Name: _____ Date: _____

UNIT 7 **LESSON 5**

AIM: HOW DO WE DIVIDE SEGMENTS PROPORTIONALLY?

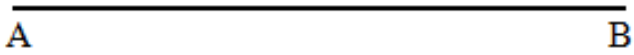
Do Now: Given m is the midpoint of line segment $\overline{AB}$:

a) What **ratio** does M split the segment into?

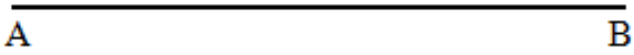
b) How many **total parts** are in the segment?

c) What **fraction** of the way from A to B is the midpoint M?

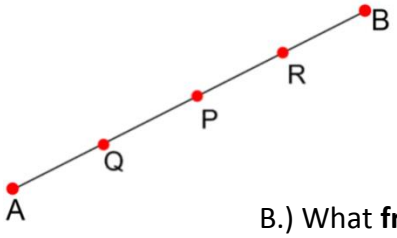
1) Partition the following segments, given the ratio 3:2 of the directed line segment AB (**initial point A**). How many total equal parts are there? _____



2) Partition the following segments, given the ratio 3:2 of the directed line segment AB (**initial point B**). How many total equal parts are there? _____



3) Segment AB is split into four equal parts. Starting closest to A, three points Q, P, and R respectively split the segment.



A.) State the **partition ratio** of:

a. AQ:QB

b. AP:PB

c. AR:RB

B.) What **fraction** of the way along AB is:

a. AQ

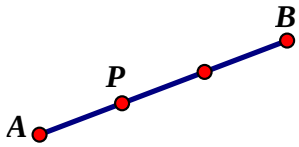
b. AP

c. AR

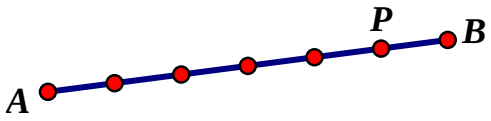
C.) Can you find the relationship between the partition ratio and the fraction?

- A directed line segment has both _____ and _____. In other words, the order of the letters matters!
- Partition Ratio: _____ : _____
- Fraction: _____
- Dilation Scale Factor: _____

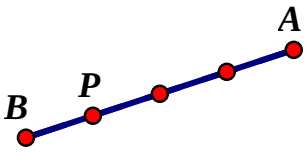
Example 3: Determine the ratio and fraction of the way of the directed line segment $\overline{AB}$ when partitioned by point P.
(Hint: **A is the initial point**)



a) _____ : _____ Fraction?___



b) _____ : _____ Fraction?___



c) _____ : _____ Fraction?___

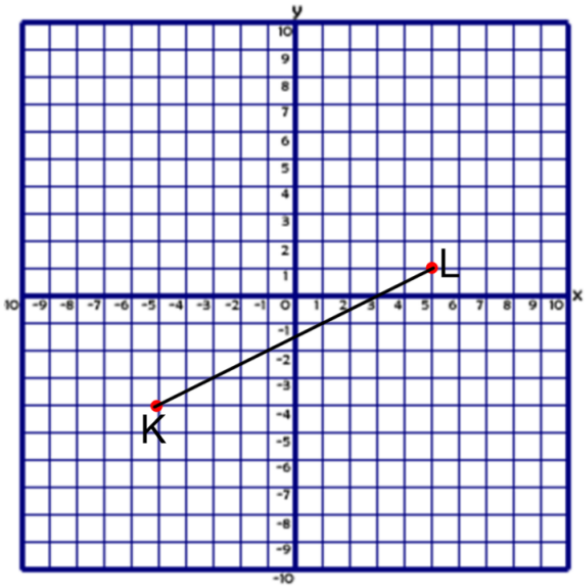
FINDING SPECIFIC POINTS USING DIRECTED LINE SEGMENTS

GRAPHICALLY:

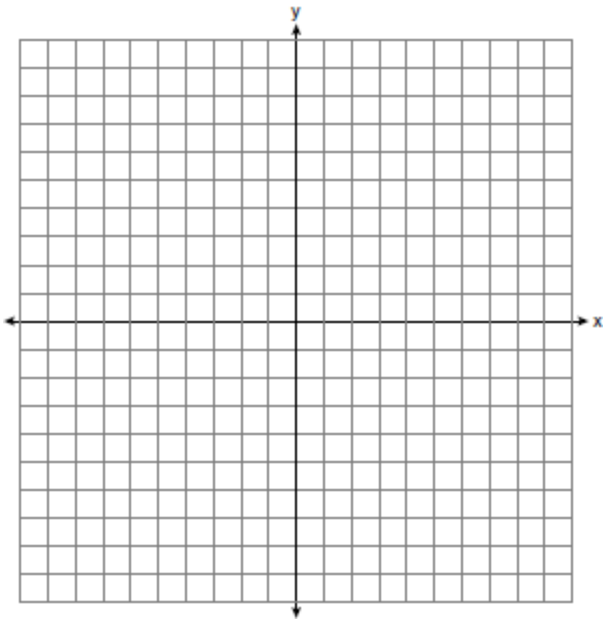
Example 4: Directed line segment *KL* has endpoints whose coordinates are *K(-5, -4)* and *L(5, 1)*. Determine the coordinates of point *M* that divides the segment in the ratio 3:2.

