Unit 10 Homework Packet NCY

Homework 10-1: Slope, Midpoint, Distance

Directions: Find the slope, midpoint, and distance (length) of each line segment using the formulas. When calculating the distance, round to the nearest tenth when you are unable to simplify the radical.

1) G (6, 5) and H (9,2)

$m=\frac{\Delta y}{\Delta x}=\frac{2-5}{9-6}=\frac{-3}{3}$

$\left(\frac{6+9}{2}, \frac{5+2}{2}\right)$

$\left(\frac{15}{2}, \frac{7}{2}\right)$

Slope= -1 ✓ Midpoint = $(7.5, 3.5)$

2) A (1, 1) and B (-3, -3)

$m=\frac{\Delta y}{\Delta x}=\frac{-3-1}{-3-1}=\frac{-4}{-4}=1$

$\left(\frac{1+-3}{2}, \frac{1+-3}{2}\right)$

$\left(\frac{-2}{2}, \frac{-2}{2}\right)$

Slope= 1 ✓ Midpoint = $(-1, -1)$

3) C(1, -1) and D (8, -7)

$m=\frac{\Delta y}{\Delta x}=\frac{-7+(+1)}{8-1}=\frac{-6}{7}$

$\left(\frac{1+8}{2}, \frac{-1+-7}{2}\right)$

$\left(9/2, -8/2\right)$

Slope= $-6/7$ Midpoint = $(4.5, -4)$

4) E (9, 3) and F (-5, -2)

$m=\frac{\Delta y}{\Delta x}=\frac{-2-3}{-5-9}=\frac{-5}{-14}$

$\left(\frac{9+-5}{2}, \frac{3+-2}{2}\right)$

$\left(\frac{4}{2}, \frac{1}{2}\right)$

Slope= $5/14$ Midpoint = $(2, 0.5)$

5. M is the midpoint of $\overline{LN}$. Find the coordinates of L if N (-1, 9) and M (-9, -10).

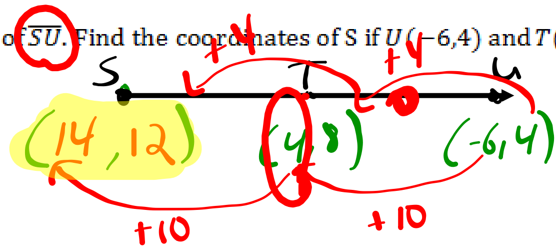
N M L

-19 -19

(-1, 9) (-9, -10) (-17, -29)

-8 -8

6. T is the midpoint of $\overline{SU}$. Find the coordinates of S if $U(-6,4)$ and $T(4,8)$.



$4 = \frac{-6 + x}{2}$

______7. What are the coordinates of the center of a circle if the endpoints of its diameter are $A(8,-4)$ and $B(-3,2)$?

1) (2.5, 1)
2) (2.5, −1)
3) (5.5, −3)
4) (5.5, 3)

$\left(\frac{8+-3}{2}, \frac{-4+2}{2}\right)$

$\left(\frac{5}{2}, -1\right)$

______8. What is the slope of the line passing through the points $(-2,5)$ and $(-2,-7)$?

1) 0
2) $-\frac{3}{2}$
3) $-\frac{2}{3}$
4) undefined

$m = \frac{-7-5}{-2--2} = \frac{-12}{0}$ UND!

* $\frac{0}{-12} = 0$

9. If the slope of the line joining the points $(2,4)$ and $(5,k)$ is 2, find the value of k.

$2 = \frac{k-4}{5-2}$

$3(2) = \left(\frac{k-4}{3}\right)3$

$6 = k - 4$
$+4 \quad +4$

$k = 10$

10. Caroline states the lines $\overleftrightarrow{AB}$ and $\overleftrightarrow{CD}$ have the same slope. The coordinates of the points are $A(0,2), B(4,6), C(5,0)$ *and* $D(6,3)$. Determine whether Caroline is correct or incorrect.

$m_{AB} = \frac{6-2}{4-0} = \frac{4}{4} = 1 \qquad m_{CD} = \frac{3-0}{6-5} = \frac{3}{1} = 3$

$m_{AB} \neq m_{CD}$ Caroline is incorrect!

Warm-up:

1. Find the midpoint given the endpoints (9, -4) and (-5, -4).

2. Find the other endpoint of a line segment given one endpoint (-5,6) and midpoint (-1, 4).

3. Determine the slope of the line given the following equation: $4y + 6x = 16$

4. a) Find the slope of the line that passes through the following points: (7, -2) and (-5, -2)

b) What does this slope tell you about the line?

