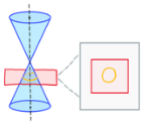
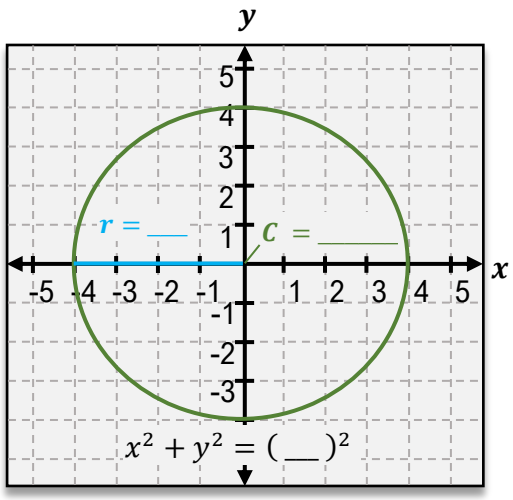
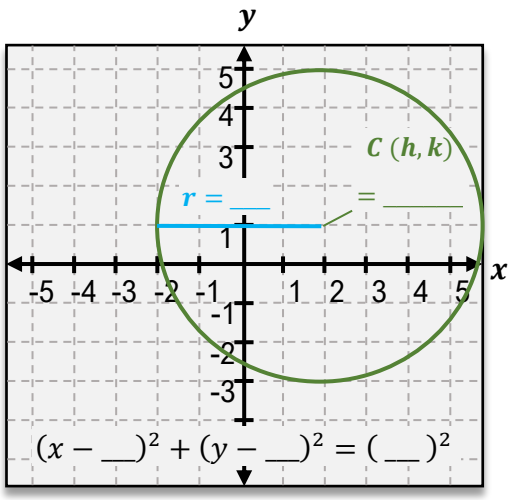
TOPIC: CIRCLES

Circle	Ellipse	Parabola	Hyperbola

Circles in Standard Form



- You'll need 2 things to graph a circle: _____ (C) & _____ (r)
  - The graph of a circle contains all points which are the _____ distance (r) from the center (C)

Circle at Origin	Circle NOT at Origin
	
$x^2 + y^2 = r^2$	$(x - h)^2 + (y - k)^2 = r^2$

EXAMPLE: Graph the circle.

$$(x - 1)^2 + (y - 2)^2 = 9$$

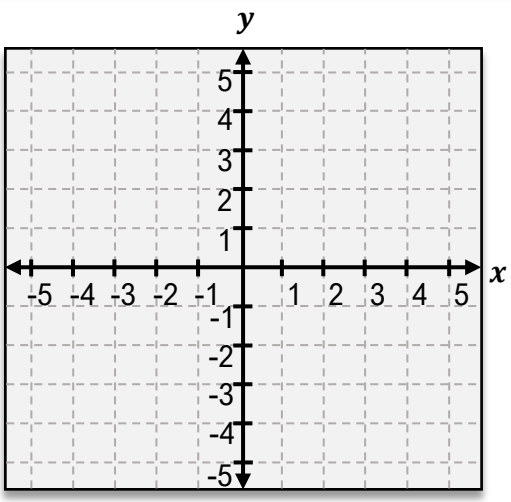
TO GRAPH

1) Center (h, k): (__ , __)

2) Radius: $r =$ _____

3) Plot 4 points a distance $r =$ ____ to the **left**, **right**, **above** and **below** the center point.

