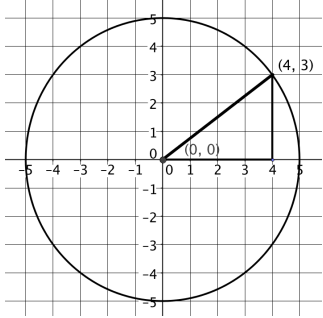## SLO: I can write the equation of a circle in center-radius form<small>Problems worthy of attack prove their worth by fighting back. —Piet Hein THE ROAD TO</small>
<small>WISDOM? Well, it's plain and simple to express. Err and err and err again, but less and less and less. — Piet Hein.</small>

VOCABULARY (have your vocabulary sheet out EVERY day)

(1) EXPLORE. Circles are defined by their radius and center. To write an equation for a circle, we need to find a relationship between the center, the radius, and the x and y coordinates. Let's start by looking at a circle with a radius of 5 and center at the origin (0,0). Each diagram below is a graph of the SAME circle with different points highlighted. Write an equation that relates the x and y values to the radius.
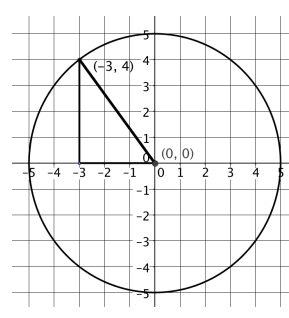
KEEP IN MIND: What shape do you see in the circle? What formula can we use with that shape?
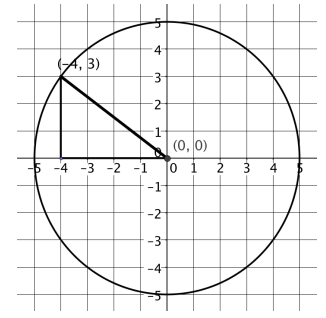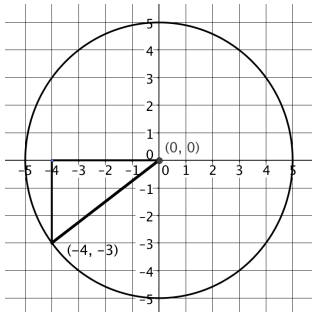

____ ____ ____
  x   y   r
check?
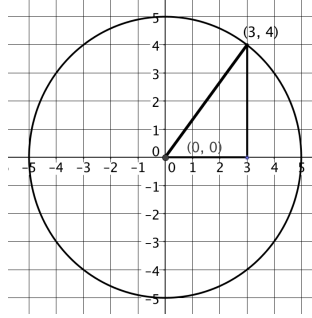
____ ____ ____
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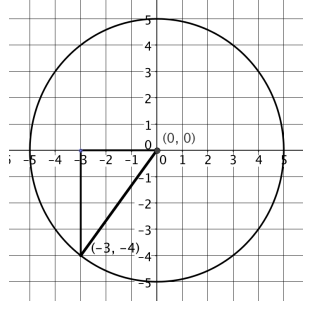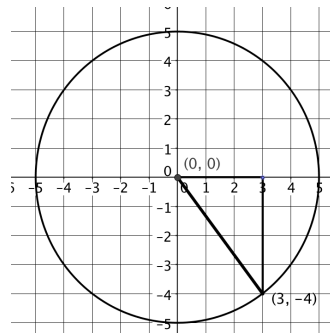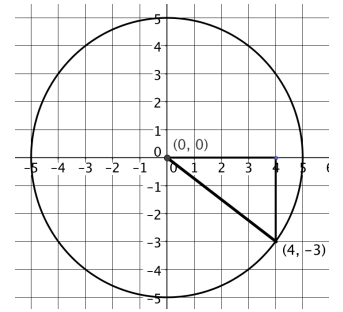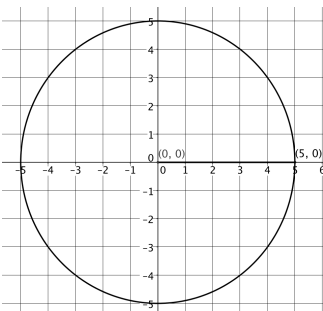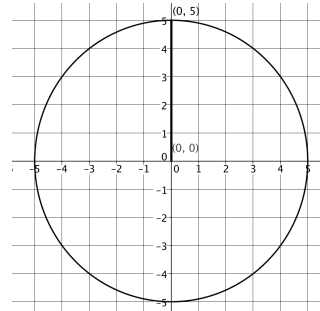
____ ____ ____
  x   y   r
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Name_____Per____
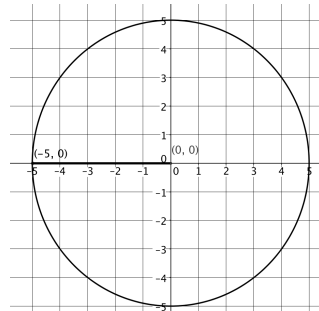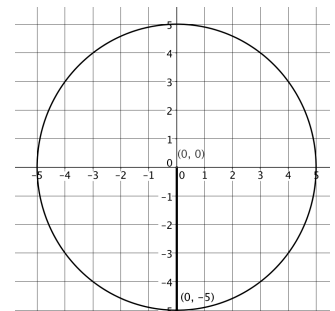
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(2) DO: Write a general equation for circles centered at the origin:

