December 4, 2018, Tuesday

Tech: find the following

1) Equation of a circle at the origin

2) Equation of a circle not at the origin

3) What do h, k & r represent

Dec 4-11:23 AM

Defn:

distance formula,

center of a circle,

diameter,

Pythagorean theorem,

radius,

standard form of a circle

Find a 'verbal' definition & a picture too!

Weebly – Circles, 4 things with questions

Dec 4-12:08 PM

December 5, 2018 Wednesday

Tech:

Find 5 facts about circles!

Be ready to share!

Dec 4-2:16 PM

UNIT 5 GEOMETRIC & ALGEBRAIC CONNECTIONS

CIRCLES:

a = is the origin, it did not move

b = can be increased or decreased

c = gets bigger, stays positive

h = move ↔

k = move ↕

r = gets bigger is small

Geogebra, Circle with center at the origin, Foster

Using the above link, what do you notice about a, b, and c?

Geogebra, Exploring the equation of a circle, Dilaura

Using the above link, what happens to the circle when you adjust h? ...adjust k? ...adjust r?

WebMath, Circle interactive

Can you guess what h, k and r will do as you enter different values in one of the four circle formats provided?

Khan Academy explains h, k, an r

Using Khan Academy's explanation, how does the circle equation 'simplify' when the equation is at the origin or (0, 0) is the center of the circle?

MathWarehouse, Practice with answers

Complete the quick review, then try the practice problems. Review your work...how many did you get correct?

Dec 4-2:19 PM

December 6, 2018, Thursday

$x^2 + y^2 = r^2$ ← origin

$(x-h)^2+(y-k)=r^2$ ← not at the origin

can you write the equations?

(-1, 3)

h = -1

k = 3

r = 4

$(x+1)^2+(y-3)^2=4^2$

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

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

can you graph the circle?

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

h = 2 ← center (2, -1)

k = -1

r = 4 ← radius

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Part 1: Finding the Radius

Consider the circle below. Notice the center is at the origin and a point is on the circle (x, y).

(x, y)

r

4

Center

2

Answer the following questions or perform the requested constructions.

1. Construct a line segment from the center to the point (x, y) on the circle and label it "r". What is this line segment called?

radius

2. Construct a right triangle with r as the hypotenuse. What are the coordinates of the point (x, y)?

(2, 4)

3. What is the measure of r? Explain your method for calculating it.

$a^2 + b^2 = c^2$

$2^2 + 4^2 = c^2$

$4 + 16 = c^2$

$\sqrt{20} = \sqrt{c^2}$

$4.4 = c$

2√5

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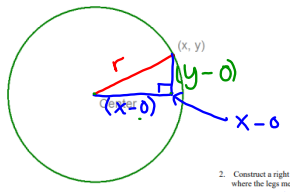
Part 2: Circles Centered at the Origin.

Consider the circle below. The center is located at the origin.



Answer the following questions or perform the requested constructions.

1. Construct a radius from the center to the point (x, y). Label it "r".
2. Construct a right triangle with r as the hypotenuse. What are the coordinates of the point where the legs meet? x-0
3. Write an expression for the distance from the center to the point from #2. Label the triangle accordingly.
4. Write an expression for the distance from (x, y) to the point from #2. Label the triangle accordingly.
5. Now use your method from part one to write an expression for r^2

① centered at the origin → $a^2 + b^2 = c^2$, $(x-0)^2 + (y-0)^2 = r^2$, $x^2 + y^2 = r^2$

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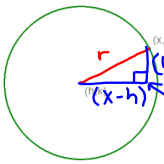
Part 3: Circles centered anywhere!

In the previous section, you found that $x^2+y^2=r^2$. This is the general equation for a circle centered at the origin. However, circles are not always centered at the origin. Use the following circle and directions to find the general equation for a circle centered anywhere.



Answer the following questions and perform the requested constructions.

1. Construct a radius between (h, k) and (x, y). Then create a right triangle with the radius as the hypotenuse. Find the coordinates for the point where the legs meet. (x, k)
2. Write an expression for the distance between (x, y) and the point from #1. Label the triangle.
3. Write an expression for the distance between (h, k) and the point from #1. Label the triangle.
4. Now write an expression for r^2.

$a^2 + b^2 = c^2$

Not at the origin → $(x-h)^2 + (y-k)^2 = r^2$

What does h represent? ↔ movement

What does k represent? ↕ movement

What does r represent? Radius

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Geometry Name_____ ID: 1

...and more circles Date_____ Period____

Identify the center and radius of each. Then graph.

1) $x^2+y^2=6$ (0, 0) $r=\sqrt{6}$

2) $(x-2)^2+y^2=25$ (2, 0) $r=5$

3) $(x+3)^2+(y+3)^2=2$ (−3, −3) $r=\sqrt{2}$

4) $x^2+(y+2)^2=16$ (0, −2) $r=4$

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

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

$(x+3)^2+(y-k)^2=r^2$

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

$h=-3$ $k=3$ $r=2$

$(-3,3)$

Use the information provided to write the standard form equation of each circle.

7) Center: (0, 0) Radius: 10

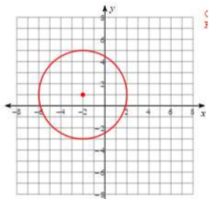
8) Center: (14, 5) Radius: 1

Can you write the equations of these circles?

Dec 6-8:05 AM

December 7, 2019, Friday

Can you write the equations of these circles?



Center: (0, 0)
Radius: 10

What are Cardinal Directions? How could Cardinal directions be related to our x-y plane?

Dec 4-11:46 AM

Learning Task: New York City

Name_____ **Date**_____

The streets of New York City are laid out in a rectangular pattern, with all blocks approximately square and approximately the same size. **Avenues** run in a north–south direction, and the numbers increase as you move west. **Streets** run in an east–west direction, and the numbers increase as you move north.

