### 7.2 Equations of Circles

SWBAT graph circles on the coordinate plane and write the equations of circles in standard form.


Example 1: Write the equation of a circle with the given information.
a) Center (0,0), Radius=10
b) Center $(2,3)$, Diameter $=12$
$h=\quad k=\quad r=$

$$
\mathrm{h}=
$$

$$
k=\quad r=
$$

Example 2: Determine the center and radius of a circle the given equation.
a) $x^{2}+y^{2}=\frac{9}{4}$
b) $(x+3)^{2}+(y-5)^{2}=81$
C) $(x+4)^{2}+(y+6)^{2}=1$

Example 3: Use the center and the radius to graph each circle.
a) $(x+2)^{2}+y^{2}=64$

Center:

Radius:

b) $x^{2}+(y+4)^{2}=36$

Center:
Radius:


## Writing an Equation with a Pass-Thru Point

Step 1: Substitute the center ( $h, k$ ) into the equation
Step 2: Substitute the "pass through point $(x, y)$ " into the equation for $x$ and $y$.

Step 3: Simplify and solve for $\mathrm{r}^{2}$.
Step 4: Substitute $r^{2}$ back into the equation from Step 1.

Example 4: Write the equation of a circle with a given center $(2,5)$ that passes through the point $(5,-1)$.

| Writing an Equation with Two Points |
| :---: | :---: |
| on the Circle |$\quad$ Midpoint Formula

Example 5: Write the equation of a circle with endpoints of diameter at $(-6,5)$ and $(4,-3)$.

| Writing the Equation of a Circle in Standard Form |  |
| :---: | :---: |
| Step 1: | Group x's and group y's together. |
| Step 2: | Move any constants to the right side of the equation. |
| Step 3: | Use complete the square to make a perfect square trinomial for the $x$ 's and then again for the*Remember, whatever you do to one side of the equation, you must do to the other! <br> Step 4: Simplify factors into standard form of a circle! |

Example 5: Write the equation of a circle in standard form. Then, state the center and the radius.
a) $x^{2}+y^{2}+4 x-8 y+16=0$
b) $x^{2}+y^{2}+6 x-4 y=0$
c) $x^{2}+y^{2}-6 x-2 y+4=0$
d) $x^{2}+y^{2}+8 x-10 y-4=0$