_____

(3) DO: Write an equation for each circle. The origin is the center for all circles below.

1) radius = 20

2) radius = 11

3) radius = 3

4) radius = 9

_____   _____   _____   _____

5)

6)
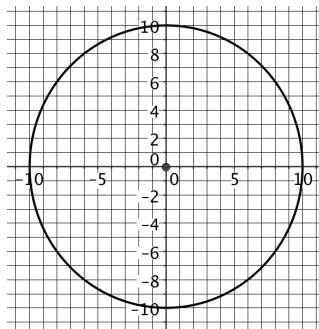
7)

8)

_____   _____   _____   _____

9) (0,2) is a point on the circle

10) (-8, 0) is a point on the circle

_____   _____

11) Write an equation for a circle centered at the origin with a radius of your choosing.

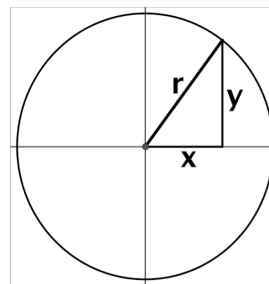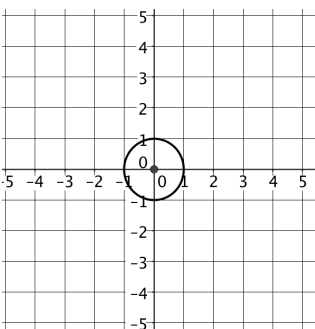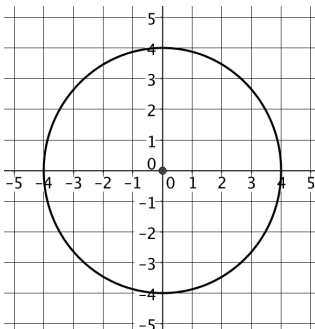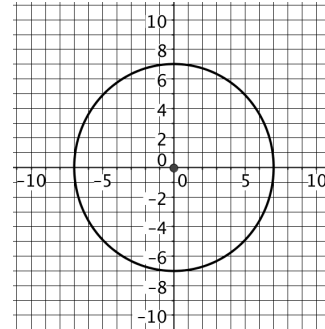**SLO: I can write the equation of a circle in center-radius form** Problems worthy of attack prove their worth by fighting back. —Piet Hein THE ROAD TO
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(4) EXPLORE: What if the center is NOT at the origin?

12)
What are the coordinates for the center of the circle at right?   (_____ , _____)

We could write the equation for the circle if the center coordinates were (0,0).

