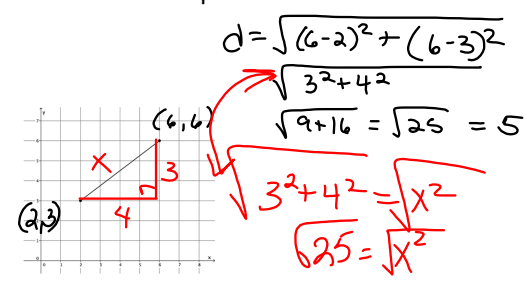---

5/7 Aim: Equation of a circle

Homework TBA

Weekly Review #4 Due Friday

May 4-10:39 AM

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1. What is the length of the segment shown on the coordinate plane below?

$$d = \sqrt{(6-2)^2 + (6-3)^2}$$
$$\sqrt{3^2 + 4^2}$$
$$\sqrt{9+16} = \sqrt{25} = 5$$

(6,6)

x, 3, 4, r

(2,3)

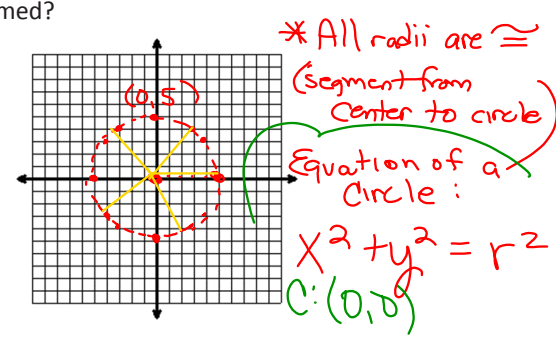$$\sqrt{3^2+4^2} = \sqrt{x^2}$$
$$\sqrt{25} = \sqrt{x^2}$$

May 4-10:43 AM

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2. Use the distance formula to determine the distance between points (9, 15) and (3, 7).

$$\sqrt{100} = 10$$

May 4-10:43 AM

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3. If we graph all of the points whose distance from the origin is equal to 5, what shape will be formed?
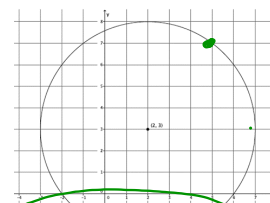
(0,5)

✳ All radii are ≅
(segment from center to circle)

Equation of a Circle:

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

C: (0,0)

May 4-10:44 AM

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4. Let's look at another circle, one whose center is not at the origin. Shown below is a circle with center (2, 3) and radius 5. How do we write the equation of a circle not centered at the origin?

(3,4) → (5,7)   C: (2,3)   r = 5

Equation of Circle:

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

$(h,k) \Rightarrow$ Center
$r \Rightarrow$ radius

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

✳ Change the signs of the x and y value

May 4-10:46 AM

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5. How would you show a point is on the circle?

May 4-10:47 AM

6. Write an equation for the circle whose center is at (9, 0) and has radius 7.

$$(x-9)^2 + (y-0)^2 = 49$$

$$(x-9)^2 + y^2 = 49$$

May 4-10:49 AM

7. Write an equation whose graph is the circle below.

$C: (-2, 4)$

$r = 2$

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

(-2, 4)

May 4-10:50 AM

8. What is the radius and center of the circle given by the equation

$$(x+\underline{12})^2 + (y-\underline{4})^2 = 81?$$

Center: $(-12, 4)$

Radius: 9

May 4-10:51 AM

9. Petra is given the equation $(x-15)^2 + (y+4)^2 = 100$ and identifies its graph as a circle whose center is $(-15, 4)$ and radius is 10. Has Petra made a mistake? Explain.

Yes because she did not change the signs. The center is actually $(15, -4)$

May 4-10:52 AM

10.
a. What is the radius of the circle with center $(3, 10)$ that passes through $(12, 12)$?

(3, 10)   (12, 12)

$d = \sqrt{(12-3)^2 + (12-10)^2}$

$\sqrt{9^2 + 2^2}$

$\sqrt{85}$

b. What is the equation of this circle?