Emily works at a building located on the corner of 9th Avenue and 61st Street in New York City. Her brother, Gregory, is in town on business. He is staying at a hotel at the corner of 9th Avenue and 43rd Street.

1. Gregory calls Emily at work, and they agree to meet for lunch. They agree to meet at a corner half way between Emily's work and Gregory's hotel. Then Gregory's business meeting ends early so he decides to walk to the building where Emily works.
   a. How many blocks does he have to walk? Justify your answer using a diagram on grid paper.
   b. After meeting Emily's coworkers, they walk back toward the corner restaurant halfway between Emily's work and Gregory's hotel. How many blocks must they walk? Justify your answer using your diagram.

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2. After lunch, Emily has the afternoon off, so she walks back to the hotel with Gregory before turning to go to her apartment. Her apartment is three blocks north and four blocks west of the hotel.
   a. At what intersection is her apartment building located?
   b. How many blocks south of the restaurant will they walk before Emily turns to go to her apartment?
   c. When Emily turns, what fraction of the distance from the restaurant to the hotel have the two of them walked? Express this fraction as a ratio of distance walked to distance remaining for Gregory.

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3. Gregory and Emily are going to meet for dinner at a restaurant 5 blocks south of her apartment.

   a. At which intersection is the restaurant located?

   b. After dinner, they walk back towards her apartment, but stop at a coffee shop that is located three–fifths of the distance to the apartment. What is the location of the coffee shop?

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By investigating the situations that follow, you will determine a procedure for finding a point that partitions a segment into a given ratio.

4. Here, you will find a point that partitions a directed line segment from $C(4, 3)$ to $D(10, 3)$ in a given ratio.

   a. Plot the points on a grid. What is the distance between the points?

   b. Use the fraction of the total length of CD to determine the location of Point A which partitions the segment from C to D in a ratio of 5:1. What are the coordinates of A?

   c. Find point B that partitions a segment from C to D in a ratio of 1:2 by using the fraction of the total length of CD to determine the location of Point B. What are the coordinates of B?

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5. Find the coordinates of Point X along the directed line segment YZ.

   a. If $Y(4, 5)$ and $Z(4, 10)$, find X so the ratio is of YX to XZ is 4:1.

   b. If $Y(4, 5)$ and $Z(4, 10)$, find X so the ratio is of YX to XZ is 3:2.

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Back to Gregory and Emily….

9. When they finished their coffee, Gregory walked Emily back to her apartment, and then walked from there back to his hotel.

   a. How many blocks did he walk?

   b. If Gregory had been able to walk the direct path ("as the crow flies") to the hotel from Emily's apartment, how far would he have walked? Justify your answer using your diagram.

   c. What is the distance Emily walks to work from her apartment?

   d. What is the length of the direct path between Emily's apartment and the building where she works? Justify your answer using your diagram.

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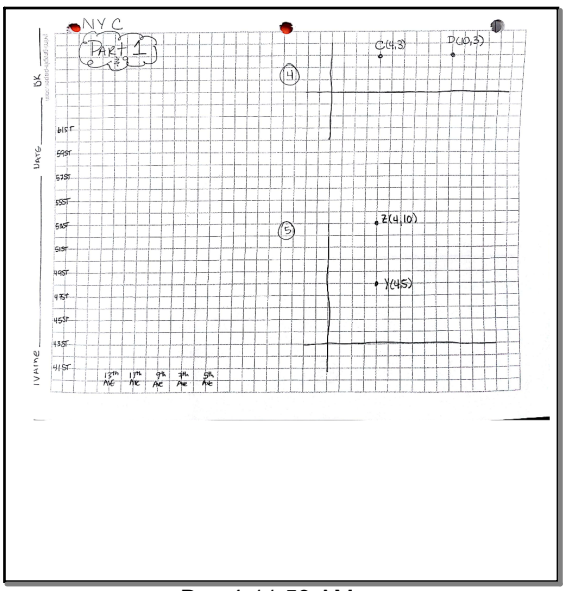

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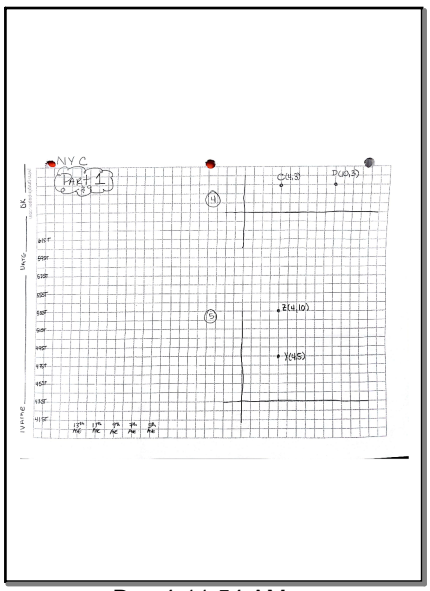

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Determine a procedure for determining the distance between points on a coordinate grid by investigating the following situations.

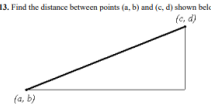
10. What is the distance between 5 and 7? 7 and 5? –1 and 6? 5 and –3?

11. Find a formula for the distance between two points, *a* and *b*, on a number line.

12. Using the same graph paper, find the distance between:

(1, 1) and (4, 4) (–1, 1) and (11, 6) (–1, 2) and (2, –6)

13. Find the distance between points (a, b) and (c, d) shown below.



14. Using your solutions from #13, find the distance between the point (x_1, y_1) and the point (x_2, y_2). Solutions written in this generic form are often called formulas.

15. Do you think your formula would work for any pair of points? Why or why not?

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