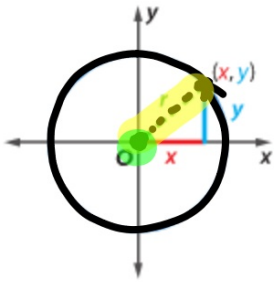
Geometry 10.8

Write the equation of a circle

Graph a circle on the coordinate plane



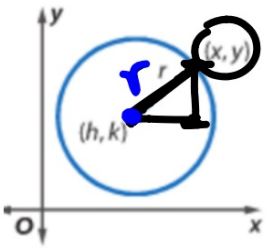
circle C (x, y)

center

radius r =

pythagorean theorem (distance)

Factoring/Completing the Square (alg 1)



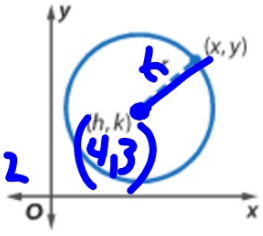
$(x-h)^2+(y-k)^2=r^2$ Distance from (x,y) to (h,k) (pythagorean theorem)

center: x, y

KeyConcept Equation of a Circle in Standard Form

The standard form of the equation of a circle with center at (h, k) and radius r is $(x-h)^2+(y-k)^2=r^2$.

The standard form of the equation of a circle is also called the *center-radius* form.



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

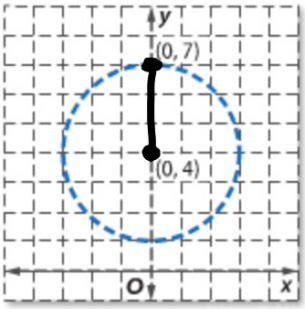
$(x-4)^2+(y-3)^2=36$

Example 1 Write an Equation Using the Center and Radius

Write the equation of each circle.

a. center at (1, −8), radius 7

$(x-1)^2+(y+8)^2=49$



$$(x-0)^2+(y-4)^2=9$$

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

$\sqrt{10} \cdot \sqrt{10} = \sqrt{100}$

GuidedPractice

1A. center at origin, radius $\sqrt{10}$

$(0, 0)$

$(x-0)^2+(y-0)^2=10$

$r=4$

1B. center at $(4, -1)$, diameter 8

$(x-4)^2+(y+1)^2=16$

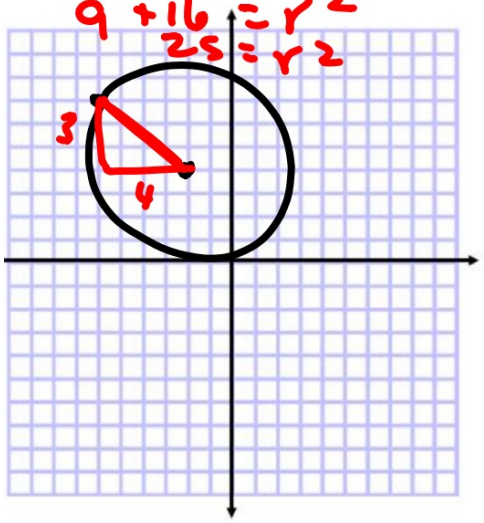
Example 2 Write an Equation Using the Center and a Point

Write the equation of the circle with center at $(-2, 4)$, that passes through $(-6, 7)$.

$3^2 + 4^2 = r^2$

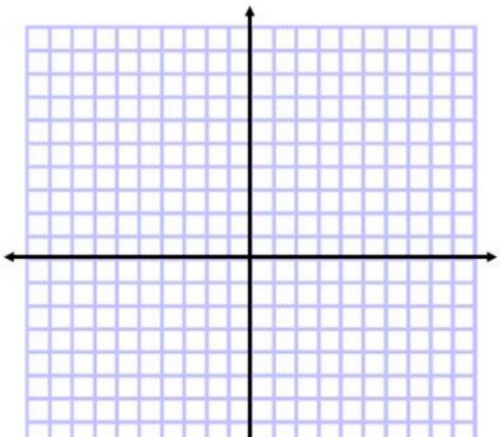
$9 + 16 = r^2$

$25 = r^2$



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

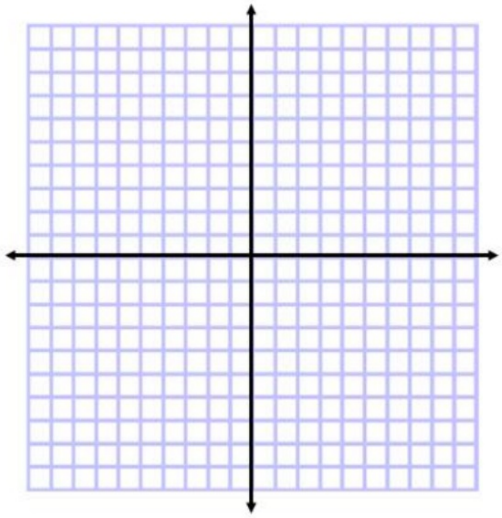
ow?



