Geometry CC – Mr. Valentino   Name: _____
Unit 10 Lesson 4: Partitioning a Line Segment   Date: _____   Per: _____

$$1 \text{ to } 2 \quad \frac{1}{2}$$
$$1 : 2 \quad \frac{1}{2}$$

Aim: How can we partition a line segment?

Do Now: Point Q divides the directed line segment AB in the ratio of 1 to 2. Make up 2 sets of possible lengths for AQ and QB.
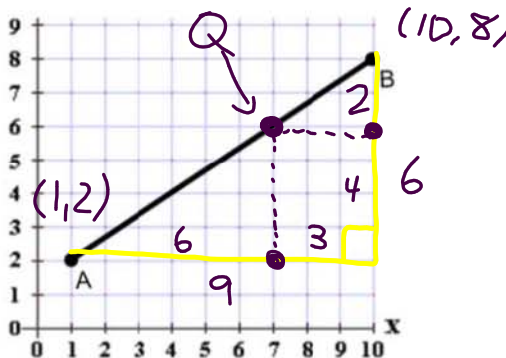
$$\frac{3}{9} = \frac{1}{3}$$

8
4
A 3 Q 6 B

$$AQ = 4$$
$$BQ = 8$$
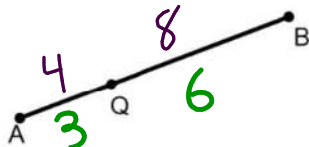
$$\frac{4}{12} = \frac{1}{3}$$

Partitioning a Line Segment Graphically

1. What if the line segment AB is on the coordinate plane? Find the coordinates of point Q if it still divides the directed line segment AB in the ratio of 1.2.

$$d = \sqrt{(10-1)^2 + (8-2)^2}$$
$$= \sqrt{(9)^2 + (6)^2}$$
$$= \sqrt{81 + 36}$$
$$= \sqrt{117}$$

Q   (10, 8)
2
B
(1,2)   4   6
6   3
A   9

2. Find the coordinates of point P that is on the directed line segment from M(-3,-3) to N(5,1) and partitions the segment in the ratio of 3 : 1.

$$\frac{3}{4}$$

$$x_1 \, y_1 \quad x_2 \, y_2$$

N
P
M
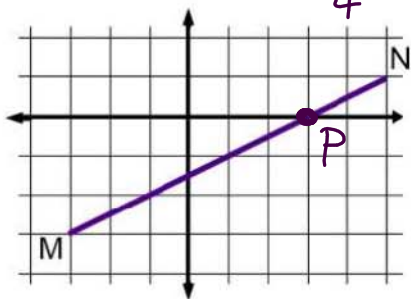
How can we find the point when it's not on a graph?
Partitioning a line segment algebraically

$$(x,y) = \left(x_1 + K(x_2 - x_1),\, y_1 + K(y_2 - y_1) \right)$$

☆ K = partition ratio
(written as a fraction)

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

$$(-3 + 6,\ -3 + 3)$$

$$P \longrightarrow (3, 0)$$

3. Find the coordinates of the point P that lies along the directed line segment from S(1, 1) to T(7, 4) and partitions the segment in the ratio of 2 : 1 (algebraically)

$$k = \frac{2}{3}$$

Partner Practice
Find the point that partitions the segment with the two given endpoints with the given ratio.

1. (-3, 4) (7, 6) 1:1

2. (-9, 3) (1, 8) 2:3

3. (8, -5) (4, 7) 1:3

4. (5, -6) (4, 5) 3:4

5. (4, 9) (-5, -3) 2:3

6. (2, -1) (-3, -5) 1:2

7. Pick any problem from 1-6 on the last page and show how to find the point graphically: