

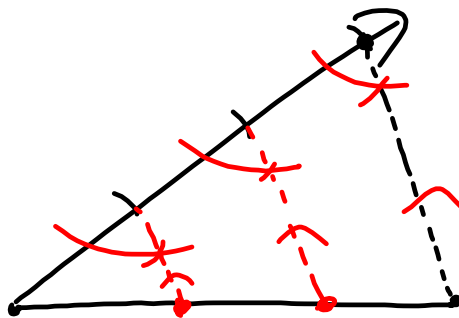
Lesson 7-7R / 7.8L: Directed Line Segments

Agenda

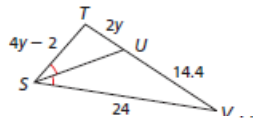
- Check & Review HW 7.6/7.7
- 7-7 Exploration and Guided Notes

Homework:

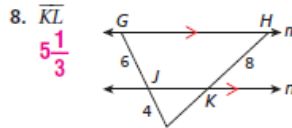
- Problem Set 7.7/7.8
- Unit Test 6 -Remediation



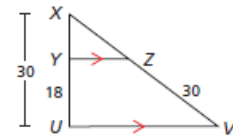
14. \overline{ST} and \overline{TU} $ST = 10$; $TU = 6$



Find the length of each segment.

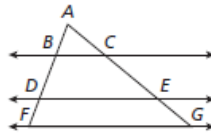


9. \overline{XZ} 20



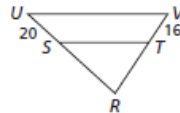
In the figure, $\overline{BC} \parallel \overline{DE} \parallel \overline{FG}$. Complete each proportion.

15. $\frac{AB}{BD} = \frac{AC}{CE}$ **CE** 16. $\frac{DF}{DF} = \frac{AE}{EG}$ **AD**
 17. $\frac{DF}{DF} = \frac{EG}{CE}$ **BD** 18. $\frac{AF}{AB} = \frac{AG}{AC}$ **AG**
 19. $\frac{BD}{CE} = \frac{DF}{EG}$ **DF** 20. $\frac{AB}{AC} = \frac{BF}{CG}$ **CG**



32. Which dimensions let you conclude that $\overline{UV} \parallel \overline{ST}$?

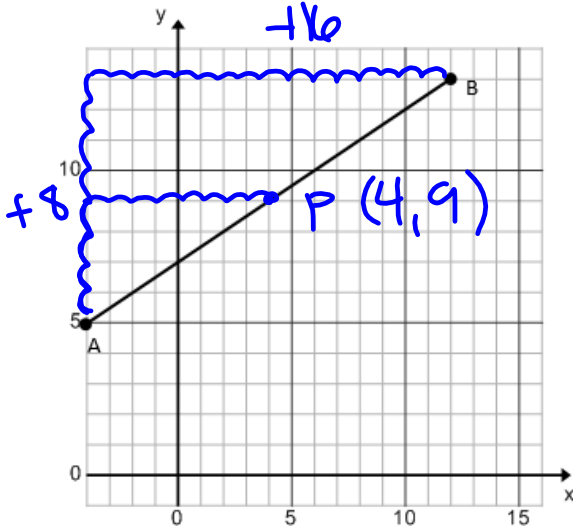
- (A) $SR = 12$, $TR = 9$ (C) $SR = 35$, $TR = 28$
 (B) $SR = 16$, $TR = 20$ (D) $SR = 50$, $TR = 48$



28. **Real Estate** A developer is laying out lots along Grant Rd. whose total width is 500 ft. Given the width of each lot along Chavez St., what is the width of each of the lots along Grant Rd. to the nearest foot? **176 ft; 235 ft; 88 ft**



Geometry 7-7R & 7-8L Directed Line Segments

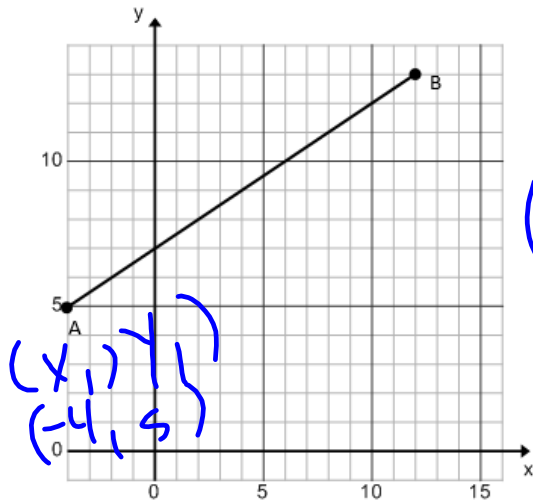


1. Given points A (-4,5) and B (12, 13), find the midpoint of \overline{AB} by counting. Label this Point P: (4, 9) What were you really doing?

