Equations of Circles

IC4

Equations of Circles: http://www.geogebra.org/en/upload/files/UC_MAT/Equation_of_Circles.html

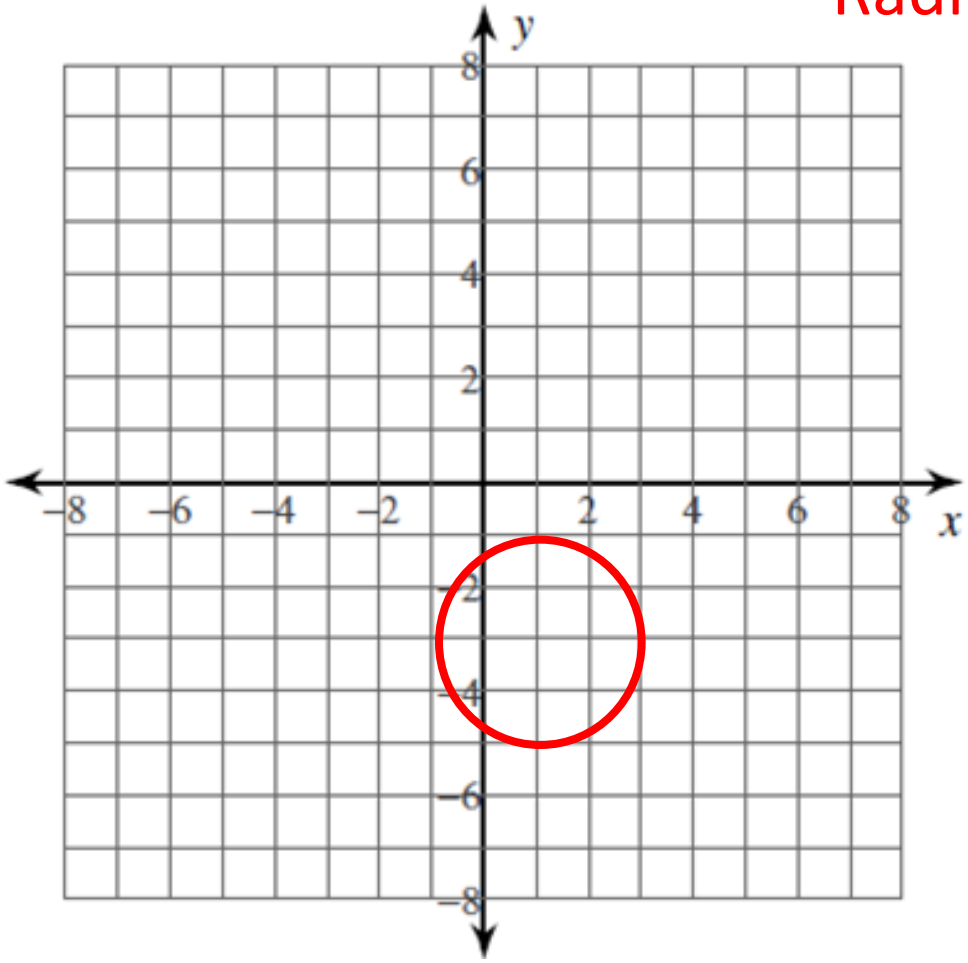
$$(x - h)^2 + (y - k)^2 = r^2$$

Where (h, k) is center and r is radius

Graph the circle given by each equation below.