4) Connect outside points with a smooth curve

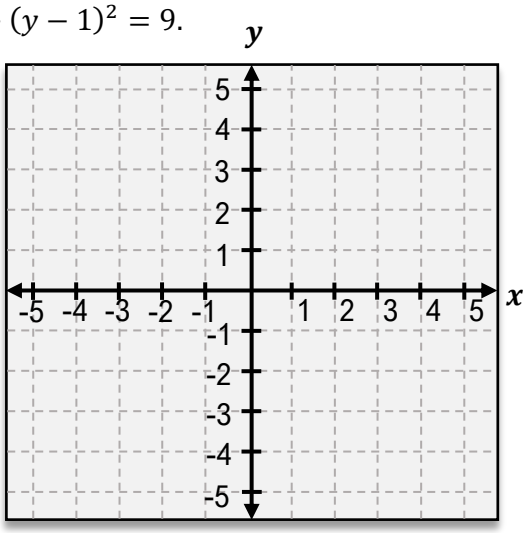


Note: A circle **[IS | IS NOT]** a function because it **[PASSES | FAILS]** the VLT.

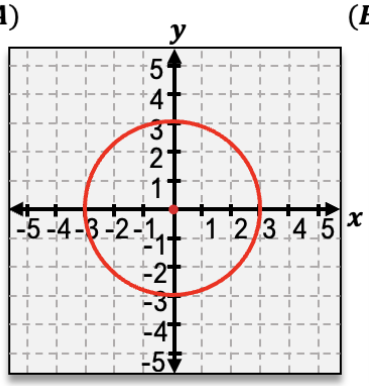
TOPIC: CIRCLES

Circle	Ellipse	Parabola	Hyperbola

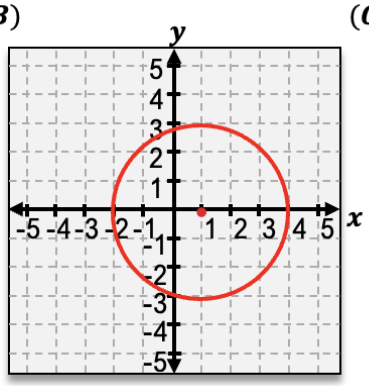
PRACTICE: Sketch a graph of the circle based on the following equation: $x^2 + (y-1)^2 = 9$.



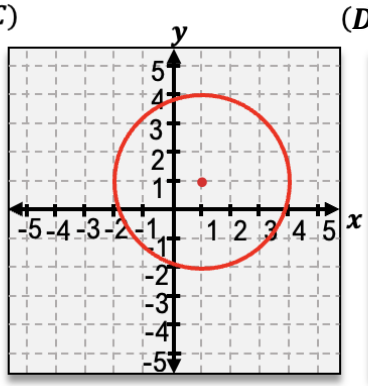
(A)



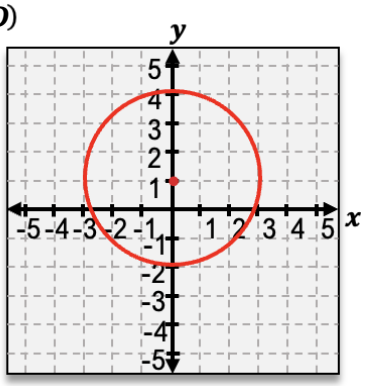
(B)



(C)



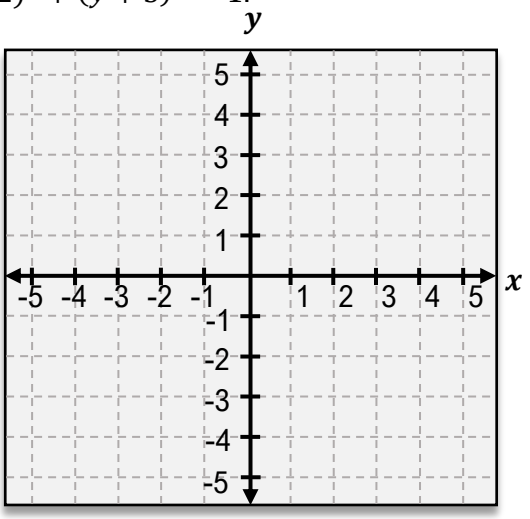
(D)



