Topic: Equation of a circle
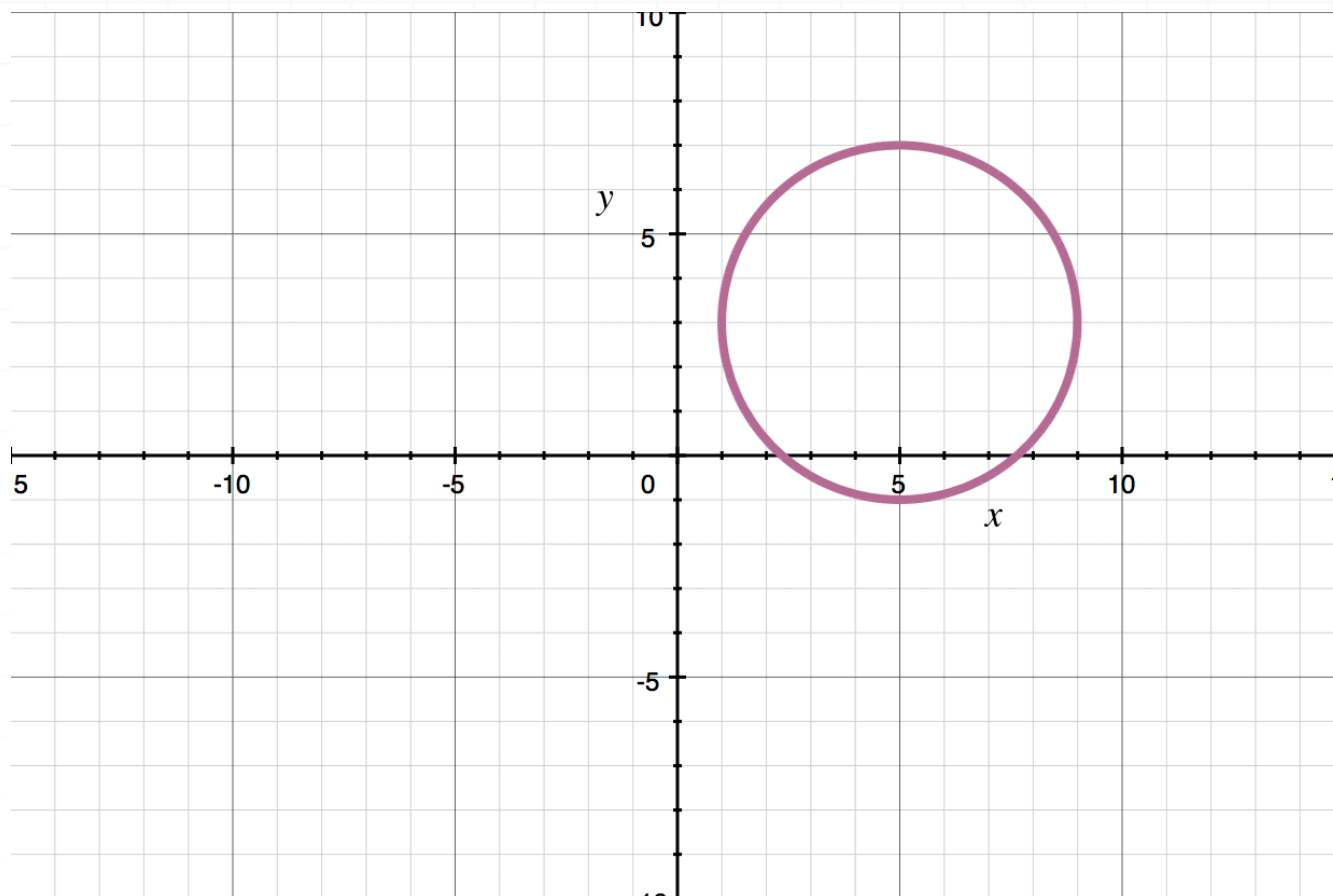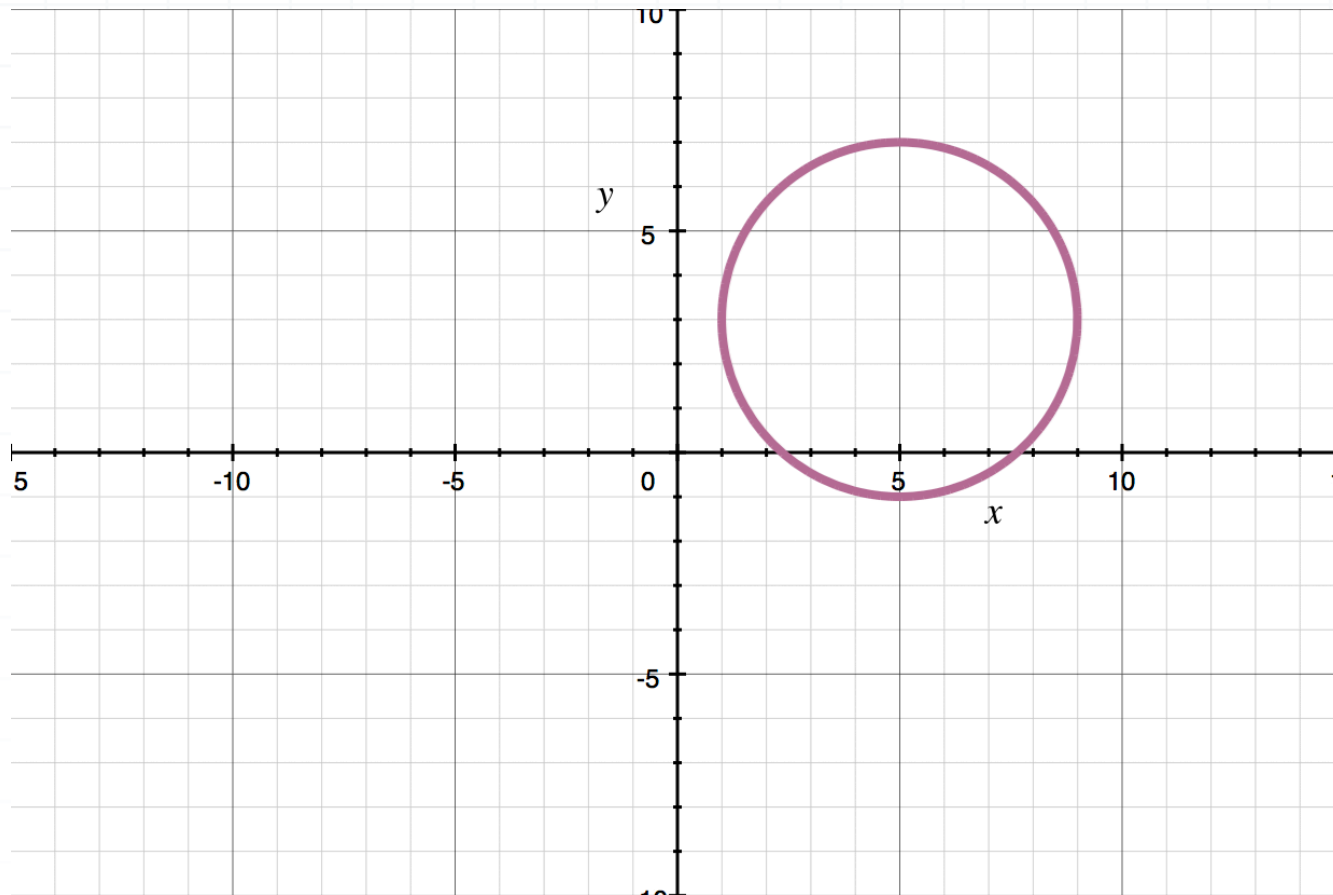
Question: What is the equation of the circle?

