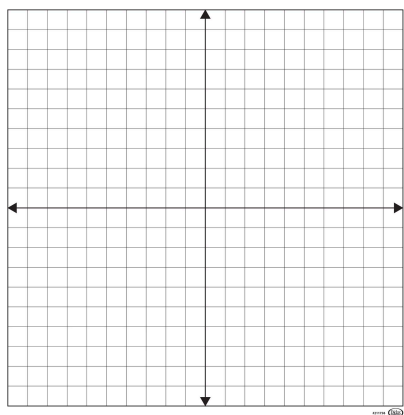
Center:
Radius:

First, rewrite the equation in standard form $(x - h)^2 + (y - k)^2 = r^2$ to find the _____ and _____.

Next, plot the _____r point. Then, from the center, use the _____ to count the units up, down, left, and right to find four points on the circle itself.
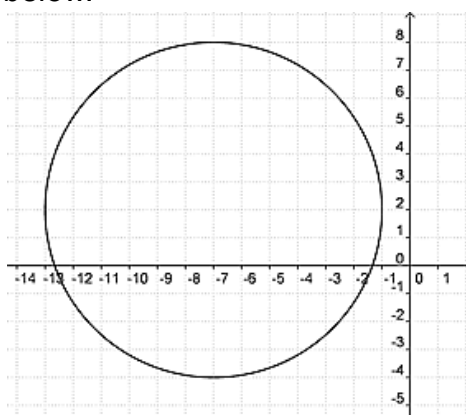
Connect all four points with a circle and you have graphed the circle! Remember to use a compass for an accurate circle.

|	
Explain how to graph the circle with the equation below by hand on the coordinate plane. $$(x - 5)^2 + (y - 3)^2 = 9$$	Find the center and radius of circle A shown below.

The center (h, k) and radius, r are key features of a circle. The circle is a relation and will have a domain and a range. The domain will refer to the _____ and the range will refer to the _____.

The domain is $h - r \leq x \leq h + r$ and the range is $k - r \leq y \leq k + r$.

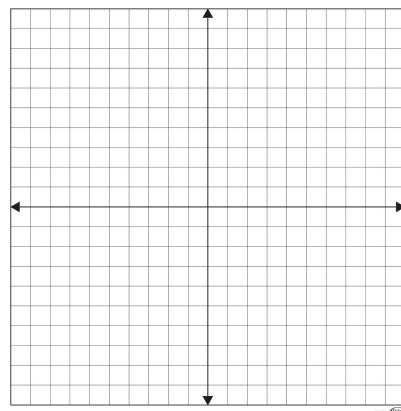Example: Identify the domain and range of a circle with center (1,3) and radius 4.

domain: ___ $\leq x \leq$ ___
range: ___ $\leq y \leq$ ___
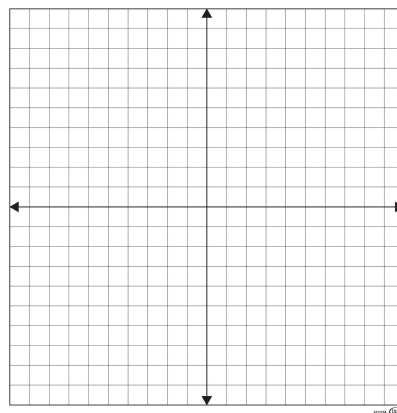
Write the equation of a circle with center (2, −5) and a diameter of 6 units and explain how to graph the circle by hand on the coordinate plane. Then identify the domain and range of the circle.

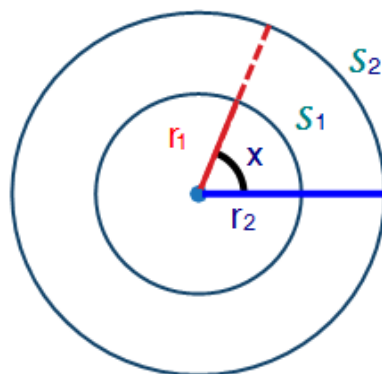**Arc length and Proportionality** Video **Click Here**

The two circles are similar. A _____ _____ for both circles is marked "x."

NOTICE: As the length of the radius _____, so does the length of its corresponding arc.

The arc length of a circle can be determined by taking the formula for the _____ of a circle and multiplying it by the _____ _____ divided by 360°.

Arc length = $2\pi r * (\frac{x}{360})$

In similar circles, the arc length is _____ to the radius.

The two circles are similar. The _____ for each circle can be found using the following formula:
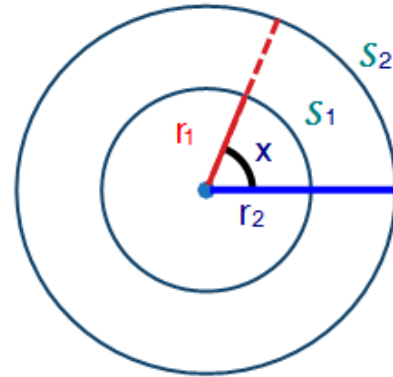
$$Area = \pi r^2$$

The area of a sector of a circle is the 2-dimensional space inside the pie-shaped area created by a _____ _____.

The area of a sector of a circle can be determined by taking the formula for the

_____ and

multiplying it by the _____ _____ divided by 360°.

Area of a Sector = $\pi r^2 * \left(\frac{x}{360}\right)$

In similar circles, the area of a sector is _____ to the radius.

Practice:

A bicycle tire in the shape of a wheel has a radius of 10 feet. The wheel has 8 spokes attached to the center of the wheel.
What is the central angle?

What is the arc length?

What is the area of a sector between any two spokes?

Using the following equation, find the center and radius of the circle.

$x^2 - 4x + y^2 + 8y = -4$

Ready to complete the assignment for 7.03?

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