Simplifying Radicals

To begin, list the first 12 perfect squares:

1. Find the ____________ perfect square which will divide evenly into the number under your radical sign. This means that when you divide, you get no remainders, no decimals, no fractions.

Simplify: $\sqrt{48}$

2. Write the number appearing under your radical as the product (multiplication) of the perfect square and your answer from dividing.

$\sqrt{48}$ = ____________________

3. Reduce the "perfect" radical which you have now created.

$\sqrt{48}$ = ______________________

4. You now have your answer.

$$\sqrt{48} = 4\sqrt{3}$$

What happens if I do not choose the largest perfect square to start the process?

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

Length

Write the formula 3 more times:

1.

2.

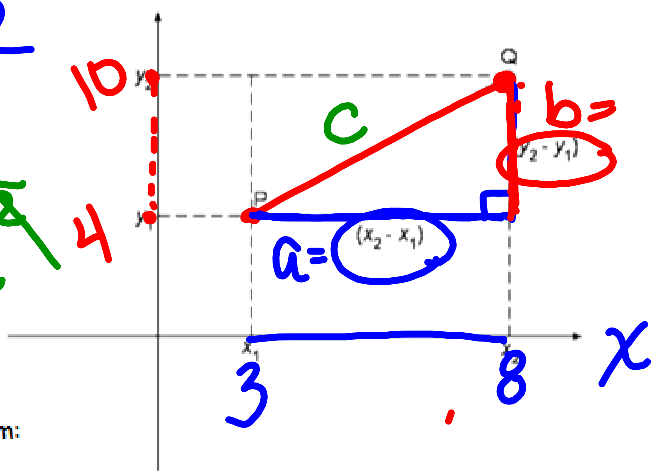
3.

When would you need this tool (formula)?

Demonstrate how the Pythagorean Theorem turns into the distance formula:

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

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



Express your answers in simplest radical form:

Express your answers in simplest radical form:

1. Find the length of the line segment whose endpoints are (-8,7) and (6,4).

distance

x y

(-8,7)

(6,4)

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

$$= \sqrt{(-8-6)^2 + (7-4)^2}$$

$$= \sqrt{(-14)^2 + (3)^2}$$

$$= \sqrt{196 + 9}$$

$$= \sqrt{205}$$

$-14^2 = -196$

$(-14)^2 = 196$

$\underbrace{-14 \cdot -14}_{+}$

Express your answers in simplest radical form:

(x_1, y_1) (x_2, y_2)

1. Find the length of the line segment whose endpoints are (-8,7) and (6,4).

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

$$\sqrt{(6 - -8)^2 + (4 - 7)^2}$$

$$\sqrt{14^2 + (-3)^2}$$

$$\sqrt{196 + 9} \rightarrow \sqrt{205}$$

$$14.3$$

2. Find the distance between the points (3,5) and (12,2).

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$$\sqrt{(2-5)^2+(12-3)^2}$$

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

$$\sqrt{9+81}$$

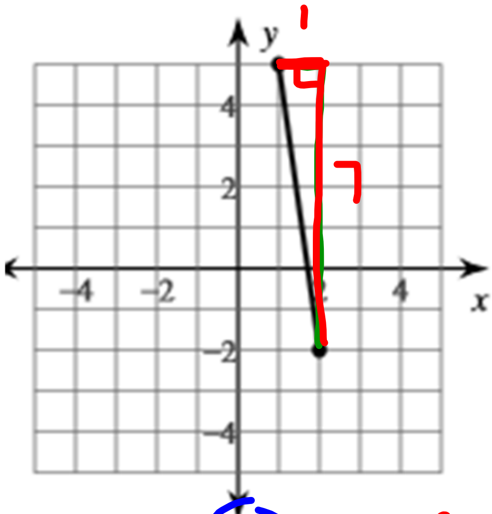
$$\sqrt{90}$$

$$\sqrt{9}\sqrt{10}$$

$$3\sqrt{10}$$

3. Find the length of the line segment whose endpoints are (3, 8) and (9,10).

4. Find the length of the following segment:



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

$$1^2+7^2=c^2$$

$$1+49=c^2$$

$$\sqrt{50}=\sqrt{c^{\cancel{2}}}$$

$$\sqrt{25}\sqrt{2}=c$$

$$5\sqrt{2}$$

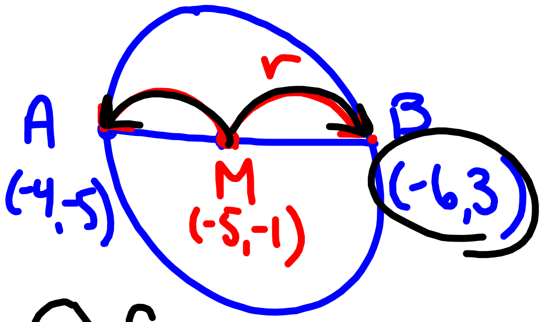
4, 9, 16, 25, 36, 49, 64, 81, 100...