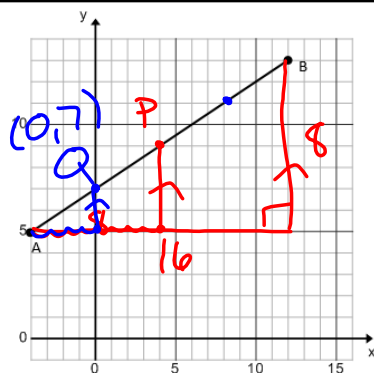
$\frac{1}{2} (\Delta x)$
 $\frac{1}{2} (\Delta y)$

2. Use this formula to find point P on the segment that is $\frac{1}{2}$ the distance from endpoint A.

$$\text{Midpoint: } \left(x_1 + \frac{1}{2}(x_2 - x_1), y_1 + \frac{1}{2}(y_2 - y_1) \right)$$



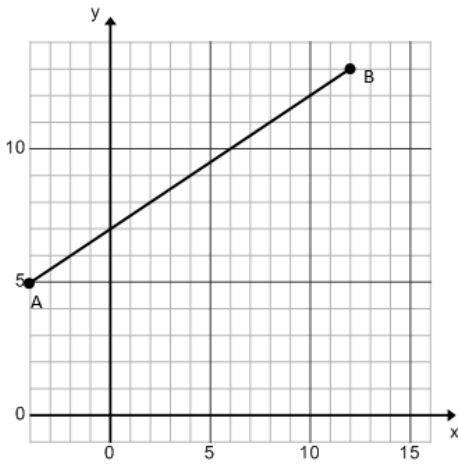
$$\begin{aligned} x_2 - x_1 &= 12 - (-4) = 16 \\ y_2 - y_1 &= 13 - 5 = 8 \\ & \left(-4 + \frac{1}{2}(16), 5 + \frac{1}{2}(8) \right) \\ & \left(-4 + 8, 5 + 4 \right) \\ & (4, 9) \end{aligned}$$



$$\begin{aligned} \frac{1}{2}(16) &= 8 \\ \frac{1}{4}(16) &= 4 \end{aligned}$$

3. Now, let's find the midpoint using another graphical method. Consider what you know about similar triangles and the triangle side splitter theorem.
4. What if we wanted to find the point Q that is $\frac{1}{4}$ of the way along segment \overline{AB} , closer to A than B? How would the formula change? Can you find that point on the graph?

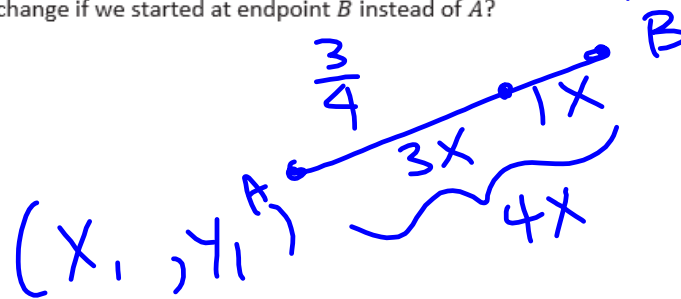
$$\begin{aligned} \frac{1}{2} \quad \frac{1}{4} \quad \leftarrow \\ Q &= \left(x_1 + \frac{1}{4} \Delta x, y_1 + \frac{1}{4} \Delta y \right) \\ & \left(-4 + \frac{1}{4}(16), 5 + \frac{1}{4}(8) \right) \\ & (-4 + 4, 5 + 2) \\ & Q(0, 7) \end{aligned}$$