CTS (Alg 1 ch. 9)

Example 3 Graph a Circle

The equation of a circle is $x^2 + y^2 - 8x + 2y = -8$. State the coordinates of the center and the measure of the radius. Then graph the equation.



p. 760 13-37 odd

GuidedPractice

For each circle with the given equation, state the coordinates of the center and the measure of the radius. Then graph the equation.

3A. $x^2 + y^2 - 4 = 0$

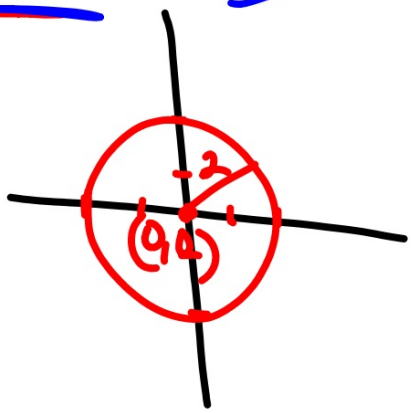
+4 +4

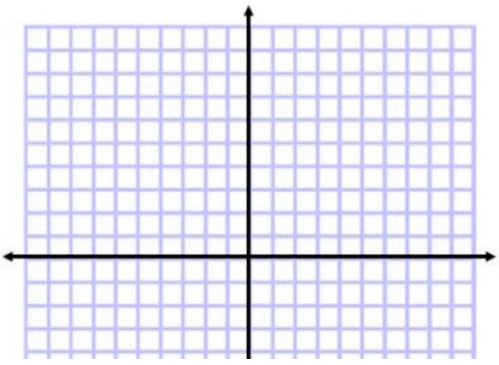
3B. $x^2 + y^2 + 8x - 14y + 40 = 0$

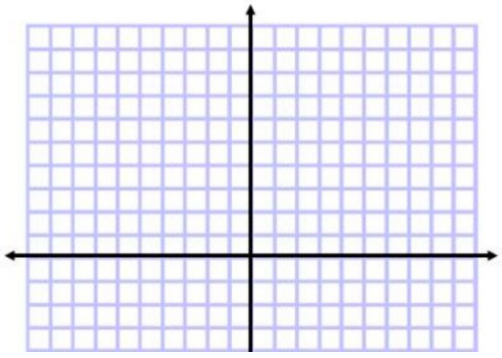
$(x-0)^2 + (y-0)^2 = 4$

C(0,0)

r = 2







(2.1)

Example 5 Intersections with Circles

Find the point(s) of intersection between $x^2 + y^2 = 4$ and $y = x$.

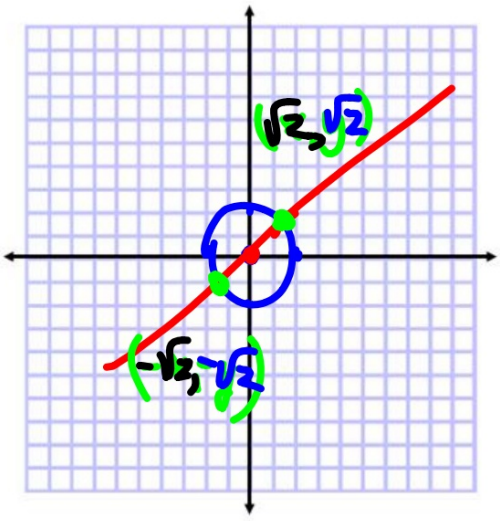
Graph & Estimate
Solve w. Substitution or Elimination (Alg1)

$x^2 + x^2 = 4$

$\frac{2x^2}{2} = \frac{4}{2}$

$\sqrt{x^2} = \sqrt{2}$

$x = \pm\sqrt{2}$



Write equations using 3 points...
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5. Find the point(s) of intersection between $x^2 + y^2 = 8$ and $y = -x$.