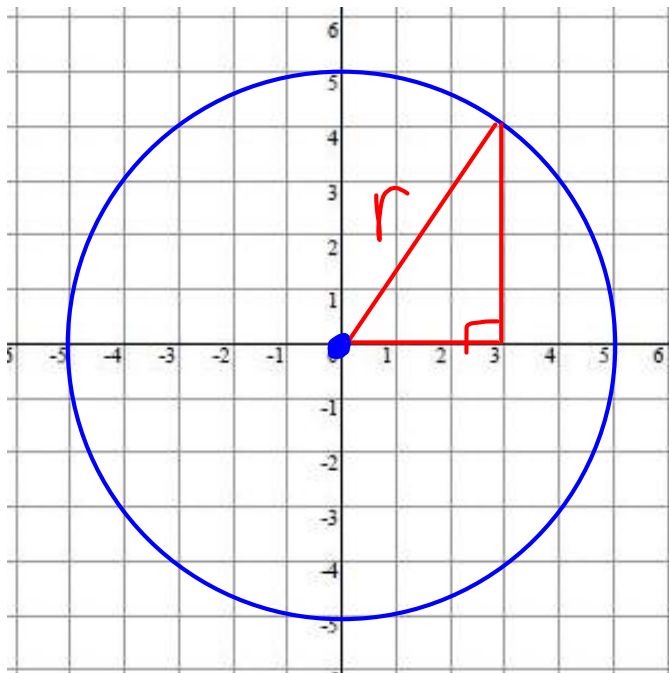


12.5 Graphing Circles

two Important parts

Center

radius



Center (0,0)

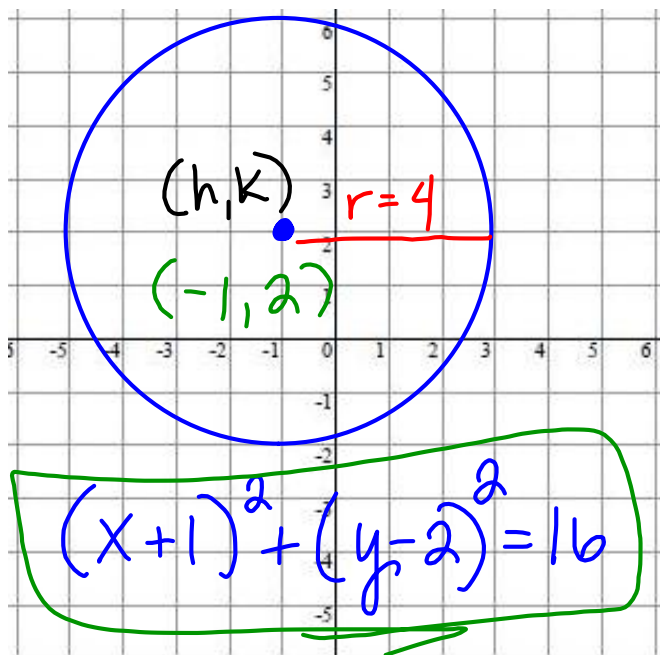
radius 5

$$x^2 + y^2 = r^2$$

$$x^2 + y^2 = 25$$

Center radius

When center is NOT at (0,0), but at (h,k)
* any point.

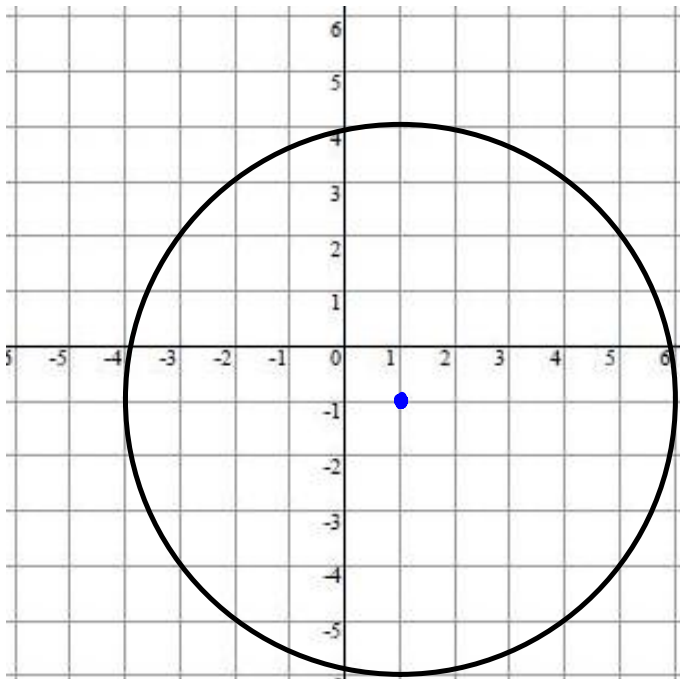


$$(x-h)^2 + (y-k)^2 = r^2$$

* must change the signs of h & k from eq \rightarrow point.