$C: (3, 10)$

$r = \sqrt{85}$

$$(x-3)^2 + (y-10)^2 = 85$$

$$(\sqrt{85})^2$$

May 4-10:53 AM

11.
A circle with center $(2, -5)$ is tangent to the x-axis.

tangent – a line that touches the outside of a circle one time

a. What is the radius of the circle?

5

b. What is the equation of the circle?

$$(x-2)^2 + (y+5)^2 = 25$$

May 4-10:53 AM

2

12. Two points in the plane, $A(-3, 8)$ and $B(17, 8)$, represent the endpoints of the diameter of a circle.

a. What is the center of the circle? Explain

$MP = \left(\frac{x_1+x_2}{2}, \frac{y_1+y_2}{2} \right)$

$\left(\frac{-3+17}{2}, \frac{8+8}{2} \right) = (7, 8)$

b. What is the radius of the circle? Explain.

$\sqrt{(17-7)^2 + (8-8)^2} = \sqrt{100} = 10$

c. Write the equation of the circle.

$(x-7)^2 + (y-8)^2 = 100$

$(-3,8)$ $(7,8)$ $B(17,8)$

May 4-10:55 AM

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13. A circle is given by the equation $(x^2 + 2x + 1) + (y^2 + 4y + 4) = 121$.

a. What is the center of the circle?

$(x+1)(x+1)$ $(x+2)(x+2)$ $(-1, -2)$

$(x+1)^2 + (x+2)^2 = 121$

b. What is the radius of the circle?

$\sqrt{121} = 11$

c. Describe what you had to do in order to determine the center and the radius of the circle.

In order to find the center we had to factor and in order to find the radius we had to take the square root of 121.

May 4-10:55 AM

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$\frac{x}{2380} = \frac{2640}{1320}$

$x = 4760$

$\frac{2380}{y} = \frac{1320}{1980}$

$1320y = 1980(2380)$

$y = 3570$

$\frac{3}{5} = \frac{15}{4x+1}$

$2x + 3 = 15$

$12x = 72$

$x = 6$

Sm
bg

$\frac{5}{12} = \frac{7}{x}$

$5x = 84$

$x = 16.8$

May 8-11:18 AM

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$\tan x = \frac{250}{350}$

$x = \tan^{-1}\left(\frac{250}{350}\right)$

$x = 64.98$

$\frac{\sin 24}{1} = \frac{45}{d}$

$\frac{d \cdot \sin 24}{\sin 24} = \frac{45}{\sin 24}$

$d = 110.6484$

$\frac{\sin 10}{50} = \frac{\sin 30}{z}$

$\frac{z \cdot \sin 10}{\sin 10} = \frac{50 \cdot \sin 30}{\sin 10}$

$z = 143.97$

$\sin 40 = \frac{y}{143.97}$

$y = 92.54$

$\cos 40 = \frac{x}{143.97}$

$x = 110.27$

May 8-11:32 AM

Completing the square to solve a quadratic equation

1. Check for GCF
2. Make sure "a" term is 1 if not use must
   divide all terms by "a"
3. Move the constant to the right side of the equation
4. Pick out and write down the "b" term
5. Write down (b/2)
6. Write down (b/2)^2
7. Open one set of parenthesis
8. Place an x and (b/2) inside and square the whole ( )
9. On the right side of the equation by the constant add the (b/2)^2 term
10. Take the square root of both sides, making sure to place a
   $\pm$ in front of the radical on the right hand side
11. Solve for x.

May 4-10:57 AM

Completing the square to find the center and radius of a circle.

