Directions: Determine the length(distance) of each line segment using the formula.

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

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

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

$=\sqrt{9+9}$

$=\sqrt{18}$

Distance = $3\sqrt{2}$

GH = _____

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

$d=\sqrt{(-3-1)^2+(-3-1)^2}$

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

$=\sqrt{16+16}$

$=\sqrt{32} = \sqrt{16}\sqrt{2}$

Distance = $4\sqrt{2}$

3) M(2a,b) and N(a,2b)

$d=\sqrt{(2a-a)^2+(b-2b)^2}$

$d=\sqrt{a^2+(-b)^2}$

$d=\sqrt{a^2+b^2}$

MN = _____

4) Express, in simplest radical form, the distance between the points whose coordinates are J(2,4) and K(-2,10).

$d=\sqrt{(-2-2)^2+(10-4)^2}$

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

$d=\sqrt{16+36} = \sqrt{52} = \sqrt{4}\sqrt{13}$

JK = _____ $2\sqrt{13}$

5. The coordinates of the vertices of ΔABC are $A(0,0), B(3,0)$ *and* $C(0,4)$. What is the length of $\overline{BC}$?

$BC=\sqrt{(0-3)^2+(4-0)^2}$

$BC=\sqrt{(-3)^2+4^2}$

$BC=\sqrt{9+16}=\sqrt{25} = 5$

6. Find the length of the radius of a circle with a center at the **origin** and passes through the point $(-3,4)$. (0,0)

$r=\sqrt{(-3-0)^2+(4-0)^2}$

$r=\sqrt{(-3)^2+4^2}$

$r=\sqrt{9+16}$ $r=5$

$r=\sqrt{25}$

7. Determine whether the triangle with vertices at $A(8,0), B(-3,2)$ and $C(10,2)$ is isosceles, equilateral or scalene. Justify your answer.

$AB = \sqrt{(-3-8)^2+(2-0)^2}$ $BC = \sqrt{(10-(-3))^2+(2-2)^2}$ $AC = \sqrt{(10-(-1))^2+(2-0)^2}$

$AB = \sqrt{121+4}$ $BC = \sqrt{13^2+0}$ $AC = \sqrt{2^2+2^2}$

$AB = \sqrt{125}$ $BC = 13$ $AC = \sqrt{8}$

ΔABC is scalene, all three sides are different lengths

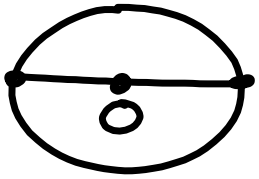
8. In circle O, diameter $\overline{RS}$ has endpoints $R(3a, 2b-1)$ and $S(a-6, 4b+5)$. Find the coordinates of point O, in terms of a and b. Express your answer in simplest form.

Center O is midpoint of RS

$O = \left(\frac{3a+a-6}{2}, \frac{2b-1+4b+5}{2}\right)$

$\left(\frac{4a-6}{2}, \frac{6b+4}{2}\right)$

$O\ (2a-3, 3b+2)$



_____9. If the endpoints of $\overline{AB}$ are $A(-4,5)$ and $B(2,-5)$, what is the length of $\overline{AB}$?

1) $2\sqrt{34}$
2) 2
3) $\sqrt{61}$
4) 8

$AB = \sqrt{(2-(-4))^2+(-5-5)^2}$

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

$AB = \sqrt{36+100}$

$AB = \sqrt{136}$

$AB = \sqrt{4}\sqrt{34}$

$AB = 2\sqrt{34}$

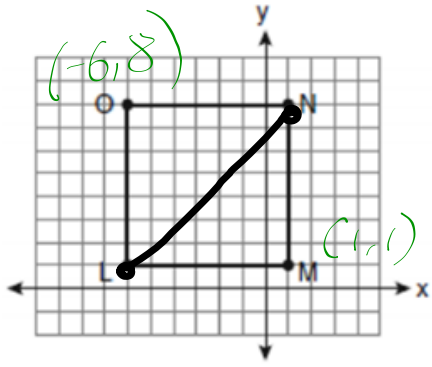
10. Square LMNO is shown in the diagram. What are the coordinates of the midpoint of diagonal $\overline{LN}$?

1) $\left(4\frac{1}{2}, -2\frac{1}{2}\right)$
2) $\left(-3\frac{1}{2}, 3\frac{1}{2}\right)$
3) $\left(-2\frac{1}{2}, 3\frac{1}{2}\right)$
4) $\left(-2\frac{1}{2}, 4\frac{1}{2}\right)$

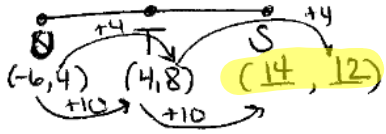
$M: \left(\frac{-6+1}{2}, \frac{8+1}{2}\right)$