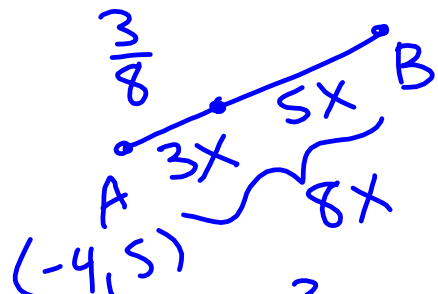
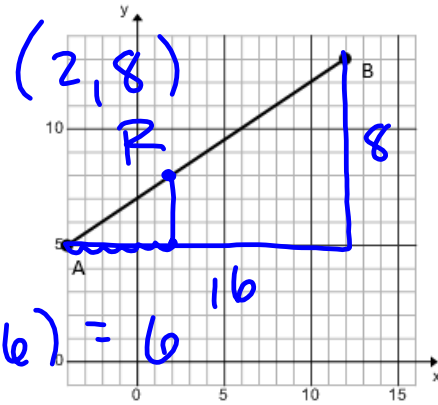
5. Another way to ask the question #4 would be to find the point on the directed segment from $A(-4, 5)$ to $B(12, 13)$ that divides it in the ratio of 1:3. Explain how this is the same question.

TOTAL OF 4

6. How would this formula change if we started at endpoint B instead of A ?



7. Now find the coordinates of the point that sits $\frac{3}{8}$ of the way along segment \overline{AB} closer to A than to B . Show how to get that point using a formula with a sketch and using the graph. R



$$\frac{3}{8}(16) = 6$$

$$R\left(-4 + \frac{3}{8}(16), 5 + \frac{3}{8}(8)\right) = (-4 + 6, 5 + 3) = (2, 8)$$

Another way to state this problem is using a ratio and the term directed segment:

Example: Find the point on the directed segment from $A(-4, 5)$ to $B(12, 13)$ that divides it into a ratio of 3:5

PART: PART
AR: RB

STARTING

8. Find the point on the directed segment from $(-4, 5)$ to $(12, 13)$ that divides it into a ratio of 3:13

$(x_1 + \text{FRAC } \Delta x, y_1 + \text{FRAC } \Delta y)$

$(-4 + \frac{3}{16}(16), 5 + \frac{3}{16}(8))$

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

$(-1, 6.5)$

Practice Exercises 1-7

1. Find the point on the directed segment from $(-2, 0)$ to $(10, 8)$ that divides it in the ratio of 1:3.

$\Delta x = 10 - (-2)$
 $= 12$

$\Delta y = 8 - 0$
 $= 8$

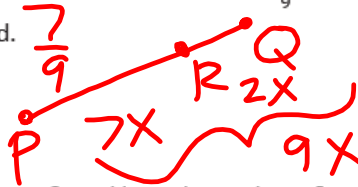
$(-2 + \frac{1}{4}(12), 0 + \frac{1}{4}(8))$

$(-2 + 3, 0 + 2)$

$(1, 2)$

2. Given \overline{PQ} and point R that lies on \overline{PQ} such that point R lies $\frac{7}{9}$ of the length of \overline{PQ} from point P .

a. Sketch the situation described.



b. Is point R closer to P or closer to Q , and how do you know?

Q BECAUSE $\frac{7}{9} > \frac{1}{2}$

c. Use the given information to determine the following ratios:

