# Expermg Grateres <br> <br> Math Virtual Learning <br> <br> Math Virtual Learning <br> <br> Geometry/Honors Geometry 

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May 13, 2020

## Geometry/Honors Geometry <br> Lesson: May 13, 2020

Objective/Learning Target:
Develop and understand the equation of a circle

## Bell Ringer: Find the length of the arc.



## Bell Ringer Answer: $1.5 \pi \mathrm{yd}$.

Let's Get Started: Go through the following slides and try the example problems.

To come up with an equation of a circle, we need to express with an equation, the idea that its graph contains all the points that are equidistant from the center. If our center is at the origin, we would have a graph that looks like the following:


Using Pythagorean theorem, we know that: $\boldsymbol{x}^{2}+y^{2}=\boldsymbol{r}^{2}$

The circle must be then, the set of all points $(x, y)$ that satisfy this equation.

For any equation of the form: $\quad x^{2}+y^{2}=r^{2}$, the graph is the circle centered at the origin with a radius of $r$.

We use horizontal and vertical shifts to move the center of the circle and get the standard form:

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

which has center $(\boldsymbol{h}, \boldsymbol{k})$ and radius $=\boldsymbol{r}$

Example Problem: Find the center and radius of the circle.

$$
x^{2}+(y+2)^{2}=49
$$

Answer:
Center (0,-2)

$$
\begin{aligned}
& \text { Radius }=\sqrt{ } 49 \\
& \text { Radius }=7
\end{aligned}
$$

Try the next practice problems on your own! Given the equation of a circle, find the center and radius.

1) $(x+1)^{2}+(y-7)^{2}=9$
2) $(x-3)^{2}+y^{2}=100$
3) $x^{2}+y^{2}=16$
4) $(x+4)^{2}+y^{2}=121$

## Answer Key:

Here you will find the answers to the previous four questions. Check your answers below.

1) Center (-1, 7); Radius $=3$
2) Center ( 3,0 ); Radius $=10$
3) Center (0, 0); Radius = 4
4) Center ( $-4,0$ ); Radius $=11$

## Additional Resources:

Click on the link below to get additional practice and to check your understanding!

## Equations of Circles Practice