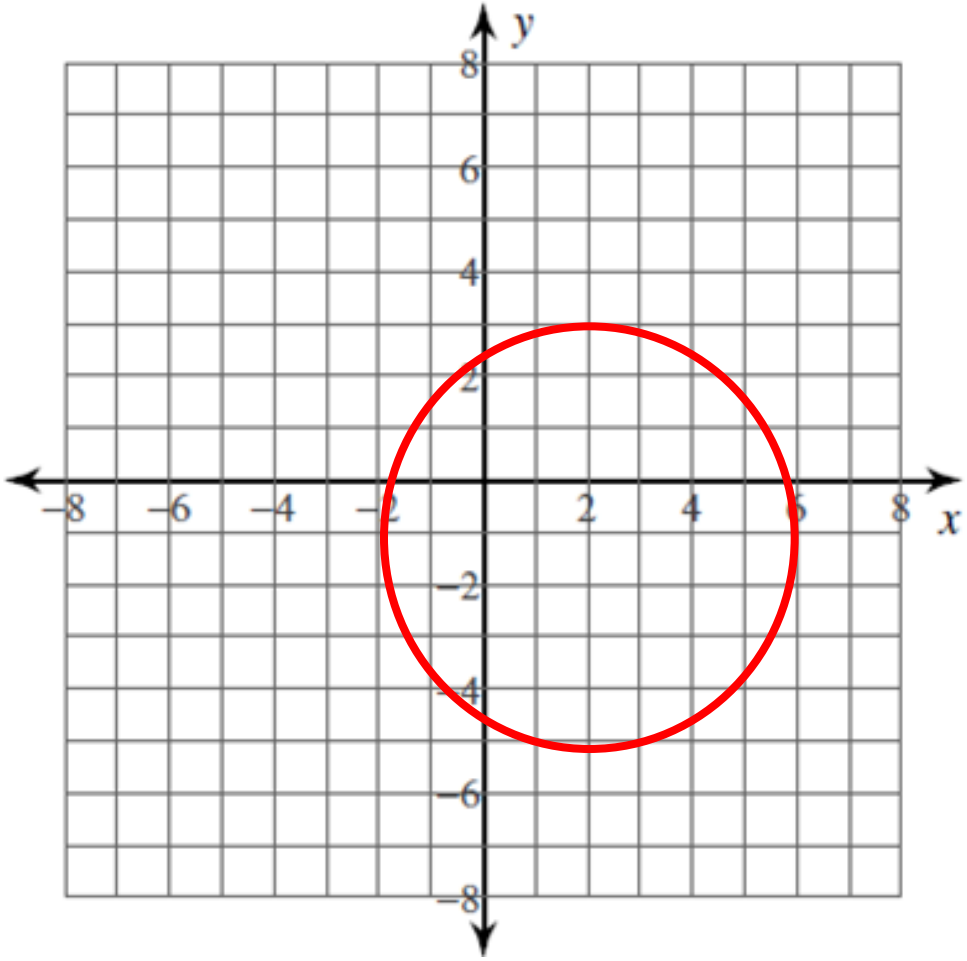
1) $(x-1)^2+(y+3)^2=4$

Center: (1, -3)
Radius: 2



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

Center: (2, -1)
Radius: 4



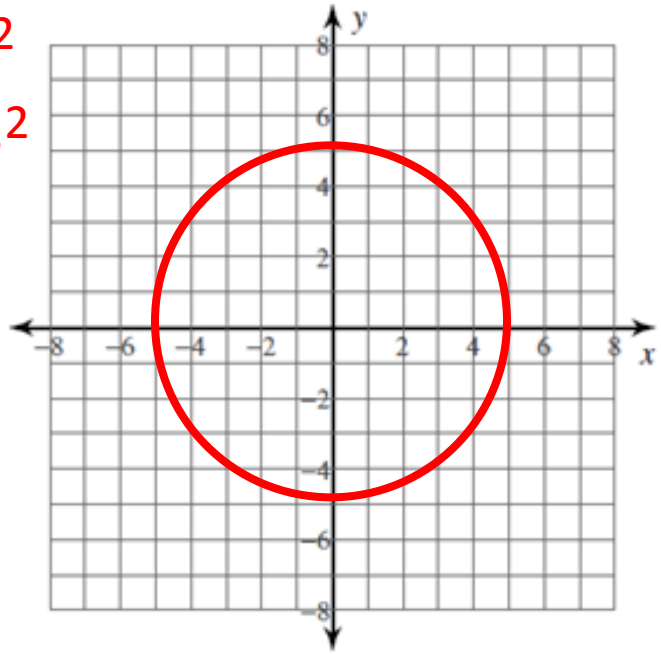
Use the information provided to write the equation of a circle that fits the criteria given. Use a graph to help you if necessary.