i. $PR:PQ$

7:9 PART:WHOLE

ii. $RQ:PQ$

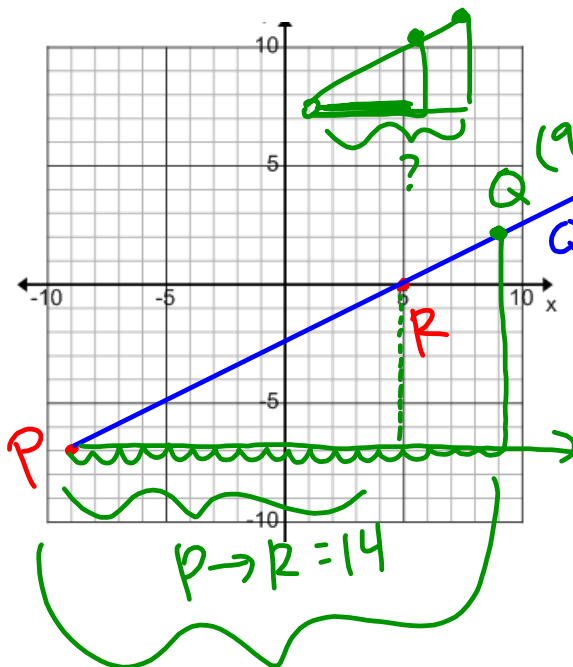
2:9 PART:WHOLE

iii. $PR:RQ$

7:2 PART:PART

iv. $RQ:PR$

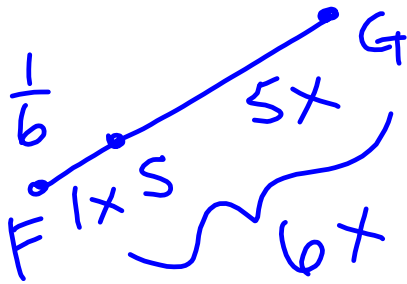
2:7 PART:PART



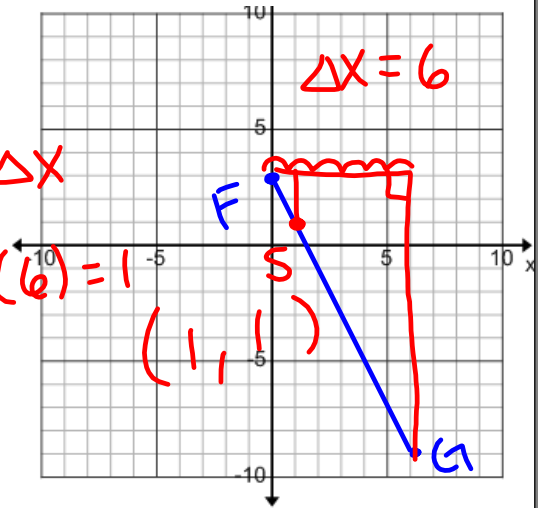
d. If the coordinates of point P are $(-9, -7)$ and the coordinates of point R are $(5, 0)$, what are the coordinates of point Q ? READ CAREFULLY.

$(\frac{9}{7}) \cdot \frac{7}{9} (\Delta X) = 14 (\frac{9}{7})$
 $\Delta X = 18$

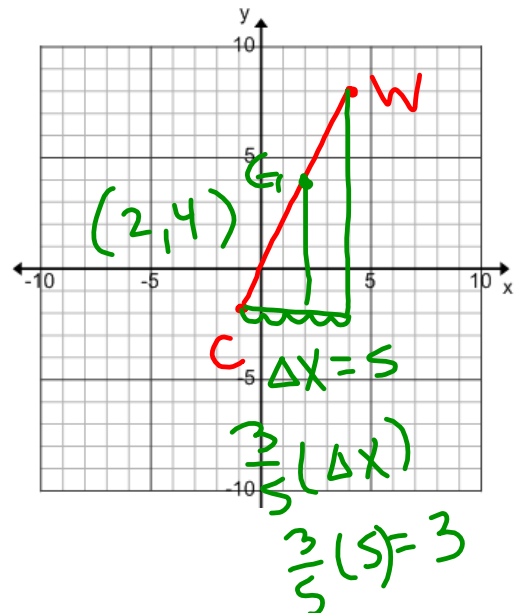
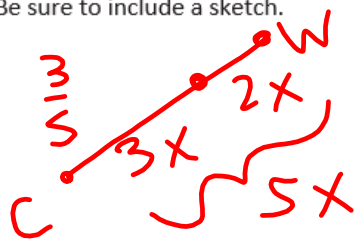
3. Given $F(0, 3)$ and $G(6, -9)$. If point S lies $\frac{5}{6}$ of the way along \overline{FG} , closer to F than to G , find the coordinates of S .
Be sure to include a sketch!



$\frac{1}{6} \Delta X$
 $\frac{1}{6}(6) = 1$



4. Find the point G on the directed segment from $C(-1, -2)$ to $W(4, 8)$ that divides it into a ratio of 3:2. Be sure to include a sketch.



5. A robot is at position $A(40, 50)$ and is heading toward the point $B(2000, 2000)$ along a straight line at a constant speed. The robot will reach point B in 10 hours.

a. What is the location of the robot at the end of the third hour?

b. What is the location of the robot 2 hours before it reaches point B ?

6. (EXTRA CREDIT) A robot begins its journey at the origin, point O , and travels along a straight line path at a constant rate. Fifteen minutes into its journey the robot is at $A(35, 80)$.

a. If the robot does not change speed or direction, where will it be 3 hours into its journey (call this point B)?

b. The robot continues past point B for a certain period of time until it has traveled an additional $\frac{3}{4}$ the distance it traveled in the first 3 hours and stops.

i. How long did the robot's entire journey take?

ii. What is the robot's final location?

iii. What was the distance the robot traveled in the last leg of its journey?