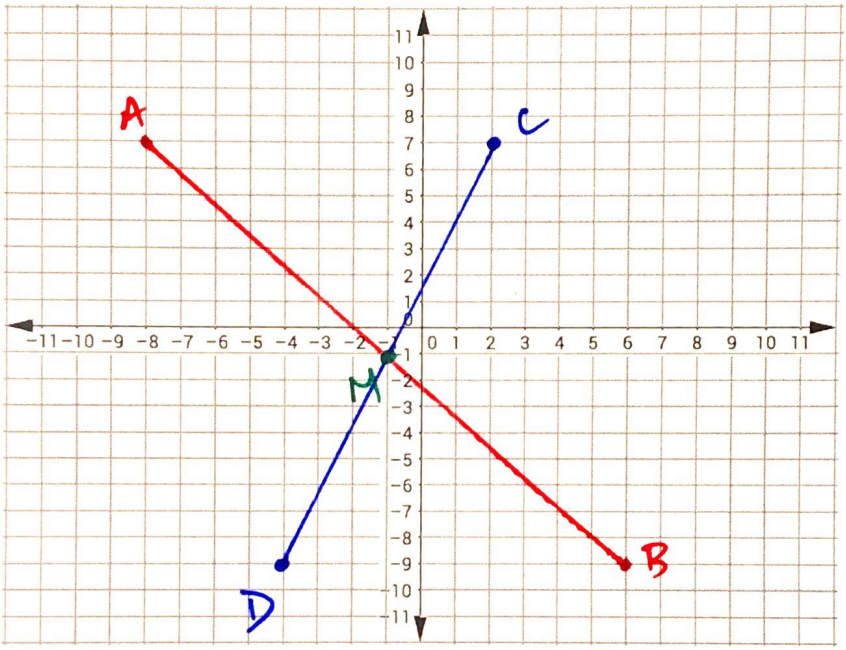
Name _____ Date_____

Introduction to Geometry – Points, Lanes and Planes
Midpoint and Distance in the Coordinate Plane – Part 1
Independent Practice

1. Consider the following coordinate plane.



Part A: Plot the points $A(-8,7)$ and $B(6,-9)$. Mark the halfway point on $\overline{AB}$ and label it point M. What are the coordinates of M?

$\frac{-8+6}{2} = -1$ $\quad$ $\frac{7-9}{2} = -1$

$(-1,-1)$

Part B: Plot point $C(2,7)$. If M is the midpoint of $\overline{CD}$, what are the coordinates of D?

$\frac{2+x}{2} = -1$ $\quad$ $\frac{7+y}{2} = -1$

$2+x = -2$ $\quad$ $7+y = -2$

$x = -4$ $\quad$ $y = -9$

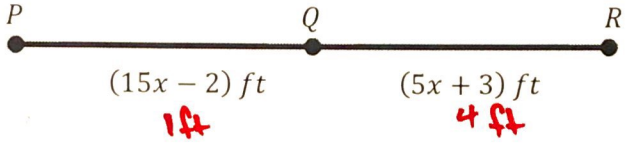
$D(-4,-9)$

2. Given $H(6, 7)$ and $I(-7, -6)$, if point G lies $\frac{1}{2}$ of the way along $\overline{HI}$, Santiago argues that point G is located at the origin. Is Santiago correct? Justify your answer.

$\left(\frac{6+(-7)}{2}, \frac{7+(-6)}{2}\right) = \left(-\frac{1}{2}, \frac{1}{2}\right)$

No, Santiago is incorrect. The midpoint G is at $\left(-\frac{1}{2}, \frac{1}{2}\right)$.

3. Consider the line segment below that is five feet long.



1 ft 4 ft

Is Q the midpoint of $\overline{PR}$? Justify your answer.

$15x - 2 + 5x + 3 = 5$

$20x + 1 = 5$

$20x = 4$

$x = .2$

No, Q is not the midpoint, because it is not halfway between P & R.

4. Rihanna works in a coffee shop approximately nine miles from her apartment. She bikes every day from her apartment to the coffee shop and then back to her apartment in the evening. However, on her way to work, she always stops halfway through to meet her best friend at a park. If the distance from Rihanna's apartment to the park is $(5x + 2)$ miles and the trip from the park to the coffee shop is $(25x - 8)$ miles long, then what is the value of x?