Answer choices:

A $(x+5)^2 + (y+3)^2 = 4$

B $(x-5)^2 + (y-3)^2 = 4$

C $(x-5)^2 + (y+3)^2 = 4^2$

D $(x-5)^2 + (y-3)^2 = 16$

Solution: D

The center of the circle is $(5,3)$.

That means that, in the equation of the circle, 5 will be h and 3 will be k.

The radius is the distance from the center to any point on the circle. If we use the point $(1,3)$, then its distance from the center is 4. Plugging the values of h, k, and r into the formula for the equation of a circle gives

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

$$(x - 5)^2 + (y - 3)^2 = 16$$

Topic: Equation of a circle

Question: What are the x-intercepts of the circle $(x+4)^2 + (y-3)^2 = 25$?

Answer choices:

A $(1,0)$, $(-9,0)$

B $(-4,0)$, $(3,0)$

C $(0,0)$, $(-8,0)$

D $(5,0)$, $(-4,0)$

Solution: C

The x-intercepts are the points at which $y = 0$, so substitute $y = 0$ into the equation of the circle.

$$(x + 4)^2 + (y - 3)^2 = 25$$

$$(x + 4)^2 + (0 - 3)^2 = 25$$

$$x^2 + 8x + 16 + 9 = 25$$

$$x^2 + 8x = 0$$

$$x(x + 8) = 0$$

$$x = 0 \text{ or } x = -8$$

So the x-intercepts are $(0,0)$ and $(-8,0)$.

Topic: Equation of a circle

Question: What are the center and radius of the circle $(x + 5)^2 + y^2 = 11$?

Answer choices:

A $(-5,0),\ 11$

B $(-5,0),\ \sqrt{11}$

C $(5,0),\ \sqrt{11}$

D $(0,5),\ 11$

Solution: B

Following the pattern $(x - h)^2 + (y - k)^2 = r^2$ tells us that

$$h = -5$$

$$k = 0$$

$$r^2 = 11$$

$$r = \sqrt{11}$$

The center of the circle is $(-5,0)$ and the radius is $\sqrt{11}$.