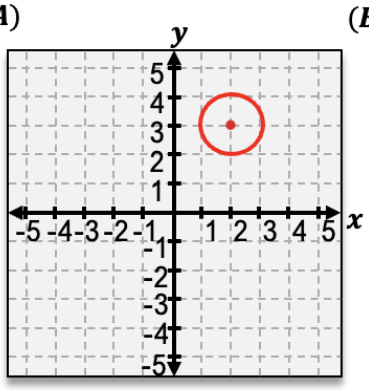
TOPIC: CIRCLES

Circle	Ellipse	Parabola	Hyperbola

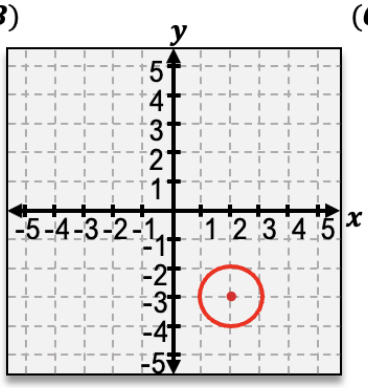
PRACTICE: Sketch a graph of the circle based on the following equation: $(x-2)^2+(y+3)^2=1$.



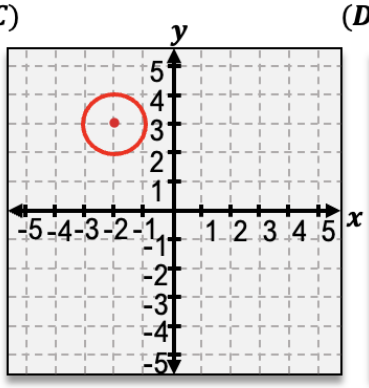
(A)



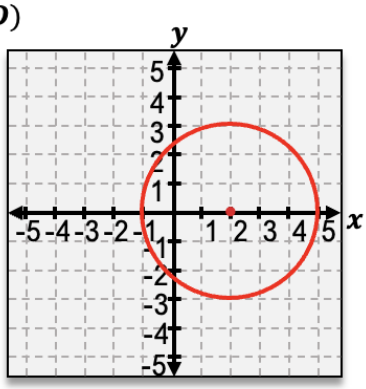
(B)



(C)



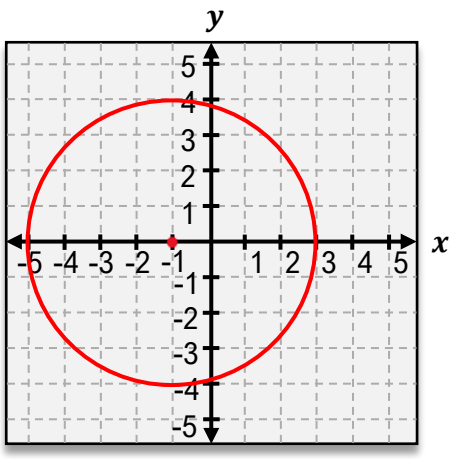
(D)



Circle	Ellipse	Parabola	Hyperbola

TOPIC: CIRCLES

PRACTICE: Find the equation for the following circle.



(A) $x^2 + y^2 = 4$

(B) $(x + 1)^2 + y^2 = 4$

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

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

TOPIC: CIRCLES

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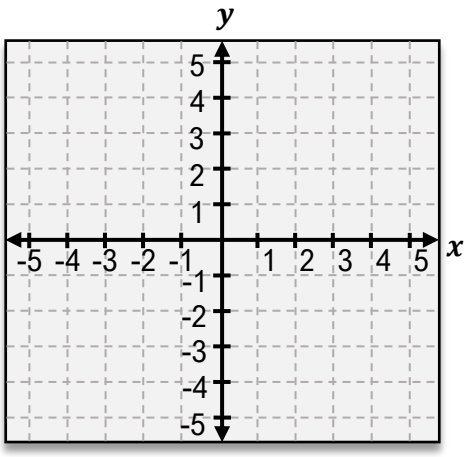
EXAMPLE: Write the equation of a circle with the following characteristics and graph it.