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

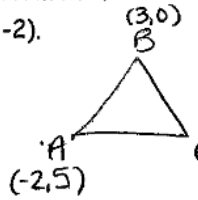
$(-2.5, 4.5)$



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



7. Determine if ΔABC is an isosceles triangle if it has vertices A(-2, 5), B(3,0) and C(-3, -2).

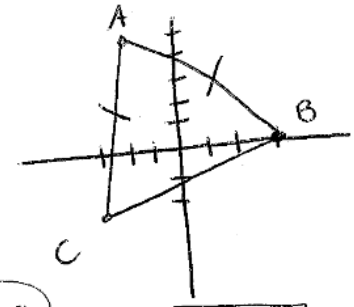


↳ at least 2 ≅ sides

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

$= \sqrt{(7)^2 + (1)^2}$

$= \sqrt{50}$



$BC = \sqrt{(3+(+3))^2 + (0-(-2))^2}$

$= \sqrt{(0)^2 + 4}$

$BC = 2$

$AB = \sqrt{(5-0)^2 + (-2-3)^2}$

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

$= \sqrt{50}$

$\overline{AB} \cong \overline{AC}$ ∴ ΔABC is an isosceles Δ

8. Determine the slope of the following lines given their equations:

a) $3x + 7y = 21$

$-3x \quad -3x$

$\frac{7y}{7} = \frac{-3x+21}{7}$

$y = -\frac{3}{7}x + 3$

$m = -\frac{3}{7}$

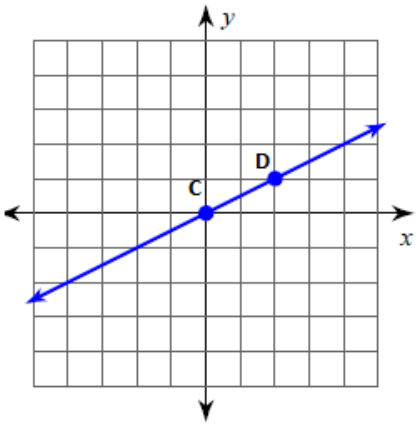
b) $y - 3 = -2(x + 1)$

$m = -2$

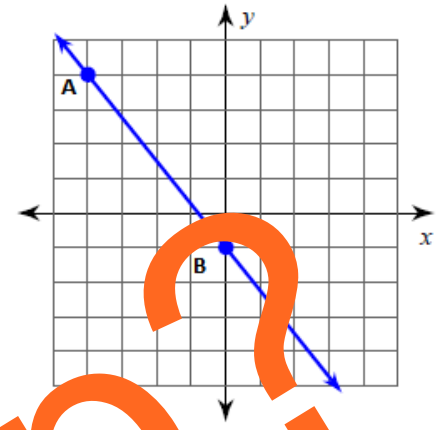
Lesson 3: Partitioning a Segment

Warm-up:

1) Find the slope of the following lines:



m=_____



m=_____

2) Find the midpoint of $\overline{CD}$: _____

Find the midpoint of $\overline{AB}$: _____

3) Find the length of $\overline{AB}$

Skip?

Solve for x:

1) $\frac{x-3}{6-x} = \frac{5}{2}$

Solve for y:

2) $\frac{y+2}{5-y} = \frac{5}{2}$

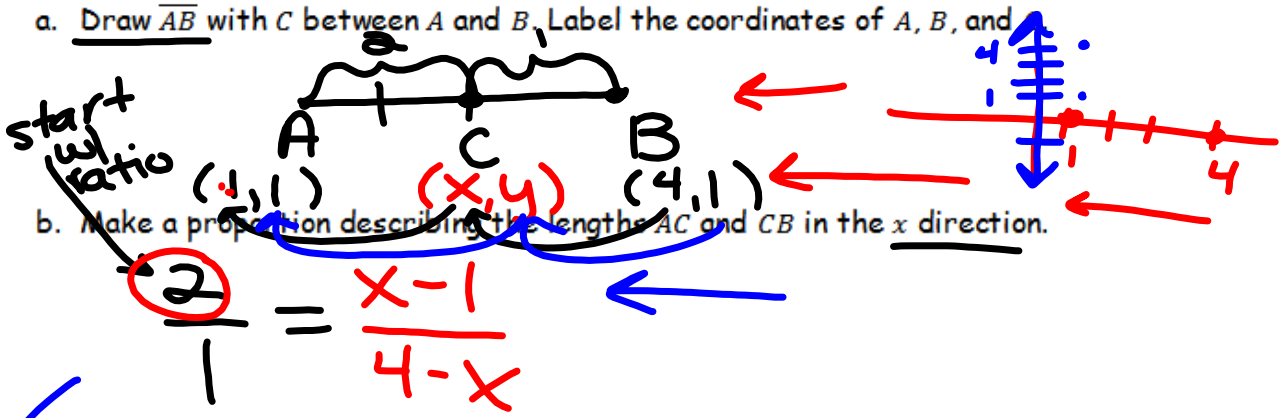
Partitioning a Segment

Question: *How do you find the point on a directed line segment that partitions a segment into a given ratio?*

Directed Line Segment: A directed line segment is a line segment that has direction associated with it, usually specified by moving from one endpoint to another.