1. Graph the Line(if not already done)
2. Find slope and mark all points using slope

3. Find the point J that will partition the directed segment into 3:2 ratio (starting from K)



NYTO (Now You Try One): Directed line segment *PT* has endpoints whose coordinates are $P(-2, 1)$ and $T(4, 7)$. Determine the coordinates of point *J* that divides the segment in the ratio 2 to 1.



ALGEBRAICALLY:

DIRECTED LINE SEGMENT FORMULA!

$$(x_1 + k(x_2 - x_1), y_1 + k(y_2 - y_1))$$

Where:

(x_1, y_1)	
k	
(x_2, y_2)	

Example 5: The coordinates of the endpoints of $\overline{AB}$ are $A(-6, -5)$ and $B(4, 0)$. Point *P* is on $\overline{AB}$. Determine and state the coordinates of point *P*, such that $AP:PB$ is $2:3$.

NYTO (Now You Try One): Point *P* is on segment *AB* such that $AP:PB$ is $4:5$. If *A* has coordinates $(4, 2)$, and *B* has coordinates $(22, 2)$, determine and state the coordinates of *P*.

PARTNER PRACTICE:

1) The endpoints of $\overline{DEF}$ are $D(1,4)$ and $F(16,14)$. Determine and state the coordinates of point *E*, if $DE:EF = 2:3$.

2) Point *Q* is on $\overline{MN}$ such that $MQ:QN = 2:3$. If *M* has coordinates $(3,5)$ and *N* has coordinates $(8,-5)$, the coordinates of *Q* are

   1) $(5,1)$
   2) $(5,0)$
   3) $(6,-1)$
   4) $(6,0)$

3) What are the coordinates of the point on the directed line segment from $K(-5,-4)$ to $L(5,1)$ that partitions the segment into a ratio of 3 to 2?

   1) $(-3,-3)$
   2) $(-1,-2)$
   3) $\left(0,-\frac{3}{2}\right)$
   4) $(1,-1)$

4. Point *P* is on the directed line segment from point $X(-6,-2)$ to point $Y(6,7)$ and divides the segment in the ratio $1:5$. What are the coordinates of point *P*?

   1) $\left(4,5\frac{1}{2}\right)$
   2) $\left(-\frac{1}{2},-4\right)$
   3) $\left(-4\frac{1}{2},0\right)$
   4) $\left(-4,-\frac{1}{2}\right)$

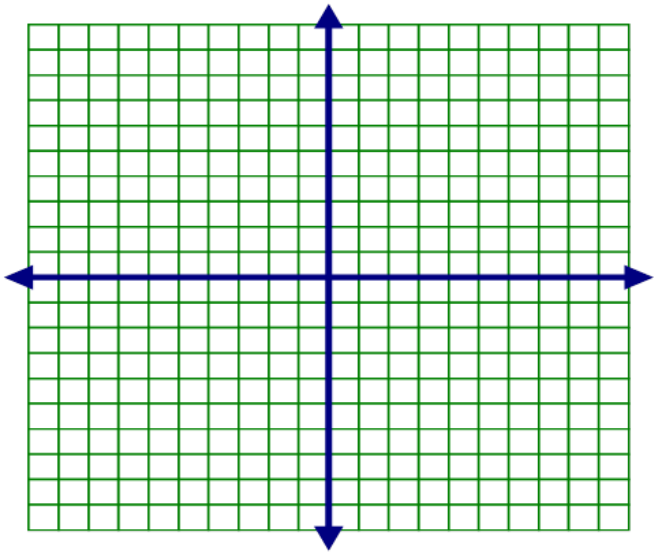
Name: _____ Date: _____

UNIT 7 **LESSON 5**

HOMEWORK

5. Given the diagram below with initial point *A*. *AP* : *PB* = 3 : 2  TRUE OR FALSE	6. Given the diagram below with initial point *A*. *AP* : *AB* = 2 : 5  TRUE OR FALSE

7. $\overline{AB}$ is drawn from $A(0, 10)$ to $B(-7, -4)$. Find point C that partitions $\overline{AB}$ in the ratio 5:2.



8. Directed line segment *PT* has endpoints whose coordinates are $P(-2, 1)$ and $T(4, 7)$. Determine the coordinates of point *J* that divides the segment in the ratio 2 to 1.