3) Center: (0, 0) Radius = 5

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

$(x - 0)^2 + (y - 0)^2 = 5^2$

$x^2 + y^2 = 25$



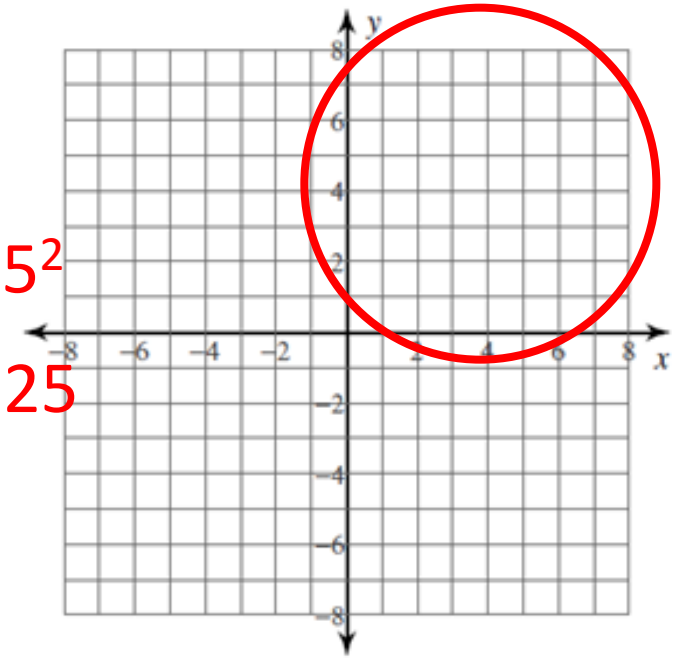
4) Ends of the diameter: (9, 4) and (-1, 4)

Center: (4, 4)

Radius: 5

$(x - 4)^2 + (y - 4)^2 = 5^2$

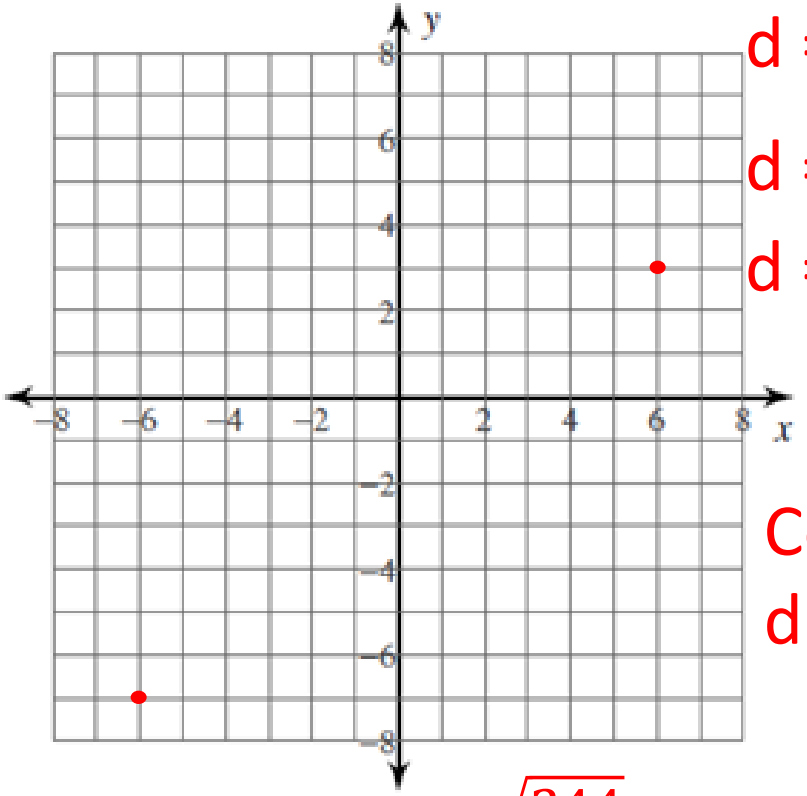
$(x - 4)^2 + (y - 4)^2 = 25$



Center is midpoint of diameter

Radius = half of diameter

5) Ends of the diameter: (6, 3) and (-6, -7)



$d = \sqrt{(-7 - 3)^2 + (-6 - 6)^2}$

$d = \sqrt{10^2 + 12^2}$

$d = \sqrt{244}$

$r = \frac{\sqrt{244}}{2}$

Center⟶ midpoint of diameter

$\left(\frac{6+(-6)}{2}, \frac{3+(-7)}{2}\right)$

(0, -2)