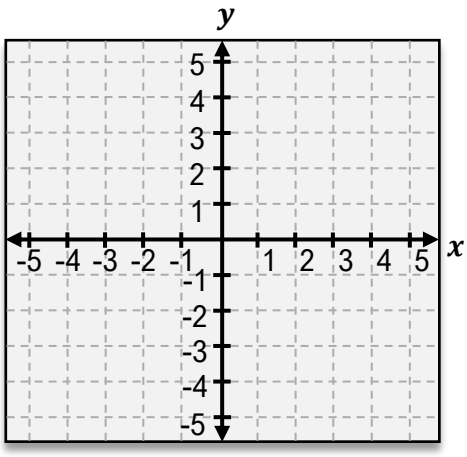
$(\boldsymbol{A})$

Center: $(0,1)$
Radius: 3



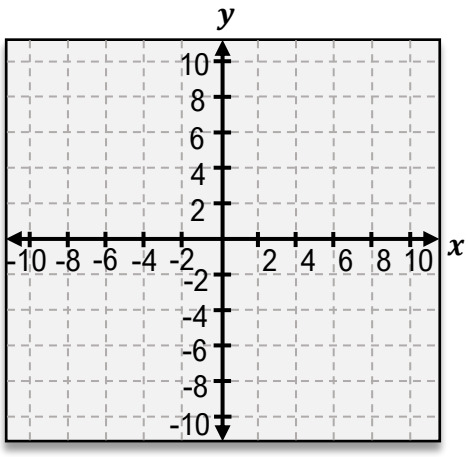
$(\boldsymbol{B})$

Center: $(1,-2)$
Radius: 1



$(\boldsymbol{C})$

Center: $(-6,3)$
Radius: $\sqrt{5}$



TOPIC: CIRCLES

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General Form → Standard 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.

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

↓ Rewrite

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

↓ Complete the Square

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

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

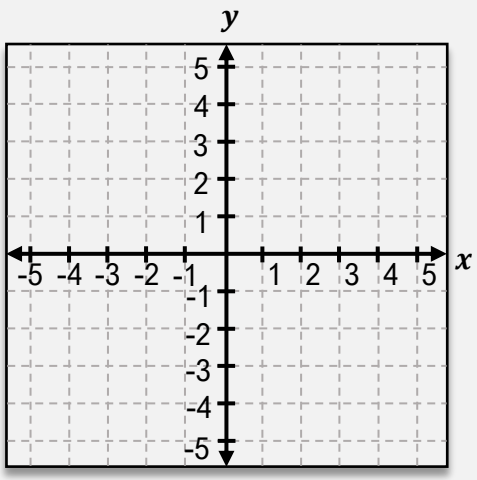
1) Group x terms & y terms on left; constant on right

2) Add _____ to both sides for x terms

Add _____ to both sides for y terms

3) Factor to $(x + \_\_)^2$ & simplify

4) Graph from _____ form



Circle	Ellipse	Parabola	Hyperbola

TOPIC: CIRCLES

PRACTICE: Determine if the equation $x^2 + y^2 - 2x + 4y - 4 = 0$ is a circle, and if it is, find its center and radius.

($\boldsymbol{A}$) Is a circle, center $= c(0,0)$, radius $r = 2$.
($\boldsymbol{B}$) Is a circle, center $= c(0,0)$, radius $r = 3$.
($\boldsymbol{C}$) Is a circle, center $= c(1,-2)$, radius $r = 3$.
($\boldsymbol{D}$) Is not a circle.

PRACTICE: Determine if the equation $x^3 + y^2 + 4x - 8y + 4 = 0$ is a circle, and if it is, find its center and radius.

($\boldsymbol{A}$) Is a circle, center $= c(0,0)$, radius $r = 4$.
($\boldsymbol{B}$) Is a circle, center $= c(2,-4)$, radius $r = 4$.
($\boldsymbol{C}$) Is a circle, center $= c(-2,4)$, radius $r = 4$.
($\boldsymbol{D}$) Is not a circle.