Rearrange the terms so that x's are together and y's are together
Make sure the "a" term is 1 for both x and y
COMPLETE THE SQUARE TWICE.
PICK OUT YOUR CENTER AND RADIUS

May 4-10:58 AM

1) $p^2 + 14p - 38 = 0$ 2) $v^2 + 6v - 59 = 0$

May 4-10:58 AM

3) $a^2 + 14a - 51 = 0$ 4) $x^2 - 12x + 11 = 0$

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5) $x^2 + 6x + 8 = 0$ 6) $n^2 - 2n - 3 = 0$

May 4-10:58 AM

7) $x^2 + y^2 + 14x + 12y + 76 = 0$ 8) $x^2 + y^2 + 20y - 10x + 61 = 0$

May 4-10:58 AM

9) $x^2 + y^2 + 14x - 8y + 29 = 0$ 10) $4y + y^2 - = -28x - 191$

May 4-10:59 AM

11) $x^2 + 2x + y^2 + 10y - 1 = 0$ 12) $x^2 - 8x + y^2 - 4y + 3 = 0$

May 4-10:59 AM

13) $2x^2 - 8x + 2y^2 + 12y + 14 = 0$ 14) $4x^2 + 4y^2 + 16x - 32y = 20$

May 4-10:59 AM

15) $5y^2 - 25x + 30y = 75 - 5x^2$ 16) $x^2 - 58 = 4y - y^2$

May 4-11:00 AM

Lesson Summary

$(x - h)^2 + (y - h)^2 = r^2$ is the center-radius form of the general equation for any circle with radius r and center (h, k).

May 4-11:00 AM

Problem Set

12. Write the equation for a circle with center $\left(\frac{1}{2}, \frac{9}{7}\right)$ and radius $\sqrt{13}$.

May 4-11:00 AM

13. What is the center and radius of the circle given by the equation $x^2 + (y - 11)^2 = 144$?

May 4-11:00 AM

A circle is given by the equation $x^2 + y^2 = 100$.
Which of the following points are on the circle?
a. $(0, 10)$
b. $(-8, 6)$
c. $(-10, -10)$
d. $(45, 55)$
e. $(-10, 0)$

May 4-11:01 AM

Determine the center and radius of each circle.

a. $3x^2 + 3y^2 = 75$

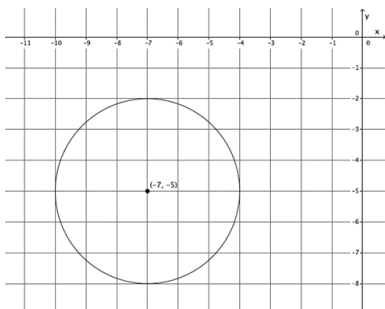b. $2(x + 1)^2 + 2(y + 2)^2 = 10$

c. $4(x - 2)^2 + 4(y - 9)^2 - 64 = 0$

May 4-11:01 AM

Two points in the plane, $A(19, 4)$ and $B(19, -6)$, represent the endpoints of the diameter of a circle.

a. What is the center of the circle?
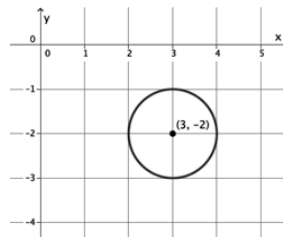b. What is the radius of the circle?
c. Write the equation of the circle.

May 4-11:01 AM

A) Write the equation of the circle shown below.

May 4-11:02 AM

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b. Write the equation of the circle shown below.
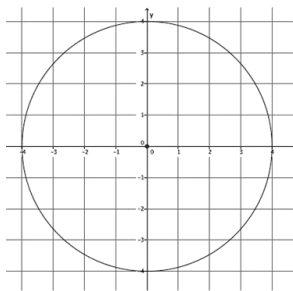

May 4-11:03 AM

Describe the circle given by the equation
$(x - 7)^2 + (y - 8)^2 = 9$.

May 4-11:03 AM

Write the equation for a circle with center $(0, -4)$ and radius 8.

May 4-11:04 AM

Write the equation for the circle shown below.

A circle has a diameter with endpoints at $(6, 5)$ and $(8, 5)$.

Write the equation for the circle.

May 4-11:04 AM   May 4-11:04 AM