$(x - 0)^2 + (y + 2)^2 = \left(\frac{\sqrt{244}}{2}\right)^2$

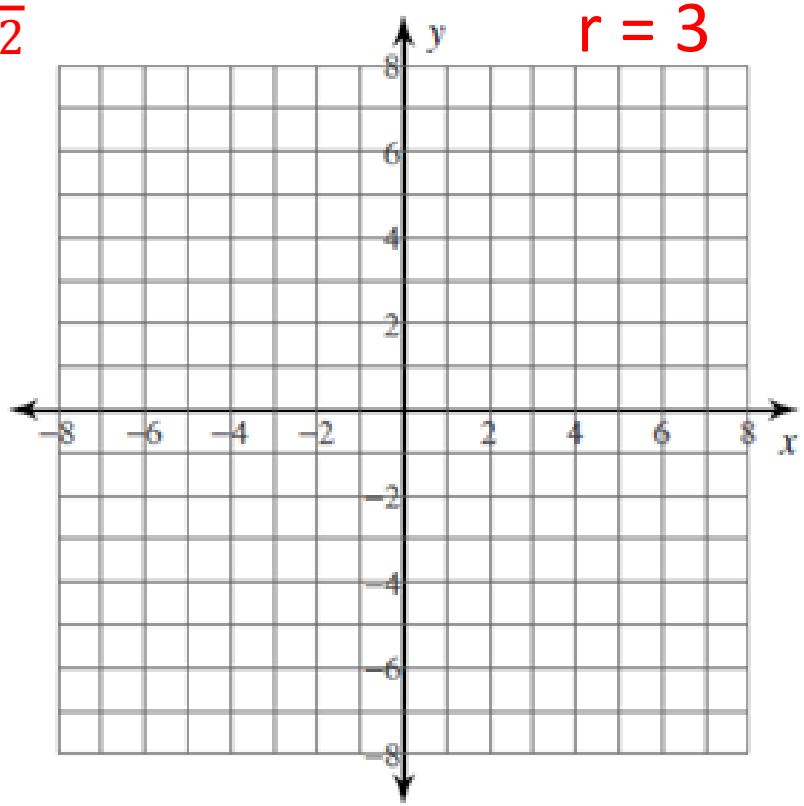
$x^2 + (y + 2)^2 = \frac{244}{4}$

$x^2 + (y + 2)^2 = 61$

Distance between is the radius of circle

6) Center: (-2, 5) Tangent to x = 1

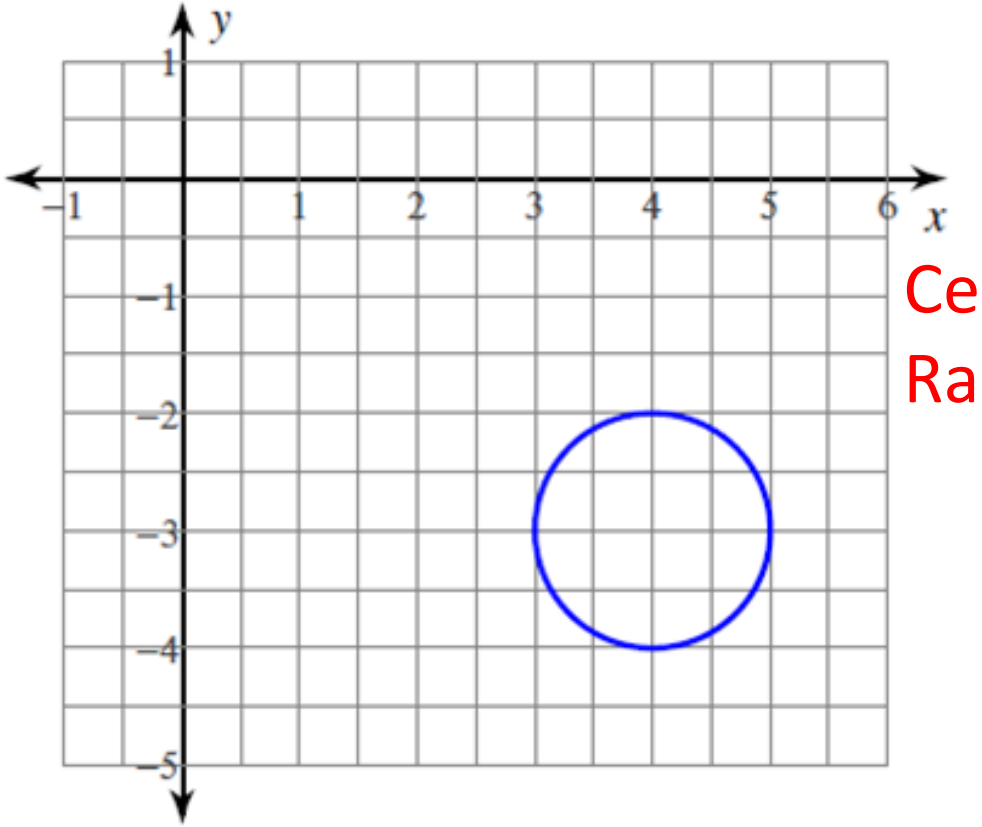
r = 3



$(x + 2)^2 + (y - 5)^2 = 3^2$

$(x + 2)^2 + (y - 5)^2 = 9$

7) Write the equation of each graphed circle or the circle in the description.



