TOPIC: GRAPHING CIRCLES

Circles in Standard Form (Center-Radius Form)

◆ The graph of a circle is the set of all points that are the _____ distance r (radius) from the center (h, k).

► To sketch, use ___ to plot points above, below, right, & left of _____ then connect with a smooth curve.

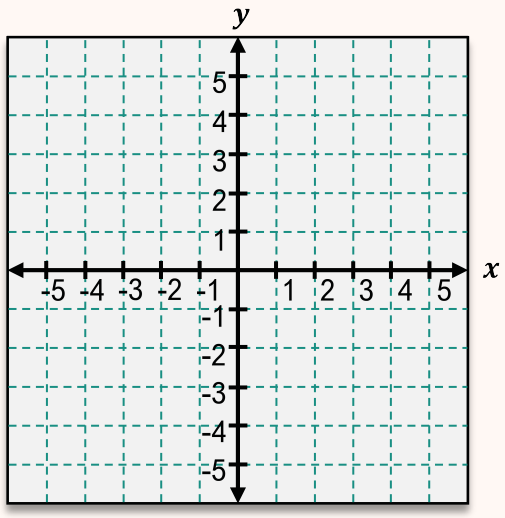
New **Graphing a Circle: Standard Form**

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

$(x - 2)^2 + (y + 1)^2 = 16$

Center: $(\underset{h}{\_\_}, \underset{k}{\_\_})$

Radius:



◆ A circle centered at the origin (__ , __) has the equation: $x^2 + y^2 = r^2$

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PRACTICE Give the center and radius of each circle and graph.

(A)

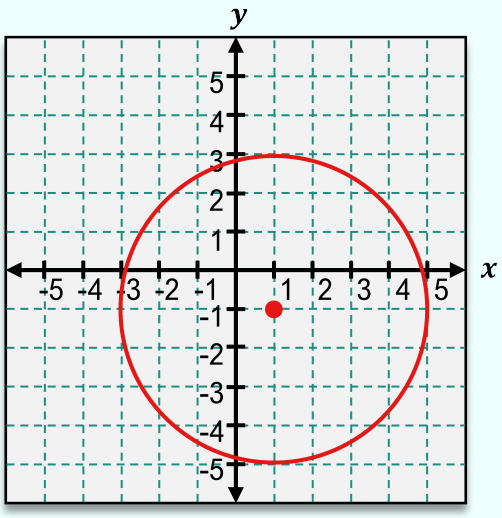
$x^2 + y^2 = 36$

(B)

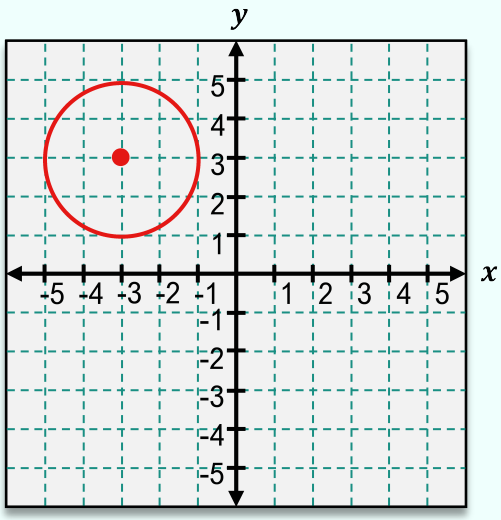
$(x + 2)^2 + (y - 3)^2 = 4$

EXAMPLE Write an equation in standard form that represents the graph of the circle.

(A)



(B)



TOPIC: GRAPHING CIRCLES

PRACTICE Write the standard form equation of the circle described.

(A) Centered at $(-3, 5)$; radius: 7

(B) Centered at the origin; diameter: 10

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Circles in General Form

◆ You will sometimes be given the equation of a circle in **general form**. $x^2 + y^2 + Ax + By + C = 0$

► Convert to **standard form** by *completing the square* for x & y, then graph.

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

$x^2 + y^2 + 2x + 6y + 8 = 0$ General Form

Rewrite

$(x^2 + 2x + \_\_\_) + (y^2 + 6y + \_\_\_) = -8 + \_\_\_\_ + \_\_\_$

Complete the Square

$(x + 1)^2 + (y + 3)^2 = 2$ Standard Form

EXAMPLE: Convert the following equation to standard form and sketch a graph of the circle.

$x^2 + y^2 + 2x - 4y + 1 = 0$

GENERAL FORM → STANDARD FORM CIRCLES

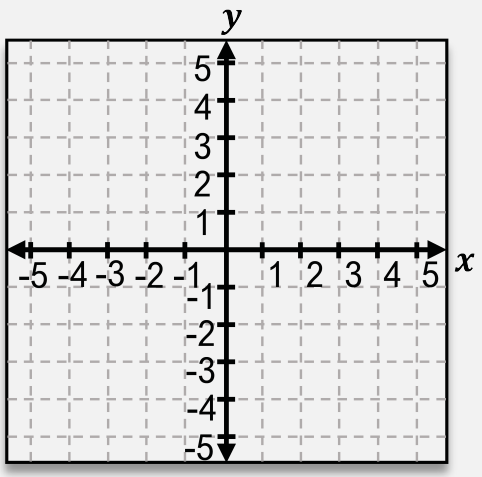
1) Group x terms & y terms on left; constant on right

2) Add _____ to both sides for x terms

Add _____ to both sides for y terms

3) Factor to $\left(x + \text{—}\right)^2$ & simplify

4) Graph from _____ form



TOPIC: GRAPHING CIRCLES

PRACTICE Write the standard form equation of the circle described. Give the center and radius.

$(\boldsymbol{A})$

$$x^2 + y^2 - 2x + 4y - 4 = 0$$

$(\boldsymbol{B})$

$$x^2 + y^2 - 8x - 12y + 3 = 0$$