1. Find the coordinates of point C that lies along the directed line segment from A (1,1) to B (4,1) and partitions the segment in the ratio of 2 to 1.

a. Draw $\overline{AB}$ with C between A and B. Label the coordinates of A, B, and C.



b. Make a proportion describing the lengths AC and CB in the x direction.

c. Solve your proportion to find the x coordinate of C.

$$2(4-x) = 1(x-1)$$
$$8-2x = x-1$$
$$+1 \quad +2x \quad +2x+1$$
$$\frac{9}{3} = \frac{3x}{3} \qquad x=3$$

d. Make a proportion describing the lengths of AC and CB in the y direction.

$$\frac{2}{1} = \frac{y-1}{1-y}$$

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e. Solve your proportion to find the y coordinate of C.

$$\frac{2}{1} = \frac{y-1}{1-y}$$

$$2(1-y) = 1(y-1) \qquad y = 1$$

f. Write C as an ordered pair.

$C(3, 1)$

Think of 2 ways you can **CHECK** to make sure your answer is correct:

* 1) slope ← slopes of segments are =

2) distance → lengths will be = to given ratio

Use both methods to check the accuracy of your answer.

SLOPE	DISTANCE

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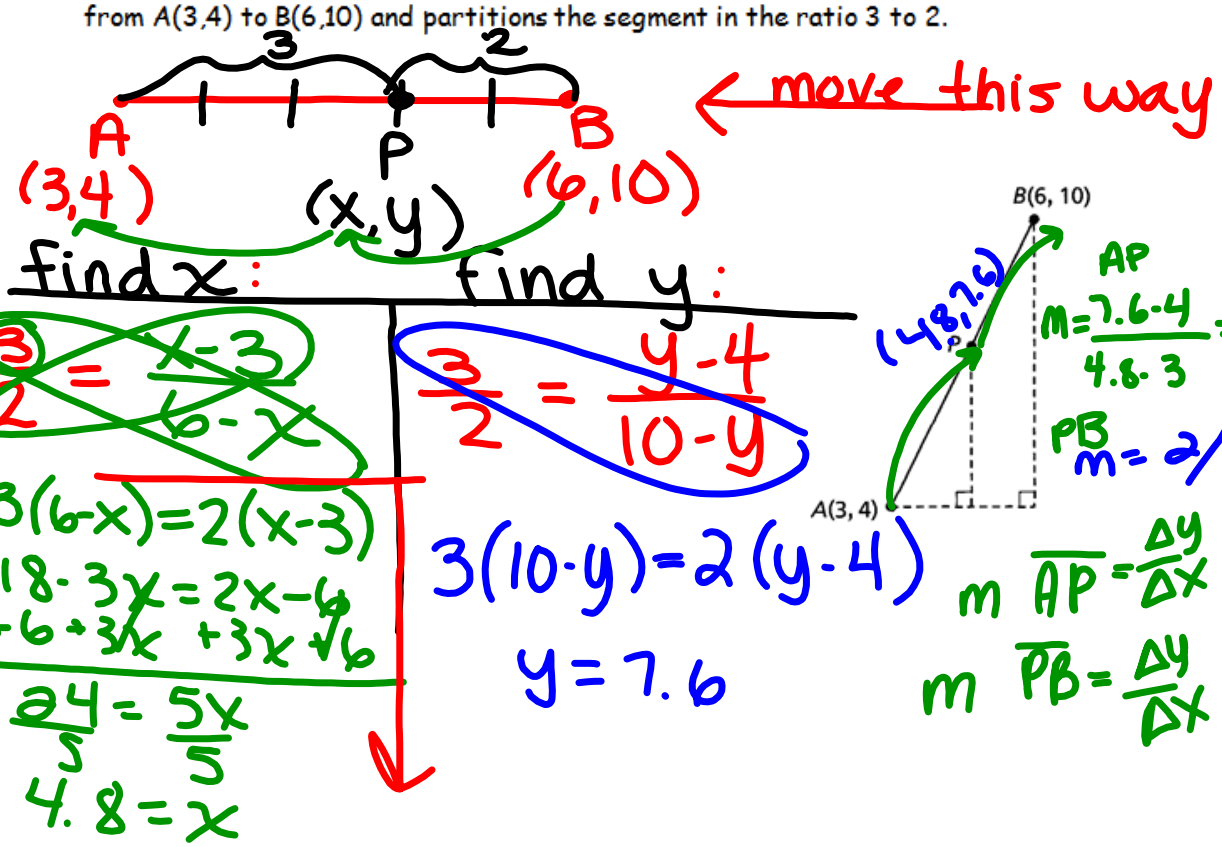
2. Find the coordinates of the point P that lies along the directed line segment from A(3,4) to B(6,10) and partitions the segment in the ratio 3 to 2.



Practice (you MUST use one method to check your work!)

1. Find L on $\overline{JK}$ such that $JL:LK = 4:1$, when $J = (-3, 5)$ and $K = (1, -10)$.

2. Find R on $\overline{MP}$ such that R partitions the line segment in the ratio of 5 to 2, when $M = (-10, 8)$ and $P = (-2, 11)$.

3. C is between A and B. $A, B,$ and C are collinear. Find the coordinates of B if $AC:CB = 5:1$, $A = (1,2)$, and $C = (6,-1)$.

HW 10-3:

HW Packet 10-3