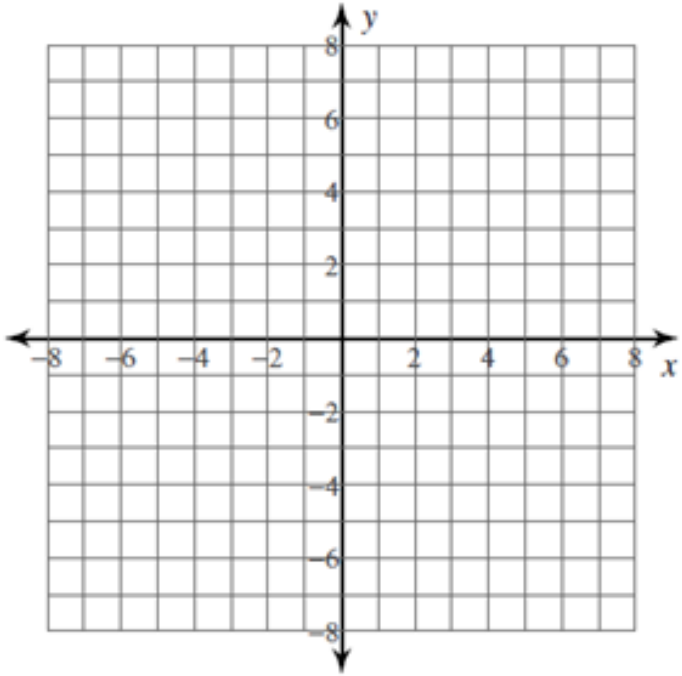
Center: (4, -3)

Radius: 1

$(x - 4)^2 + (y + 3)^2 = 1^2$

$(x - 4)^2 + (y + 3)^2 = 1$

8) Translate the circle $(x + 5)^2 + (y + 7)^2 = 36$ up 6 and right 2.



Old Center:

(-5, -7)

+2 +6

New Center:

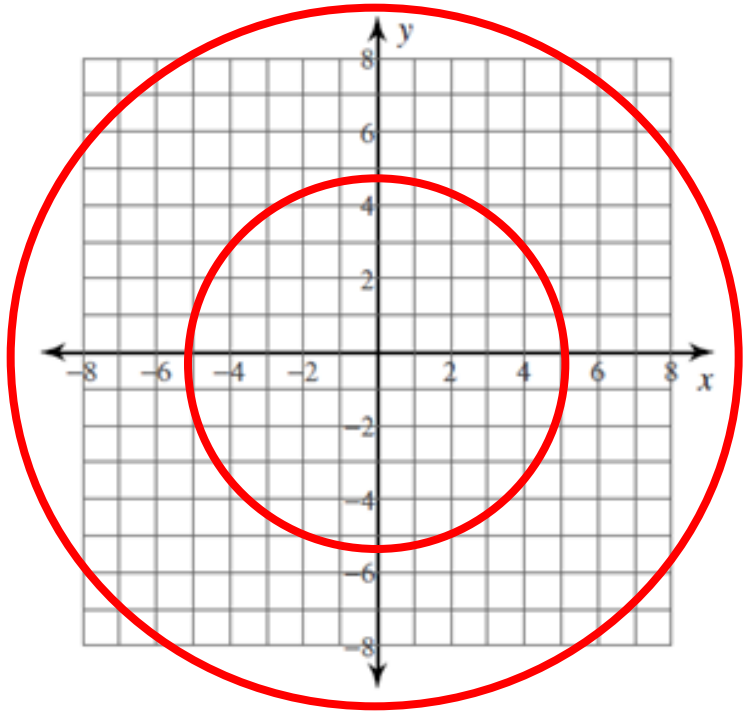
(-3, -1)

Radius: 6

$(x + 3)^2 + (y + 1)^2 = 36$

Use what you know about the equation of a circle to answer the following questions.

10) Suppose that a dart is tossed at random onto the graph of $x^2 + y^2 = 100$. What is the probability that it will land within the graph of $x^2 + y^2 = 25$?



Center: (0, 0)
Radius: 5

Center: (0, 0)
Radius: 10

$$\text{Probability} = \frac{\textit{success region}}{\textit{total region}} = \frac{\pi(5)^2}{\pi(10)^2} = \frac{25\pi}{100\pi} = \tfrac{1}{4}$$