Name _____ Date _____

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 $-1 \le m_1 < 0$.

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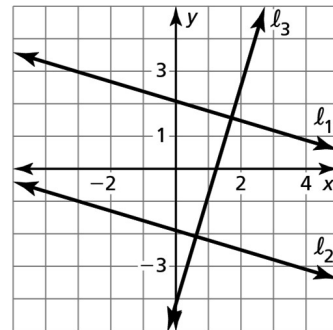
10. Two lines are perpendicular. Is it possible for the lines to have the same y-intercept? Justify your answer.

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?