

Lesson 12: Dividing Segments Proportionately

Classwork

Exercises

- Find the midpoint of \overline{ST} given $S(-2, 8)$ and $T(10, -4)$.
- Find the point on the directed segment from $(-2, 0)$ to $(5, 8)$ that divides it in the ratio of 1:3.
- 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 along \overline{PQ} :
 - Sketch the situation described.
 - Is point R closer to P or closer to Q , and how do you know?

- c. Use the given information to determine the following ratios:
- $PR:PQ$
 - $RQ:PQ$
 - $PR:RQ$
 - $RQ:PR$
- d. If the coordinates of point P are $(0, 0)$ and the coordinates of point R are $(14, 21)$, what are the coordinates of point Q ?
4. 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.
- What is the location of the robot at the end of the third hour?
 - What is the location of the robot five minutes before it reaches point B ?

- c. If the robot keeps moving along the straight path at the same constant speed as it passes through point B , what will be its location at the twelfth hour?
- d. Compare the value of the abscissa (x -coordinate) to the ordinate (y -coordinate) before, at, and after the robot passes point B .
- e. Could you have predicted the relationship that you noticed in part (d) based on the coordinates of points A and B ?

Problem Set

- Given $F(0, 2)$ and $G(2, 6)$, if point S lies $\frac{5}{12}$ of the way along \overline{FG} , closer to F than to G , find the coordinates of S . Then verify that this point lies on \overline{FG} .
- Point C lies $\frac{5}{6}$ of the way along \overline{AB} , closer to B than to A . If the coordinates of point A are $(12, 5)$ and the coordinates of point C are $(9.5, -2.5)$, what are the coordinates of point B ?
- Find the point on the directed segment from $(-3, -2)$ to $(4, 8)$ that divides it into a ratio of 3: 2.
- 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 $A(35, 80)$.
 - If the robot does not change speed or direction, where will it be 3 hours into its journey (call this point B)?
 - The robot continues past point B for a certain period of time until it has traveled an additional $\frac{3}{4}$ of the distance it traveled in the first 3 hours and stops.
 - How long did the robot’s entire journey take?
 - What is the robot’s final location?
 - What was the distance the robot traveled in the last leg of its journey?
- Given \overline{LM} and point R that lies on \overline{LM} , identify the following ratios given that point R lies $\frac{a}{b}$ of the way along \overline{LM} , closer to L than to M .
 - $LR:LM$
 - $RM:LM$
 - $RL:RM$
- Given \overline{AB} with midpoint M as shown, prove that the point on the directed segment from A to B that divides \overline{AB} into a ratio of 1: 3 is the midpoint of \overline{AM} .

