

10.2 Equations of Circles Day 1.....page #

Goal: Write an equation of a circle, graph a circle, and identify its center and radius.

Apr 11-10:25 AM

Warm Up
Find the slope of the line that connects each pair of points.

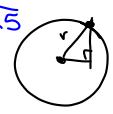
1. (5, 7) and (-1, 6)
 $\frac{y_2 - y_1}{x_2 - x_1} = \frac{6 - 7}{-1 - 5} = \frac{-1}{-6} = \frac{1}{6}$

2. (3, -4) and (-4, 3)
 $\frac{3 - (-4)}{-4 - 3} = \frac{7}{-7} = -1$

Find the distance between each pair of points. $d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$

3. (-2, 12) and (6, -3)
 $D = \sqrt{(6 - (-2))^2 + (-3 - 12)^2} = \sqrt{64 + 225} = \sqrt{289} = 17$

4. (1, 5) and (4, 1)
 $D = \sqrt{(4 - 1)^2 + (1 - 5)^2} = \sqrt{9 + 16} = \sqrt{25} = 5$



Jan 25-8:40 PM

A **circle** is the set of points in a plane that are a fixed distance, called the radius, from a fixed point, called the center. Because all of the points on a circle are the same distance from the center of the circle, you can use the Distance Formula to find the equation of a circle.

$$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

$$r = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

$$r^2 = (x_2 - x_1)^2 + (y_2 - y_1)^2$$

Equation of a Circle

$(x - h)^2 + (y - k)^2 = r^2$ center (h, k) and radius r
 point (x, y) lies on the circle

(h, k) center
 r radius

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Notice that r^2 and the center are visible in the equation of a circle. This leads to a general formula for a circle with center (h, k) and radius r.

EQUATION	EXAMPLE	GRAPH
The equation of a circle with center (h, k) and radius r is $(x - h)^2 + (y - k)^2 = r^2$.	The equation of the circle with center (5, -2) and radius r = 8 is $(x - 5)^2 + (y - (-2))^2 = 8^2$ or $(x - 5)^2 + (y + 2)^2 = 64$.	

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WATCH!
Write the equation of the circle.
the circle with center (0, 6) and radius r = 1

$(x - h)^2 + (y - k)^2 = r^2$ Equation of a circle

$(x - 0)^2 + (y - 6)^2 = 1^2$ Substitute.

$x^2 + (y - 6)^2 = 1$

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Together!!
Write the equation of a circle with center (-3, 4) and radius r = 6.

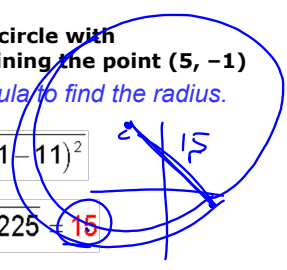
$(x + 3)^2 + (y - 4)^2 = 36$

Write the equation of a circle with center (9, -2) and radius $r = 2\sqrt{7}$.

$(x - 9)^2 + (y + 2)^2 = 28$ $(2\sqrt{7})^2 = 2\sqrt{7} \cdot 2\sqrt{7} = 4 \cdot 7 = 28$

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WATCH!
 Write an equation for the circle with center $(-4, 11)$ and containing the point $(5, -1)$
 Use the Distance Formula to find the radius.

$$r = \sqrt{(5 - (-4))^2 + (-1 - 11)^2}$$


$$r = \sqrt{(9)^2 + (-12)^2} = \sqrt{225 + 144}$$

Substitute the values into the equation of a circle.
 $(x + 4)^2 + (y - 11)^2 = 15^2$
 $(x + 4)^2 + (y - 11)^2 = 225$

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Together!!
 Write an equation for the circle with center $(12, -3)$ and containing the point $(-12, 7)$

$$D = \sqrt{(-12 - 12)^2 + (7 - (-3))^2}$$

$$D = \sqrt{(-24)^2 + (10)^2}$$

$$576 + 100 = 676$$

$$\sqrt{676}$$

$$D = 26$$

$$r = 26$$

$$(x - 12)^2 + (y + 3)^2 = 676$$

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Left page of notes!!
 c) Write an equation for the circle with center $(1, -5)$ and a radius of $\sqrt{10}$.

$$(x - 1)^2 + (y + 5)^2 = 10$$

d) Find the equation of the circle with center $(-3, 5)$ and containing the point $(9, 10)$.

$$\sqrt{(9 + 3)^2 + (10 - 5)^2}$$

$$144 + 25 = 169$$

$$\sqrt{169}$$

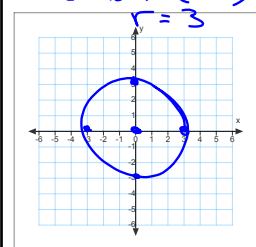
$$r = 13$$

$$(x + 3)^2 + (y - 5)^2 = 169$$

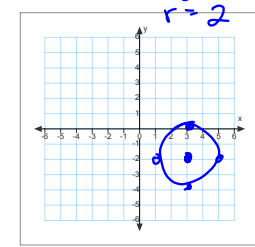
Jan 25-9:03 PM

Graph each equation.

$x^2 + y^2 = 9$
 center: $(0, 0)$
 $r = 3$




$(x - 3)^2 + (y + 2)^2 = 4$
 center: $(3, -2)$
 $r = 2$



Apr 11-10:39 AM

Assignment: 11-7 Worksheet A /D-33

#4 on the bottom of 11-7 A
 do the same thing you did for #'s 7 & 8



Mar 8-10:04 AM