

3.5 Practice B

In Exercises 1 and 2, find the coordinates of point Q along the directed line segment LM so that LQ to QM is the given ratio.

1. $L(-1, -2), M(3, 6); 5$ to 3

2. $L(2, 7), M(-1, 1); 2$ to 1

3. Tell whether the lines through the given points are *parallel*, *perpendicular*, or *neither*. Justify your answer.

Line 1: $(2.5, -2), (9.5, 12)$

Line 2: $(-4, -2), (8, -4)$

4. Write an equation of the line passing through point $P(-1, -4)$ that is parallel to $y = -6x + 8$.
5. Write an equation of the line passing through point $P(-1, 3)$ that is perpendicular to $y = 4x - 7$.

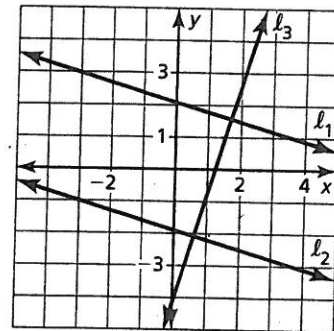
In Exercises 6 and 7, find the distance from point P to the given line.

6. $P(4, 8), 6 = y + 2x$

7. $P(-2, 1), y = \frac{1}{4}x - 3$

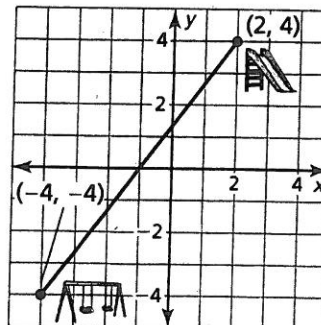
8. A line through $(-1, b)$ and $(c, 8)$ is parallel to a line through $(-6, 3)$ and $(0, 12)$. Find values of b and c that make the above statement true.
9. The graph shows three lines. The slope of line l_1 is m_1 , where $-1 \leq m_1 < 0$.

- a. Lines l_1 and l_2 are parallel. What do you know about the slope of line l_2 ?
- b. Lines l_1 and l_3 are perpendicular. What do you know about the slope of line l_3 ?
- c. What is the relationship between l_2 and l_3 ? Justify your answer.



10. Two lines are perpendicular. Is it possible for the lines to have the same y -intercept? Justify your answer.

11. The diagram shows a map of a playground. The water fountain lies directly between the swings and the slide. The distance from the swings to the water fountain is one-third the distance from the water fountain to the slide. What point on the graph represents the water fountain?



3.5 Enrichment and Extension**Equations of Parallel and Perpendicular Lines**

1. Write the equation of the perpendicular bisector for the line segment defined between points $A(2, 5)$ and $B(-6, -1)$.
2. Find the values of a and b in $ax + by = 90$ such that the equation is perpendicular to $-20x + 12y = 36$ and has the same y -intercept.
3. Consider the linear equation $y = 3.62(x - 1.35) + 2.74$.
 - a. What is the slope of this line?
 - b. What is the value of y when $x = 1.35$?
 - c. Find an equation for the line through $(4.23, -2.58)$ that is parallel to this line.
 - d. Find an equation for the line through $(4.23, -2.58)$ that is perpendicular to this line.
4. What is the slope of the line $ax + by = c$? Find an equation for the line through the origin that is parallel to the line $ax + by = c$. Find an equation for the line through the origin that is perpendicular to the line $ax + by = c$.
5. A line passes through the points $(k + 10, -2k - 1)$ and $(2, 9)$ and has a y -intercept of 10. Find the value of k and the equation of the line.
6. A line passes through the points $(3k, 6k - 5)$ and $(-1, -7)$ and has a y -intercept of -5 . Find the value of k and the equation of the line.
7. Consider the two linear equations $ax + by = c$ and $dx + ey = f$.
 - a. Under what conditions will the graphs of the two equations intersect at one point?
 - b. Under what conditions will the graphs of the two equations be parallel?
8. Point F is located at $(0, 4)$.
 - a. Find coordinates of three points that are equidistant from F and the x -axis.
 - b. If possible, write the equations of the lines that are parallel or perpendicular to the line $x = 0$ and pass through the coordinates from part (a).
 - c. Consider $G(0, y)$. Find the coordinates of three points that are equidistant from G and the x -axis.