Name _____ Date _____

LESSON 1.3 Challenge Practice

For use with pages 15–22

1. Use the Midpoint Formula three times to find the three points that divide $\overline{AB}$ with endpoints $A(x_1, y_1)$ and $B(x_2, y_2)$ into four equal parts.

2. Use the result of Exercise 1 to find the points that divide $\overline{AB}$ with the given endpoints into four equal parts.

a. $A(1, -2)$, $B(4, -1)$

b. $A(-2, -3)$, $B(0, 0)$

3. *Explain* how you can use the Distance Formula and the Segment Addition Postulate to determine whether three points A, B, and C in a coordinate plane are collinear.

In Exercises 4–7, tell whether the three given points are collinear.

4. $A(2, 6)$, $B(5, 2)$, $C(8, -2)$

5. $A(2, 3)$, $B(2, 6)$, $C(6, 3)$

6. $A(-2, -2)$, $B(1, 1)$, $C(7, 5)$

7. $A(-1, -8)$, $B(4, 7)$, $C(6, 13)$

In Exercises 8–11, use the following information to find the distance between *A* and *B* and the coordinates of the midpoint of $\overline{AB}$.

In a three-dimensional coordinate system, the distance between two points $A(x_1, y_1, z_1)$ and $B(x_2, y_2, z_2)$ is

$$AB = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2 + (z_2 - z_1)^2}.$$

In a three-dimensional coordinate system, the midpoint M of $\overline{AB}$ with endpoints $A(x_1, y_1, z_1)$ and $B(x_2, y_2, z_2)$ has coordinates

$$\left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2}, \frac{z_1 + z_2}{2}\right).$$

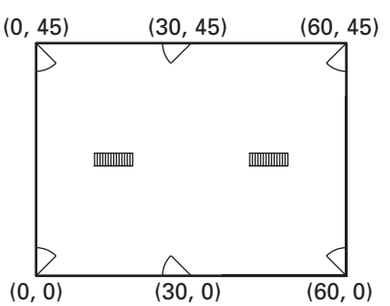
8. $A(3, 2, 5)$, $B(7, 4, 8)$

9. $A(4, 1, 9)$, $B(2, 1, 6)$

10. $A(-3, 5, 5)$, $B(-6, 4, 8)$

11. $A(-2, 8, 10)$, $B(7, -4, 2)$

12. Floor Plan An engineer is designing a department store. The diagram at the right shows the first floor of the store. The store is to have one escalator going up to the second floor and one escalator going down to the first floor from the second floor. Each escalator is supposed to be equidistant from four of the six store entrances. The labeled points shown represent the store entrances.



a. Where should the escalators be placed?

b. How far apart should the escalators be placed?