5. Find the $\boxed{\text{length}}$ of the radius of a circle that has a diameter with endpoints A(-4, -5) and B(-6, 3).

① find midpt

$$\left(\frac{-4+-6}{2}, \frac{-5+3}{2}\right)$$

$$(-5, -1)$$



② find the radius

x y
(-5, -1)
(-6, 3)

$$r = \sqrt{(-5-(-6))^2 + (-1-3)^2}$$

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

$$= \sqrt{1+16}$$

$$= \sqrt{17}$$

Unit 10: Formulas & Writing Equations

6. Determine if ΔABC is an isosceles triangle if it has vertices A(6,5), B(10, 1) and C(7, -1).

at least 2 $\cong$ sides

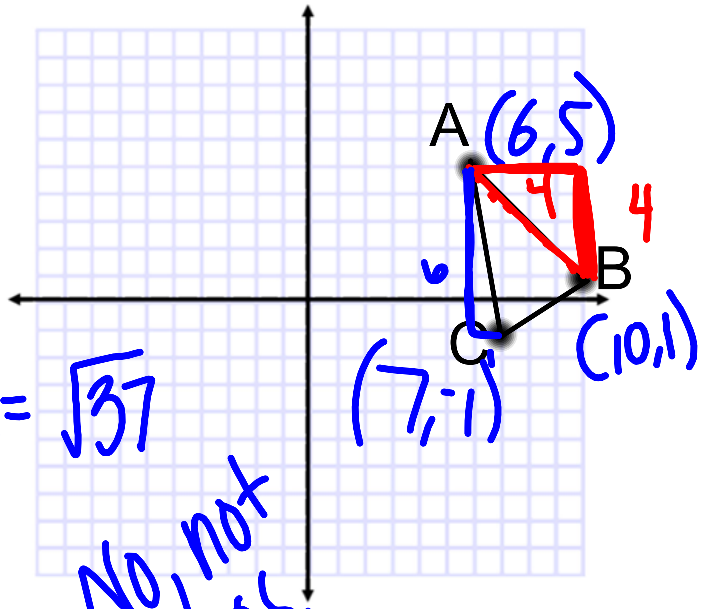
$AB = \sqrt{4^2 + 4^2}$

$= \sqrt{32}$

$= \sqrt{16}\sqrt{2}$

AB $= 4\sqrt{2}$

$AC = \sqrt{37}$



No, not isos.

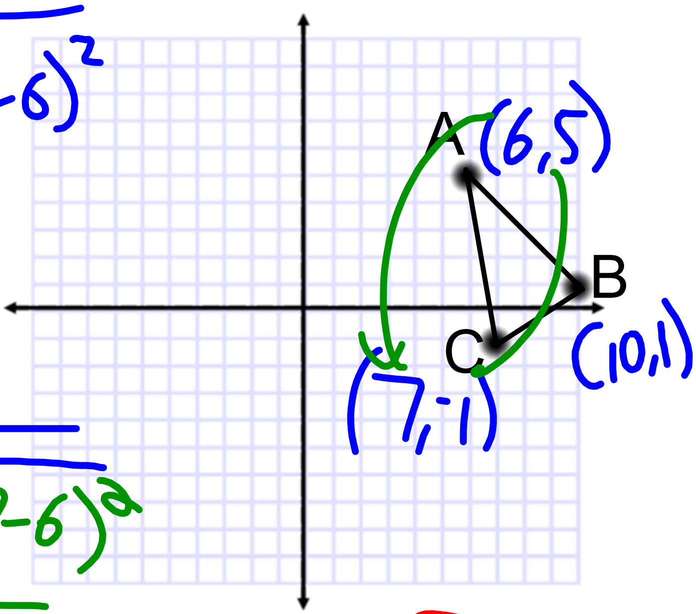
5

6. Determine if ΔABC is an isosceles triangle if it has vertices A(6,5), B(10, 1) and C(7, -1).

$AB = \sqrt{(1-5)^2+(10-6)^2}$

$AB = \sqrt{(-4)^2+(4)^2}$

$AB = \sqrt{32}$



$AC = \sqrt{(-1-5)^2+(7-6)^2}$

$\sqrt{(-6)^2+(1)^2}$

$\sqrt{37}$

$\sqrt{37} \neq \sqrt{32}$

Not Isosceles!

7. Given points A(-1,4) and B (x, 7) determine the value(s) of x if AB = 5 cm.

HW 10-2:

HW Packet 10-2