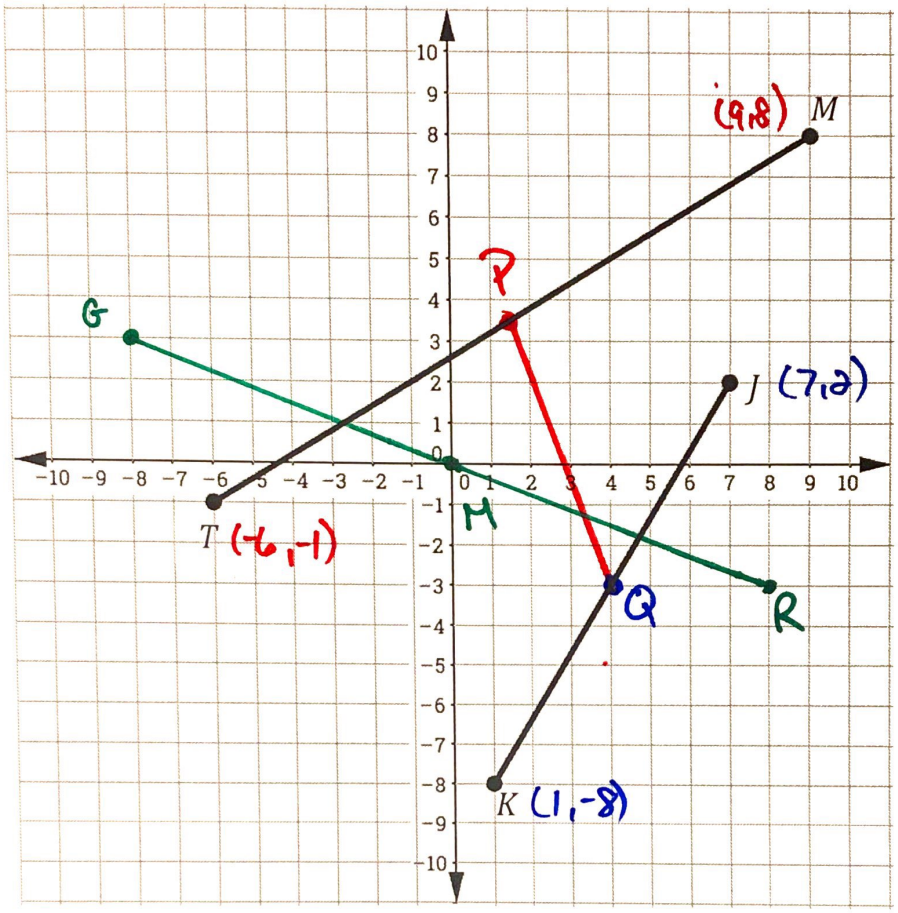
$(5x + 2) + (25x - 8) = 9$

$30x - 6 = 9$

$\frac{30x}{30} = \frac{15}{30}$

$x = 1/2$

5. Consider the following graph.



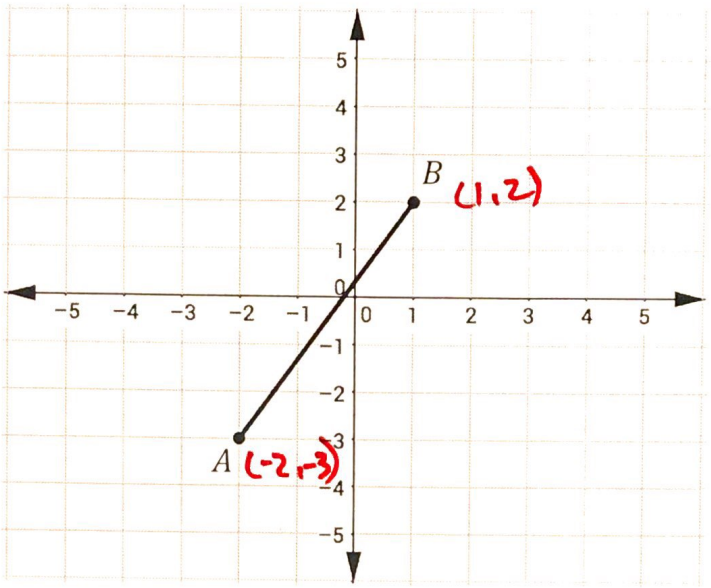
If P and Q are the midpoints of $\overline{MT}$ and $\overline{JK}$, respectively, then sketch $\overline{PQ}$ in the above coordinate plane.

$P\left(\frac{3}{2}, \frac{7}{2}\right)$ $Q(4,-3)$

6. M is the midpoint of $\overline{GR}$. G has coordinates $(-8,3)$ and M is at the origin. Find the coordinates of R.

$R(8,-3)$

7. Consider the following graph.



If $\overline{BA}$ is extended all the way through A creating $\overline{BF}$ and A becomes the midpoint of $\overline{BF}$, then what are the coordinates of F?

$\frac{1+x}{2} = -2$ $\qquad$ $\frac{2+y}{2} = -3$

$1+x = -4$ $\qquad$ $2+y = -6$

$x = -5$ $\qquad$ $y = -8$

$(-5, -8)$