Ex 1 | What is standard form for the equation of a circle with center $(5, -2)$ and radius 7?

Ex 2 | Write an equation in standard form for the given circle.



Ex 1 | What is standard form for the equation of a circle with center $(5, -2)$ and radius 7? $(x-h)^2 + (y-k)^2 = r^2$

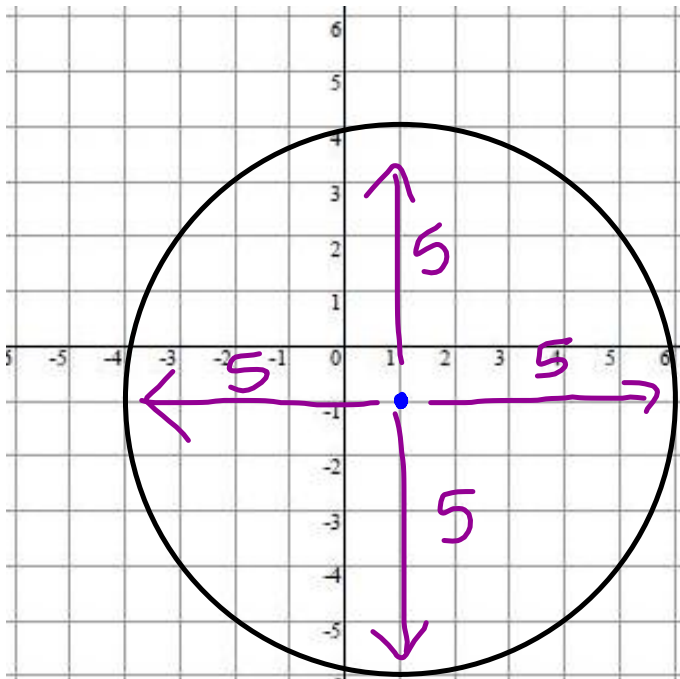
$$r = 7$$

$$h = 5$$

$$k = -2$$

$$(x-5)^2 + (y+2)^2 = 49$$

Ex 2 | Write an equation in standard form for the given circle.



$$r = 5$$

$$\text{center} = (1, -1)$$

$$(x-1)^2 + (y+1)^2 = 25$$

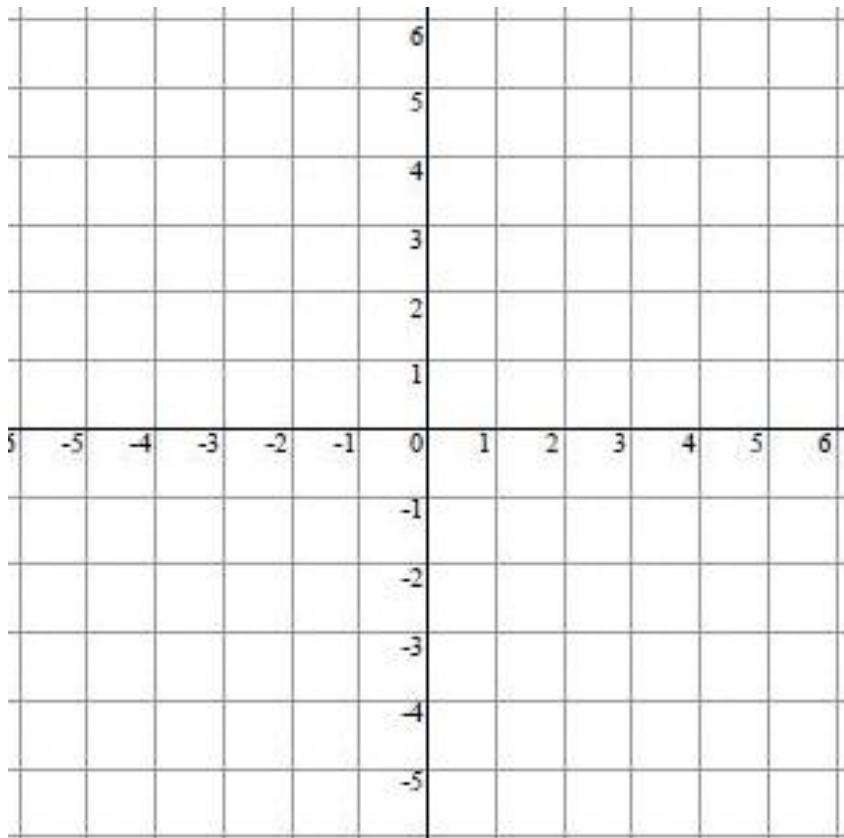
Ex 3 | Find the center and radius for each circle.

