13.1 The Circle and Its Graph
MATH 64

Recall all Graphing we have covered:

a) Linear Equations

b) Quadratic Equations

c) Exponential Equations

d) Logarithmic Equations

Pre-Requisite Knowledge:

1. You need to recall how to complete the square

2. You need to recall how to find the distance between two points in the coordinate plane.

The **Distance Formula** is a formula used for computing the distance "d" between two points in a coordinate plane. If one point A is designated with coordinates (x_1, y_1) and the second point B is (___ , ___), then

distance "d" = AB = $\sqrt{\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad}$

Always leave in simplified **radical** form – no decimals.

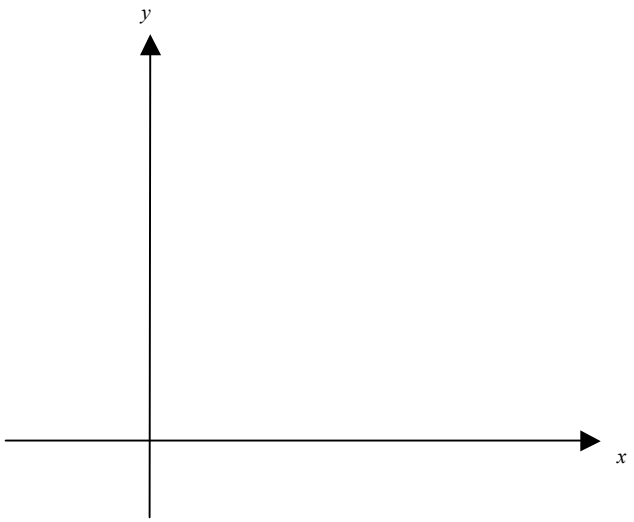
Ex.1 Find the distance between the point (–4, –3) and (2, 5).

Ex. 2 Find the distance between the point (3, –8) and (–4, 6).

Definition: A **circle** is the set of all points in a plane that are equidistant from a _____ point, called the center. The fixed distance from the circle's center to any point on the circle is called the _____. A compass is usually used to draw a circle (or a _____)

To find the Equation of a Circle

Step 1. Draw a circle in the rectangular coordinate system below.
Step 2. Label the center of the circle (h, k).
Step 3. Let (x, y) represent the coordinates of any point on the circle.



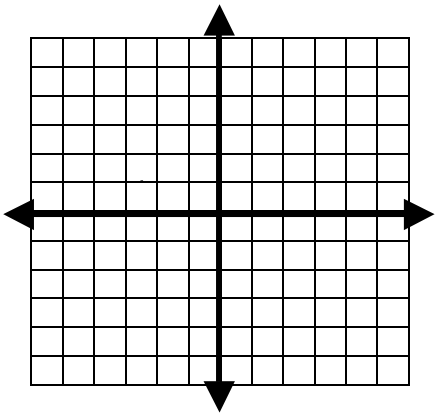
Step 4. What does the geometric definition (above) tell us about a point (x, y) on the circle?

_____

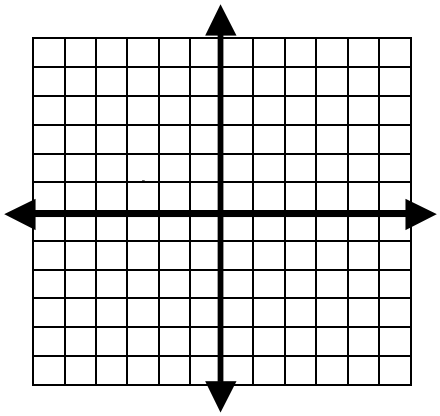
Step 5. Use the distance formula to express the idea from step 4 algebraically.

The Standard Form of the Equation of a Circle with center (h, k) and radius r.

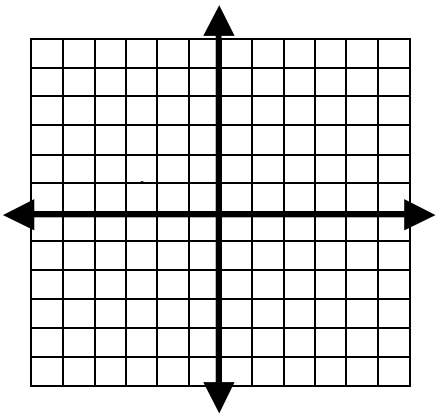
① Write the standard form of the equation of a circle with center $(0, 0)$ and radius of 2. Graph the circle.



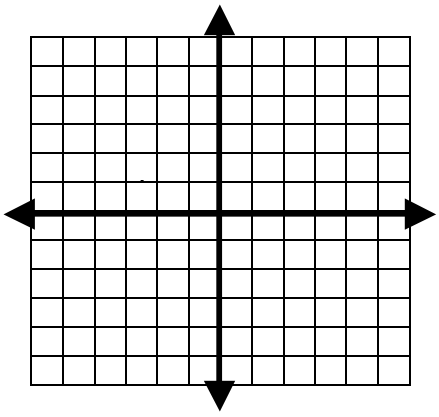
② Write the standard form of the equation of a circle with center $(-2, 3)$ and radius of 4. Graph the circle.



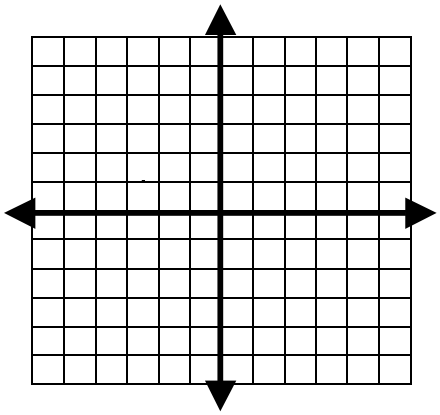
③ Find the center and radius of the circle whose equation is $(x-2)^2+(y+4)^2 = 9$.
Graph the circle.



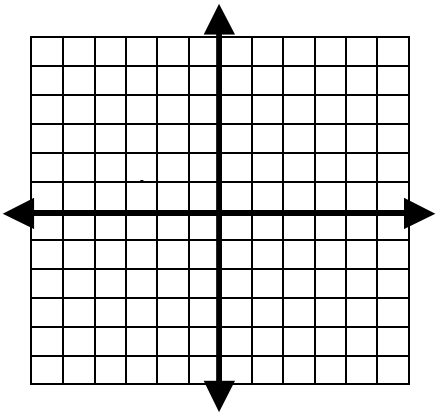
④ Find the center and radius of the circle whose equation is $x^2+(y-3)^2 = 8$.
Graph the circle.



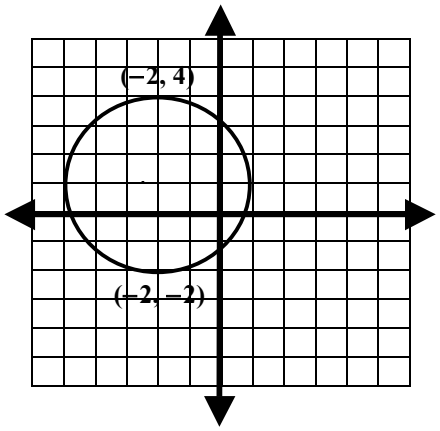
⑤ Write in standard form and graph: $x^2 + y^2 + 4x - 6y - 23 = 0.$



⑥ Write in standard form and graph: $x^2 + y^2 + 12x + 32 = 0.$



⑦ Find the equation of the circle graphed below.
Your answer should be in standard form.



⑧ Graph the parabola: $y = x^2$ on the graph in problem ⑦. At what two points do the graphs intersect?