How can we change x & y to drag the center back to the origin?   (_____ , _____)

What will our equation look like?   ($)^2$ + ($)^2$ = ($)^2$

13)
What are the coordinates for the center of the circle at right?   (_____ , _____)

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14)
What are the coordinates for the center of the circle at right?   (_____ , _____)
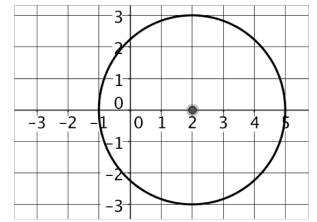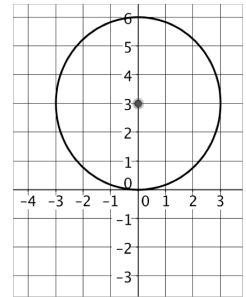
We could write the equation for the circle if the center coordinates were (0,0).

How can we change x & y to drag the center back to the origin?   (_____ , _____)

What will our equation look like?   ($)^2$ + ($)^2$ = ($)^2$

15)
What are the coordinates for the center of the circle at right?   (_____ , _____)
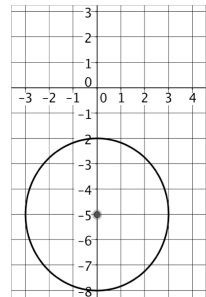
We could write the equation for the circle if the center coordinates were (0,0).

How can we change x & y to drag the center back to the origin?   (_____ , _____)

What will our equation look like?   ($)^2$ + ($)^2$ = ($)^2$

16)
What are the coordinates for the center of the circle at right?   (_____ , _____)
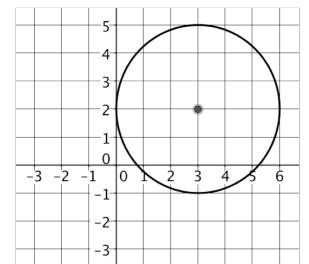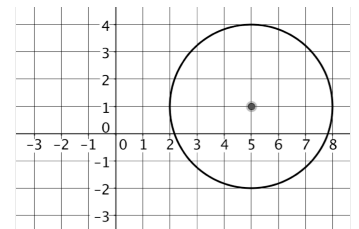
We could write the equation for the circle if the center coordinates were (0,0).

How can we change x & y to drag the center back to the origin?   (_____ , _____)

What will our equation look like?   ($)^2$ + ($)^2$ = ($)^2$

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17)

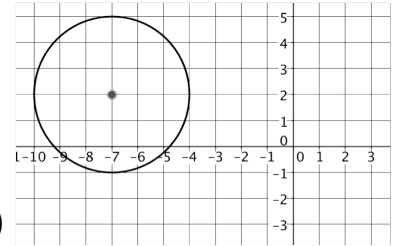What are the coordinates for the center of the circle at right?   (_____ , _____)

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What will our equation look like?   _____

18)

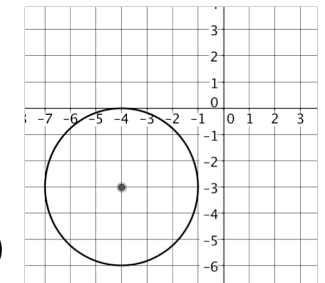What are the coordinates for the center of the circle at right?   (_____ , _____)

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19)

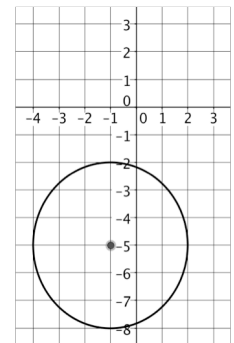What are the coordinates for the center of the circle at right?   (_____ , _____)

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20)

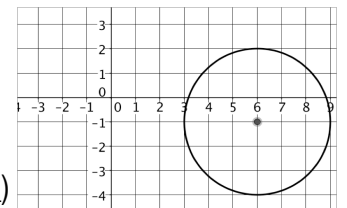What are the coordinates for the center of the circle at right?   (_____ , _____)

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How can we change x & y to drag the center back to the origin?   (_____ , _____)

What will our equation look like   _____

(5) SUMMARIZE: For any circle with center *(h, k)* and radius *r*, the equation of the circle can be written:

_____