a) $x^2 + y^2 = 36$

b) $(x+4)^2 + (y-1)^2 = 25$

c) $x^2 + (y+8)^2 = 100$

Ex 4 | Graph $(x-5)^2 + (y+2)^2 = 16$



Ex 5 | Write an equation of a circle with the center at $(7, -2)$ and passes through the point $(1, -6)$.

$$\rightarrow (x-7)^2 + (y+2)^2 = r^2$$

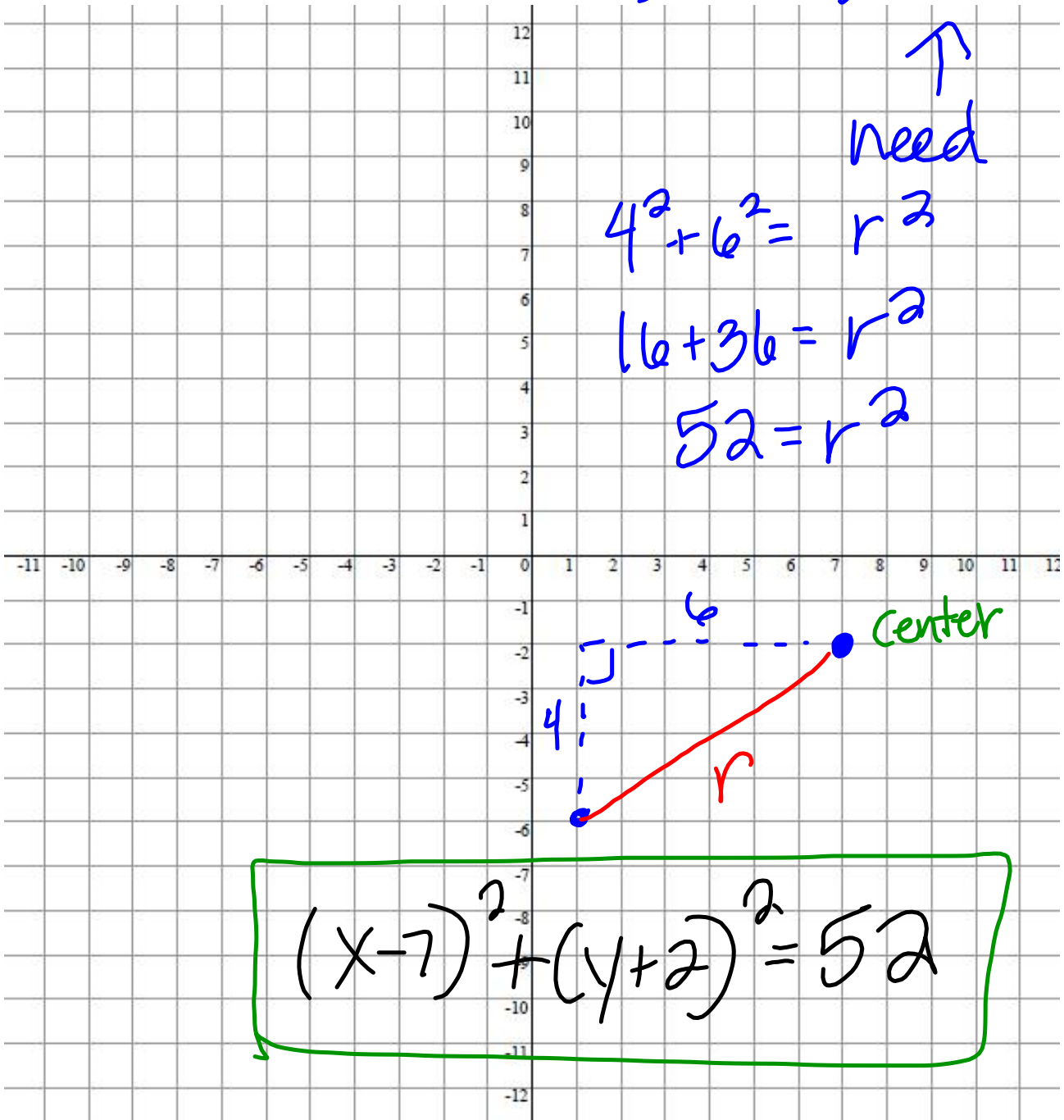
↑

need

$$4^2 + 6^2 = r^2$$

$$16 + 36 = r^2$$

$$52 = r^2$$



$$(x-7)^2 + (y+2)^2 = 52$$

Ex 6

a) What is standard form for the equation of a circle with center $(4, -3)$ and radius 3?

$$(x-4)^2 + (y+3)^2 = 9$$

b) State the center and radius for $(x+3)^2 + y^2 = 12$

Center: $(-3, 0)$

$r: \sqrt{12}$

$$(x-4)^2$$

$$(x-4)(x-4)$$

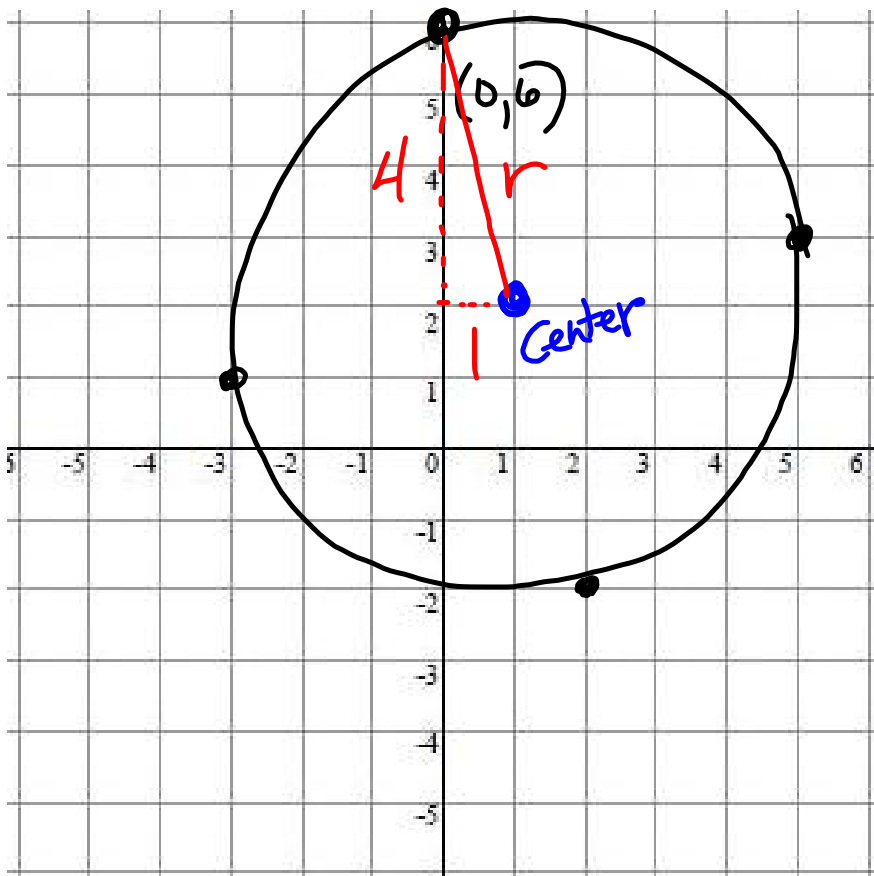
$$x^2 - 8x + 16$$

$$x^2 + 6x + 9$$

$$(x+3)(x+3)$$

$$(x+3)^2$$

Ex 7 Write an equation of a circle with center at $(1, 2)$ and passes through $(0, 6)$.



$$4^2 + 1^2 = r^2$$

$$\implies 16 + 1 = r^2$$

$$17 = r^2$$

$$(x-1)^2 + (y-2)^2 = 17$$

Ex 8 | Rewrite the equation of a circle in standard form

$$8x + x^2 - 2y = 64 - y^2$$

Standard form $(x-h)^2 + (y-k)^2 = r^2$	Complete the Square of a quadratic function $ax^2 + bx + c$
--	---

<u>1st</u> All "x" stuff	<u>2nd</u> "y" stuff	<u>right</u> #
--------------------------------	-------------------------	-------------------

1st
regroup

$$x^2 + 8x + y^2 - 2y = 64$$

$$b = 8$$

$$b = -2$$

$$\left(\frac{b}{2}\right)^2 = 16$$

$$\left(\frac{b}{2}\right)^2 = 1$$

2nd
make "c"
for each group

$$c = \left(\frac{b}{2}\right)^2$$

* What you add to the left,
you must add to the right.

$$x^2 + 8x + 16 + y^2 - 2y + 1 = 64 + 16 + 1$$

$$\downarrow$$

$$(x+4)^2 + (y-1)^2 = 81$$

Ex 9 | Rewrite the equation of a circle
in standard form

$$8x + 32y + y^2 = -263 - x^2$$

$$x^2 + 8x + y^2 + 32y = -263$$

$$\boxed{x^2 + 8x + 16} + \boxed{y^2 + 32y + 256} = \begin{matrix} -263 \\ +256 \\ +16 \end{matrix}$$

$$\boxed{(x+4)^2 + (y+16)^2 = 9}$$