

**Zero The Math Hero**  
**Standard Mathematical Elements - Lesson 4**

Lesson 4 provides a discussion of the coordinate plane, its parts, and how it is used to graph points on a 2-dimensional coordinate system. It also offers a practical modern-day application of the coordinate plane as it relates to maps.

Lesson 4 shows students how to use The Distance Formula to find the length of a segment on a rectangular coordinate system.

Lesson 4 also shows students how to use The Midpoint Formula to find the coordinates of the midpoint of a segment on a graph.

## Zero the Math Hero – Lesson 4

### Lesson 4 – Definitions

**coordinate plane** - a plane that is divided into four regions by two intersecting number lines that form right angles

**x-axis** - the horizontal number line on a graph

**y-axis** - the vertical number line on a graph

**ordered pair** - the two numbers written as (x,y) that determine the location of a point on a coordinate plane

**origin** - the point on a coordinate plane where the x-axis and y-axis touch; it has coordinates (0, 0).

**quadrant** - one of the four regions determined by the axes on a coordinate plane

**midpoint** - the point that divides a segment into two equal segments

### Lesson 4 – Formulas

**distance formula** - the formula used to find the distance between two points on a graph

$$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

**midpoint formula** - the formula used to find the midpoint of a line segment on a graph

$$M = \left( \frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2} \right)$$

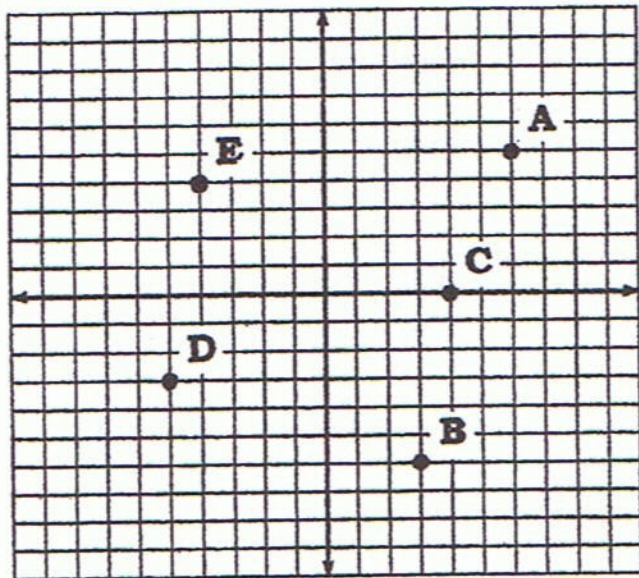
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### Lesson 4 - Practice Problems

#### Coordinate Plane - Distance Formula - Midpoint Formula

Name the coordinates for each point on the graph.



1. A ( \_\_\_\_\_ , \_\_\_\_\_ )

2. B ( \_\_\_\_\_ , \_\_\_\_\_ )

3. C ( \_\_\_\_\_ , \_\_\_\_\_ )

4. D ( \_\_\_\_\_ , \_\_\_\_\_ )

5. E ( \_\_\_\_\_ , \_\_\_\_\_ )

6. In which quadrant is B located?

6. \_\_\_\_\_

7. In which quadrant is A located?

7. \_\_\_\_\_

8. In which quadrant is C located?

8. \_\_\_\_\_

A. I B. II C. III D. None

9. Find the coordinates of the midpoint for C(-3, 4) and D(4, -6).

9. \_\_\_\_\_

10. For segment KL, what are the coordinates for K if the midpoint has coordinates (6, 10) and L has coordinates (2, 7)?

10. \_\_\_\_\_

11. Find the distance between Q(7, 10) and R(-2, 8).

11. \_\_\_\_\_

12. Find the distance between D(0, 4) and G(-7, 10).

12. \_\_\_\_\_

13. Find the distance between F(4, -5) and T(4, 10).

13. \_\_\_\_\_



Name: \_\_\_\_\_

Date: \_\_\_\_\_

**Quiz – Definitions**  
**Zero the Math Hero – Lesson 4**

**Directions:** Fill in each blank with the letter that corresponds to the correct answer, A-G.

- |  |                     |
|--|---------------------|
| 1. _____ the horizontal number line on a graph   | A. coordinate plane |
| 2. _____ the point on a coordinate plane where the x-axis and y-axis touch; it has coordinates (0,0).          | B. x-axis           |
| 3. _____ the point that divides a segment into two equal segments  | C. y-axis           |
| 4. _____ a plane that is divided into four regions by two two intersecting number lines that form right angles | D. ordered pair     |
| 5. _____ the vertical number line on a graph   | E. origin           |
| 6. _____ one of the four regions determined by the axes on a coordinate plane                                  | F. quadrant         |
| 7. _____ the two numbers, written as (x, y), that determine the location of a point on a coordinate plane      | G. midpoint         |

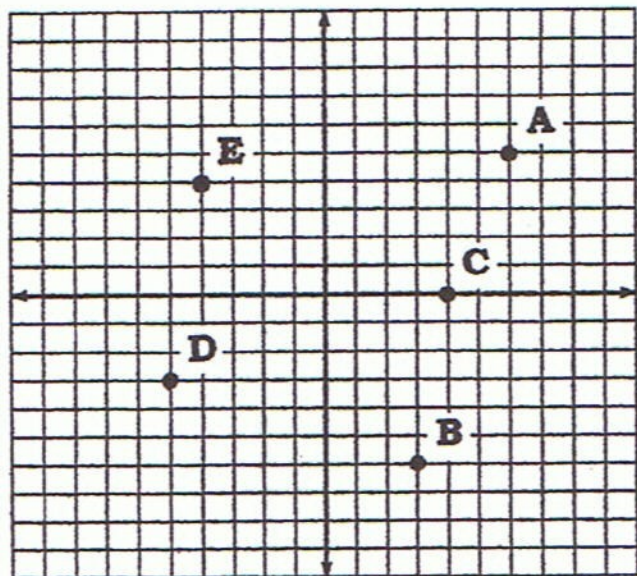
Name: ANSWER KEY

Date: \_\_\_\_\_

**Lesson 4 - Practice Problems**

## Coordinate Plane - Distance Formula - Midpoint Formula

Name the coordinates for each point on the graph.



1. A ( 6 , 5 )

2. B ( 3 , -6 )

3. C ( 4 , 0 )

4. D ( -5 , -3 )

5. E ( -4 , 4 )

6. In which quadrant is B located?

6. IV

7. In which quadrant is A located?

7. I

8. In which quadrant is C located?

8. D

A. I B. II C. III D. None

9. Find the coordinates of the midpoint for C(-3, 4) and D(4, -6).

9.  $(\frac{1}{2}, -1)$

10. For segment KL, what are the coordinates for K if the midpoint has coordinates (6, 10) and L has coordinates (2, 7)?

10. (10, 13)

11. Find the distance between Q(7, 10) and R(-2, 8).

11.  $\sqrt{85} \approx 9.2$

12. Find the distance between D(0, 4) and G(-7, 10).

12.  $\sqrt{85} \approx 9.2$

13. Find the distance between F(4, -5) and T(4, 10).

13. 15

Name: ANSWER KEY

Date: \_\_\_\_\_

**Quiz – Definitions**  
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**Directions:** Fill in each blank with the letter that corresponds to the correct answer, A-G.

1. B the horizontal number line on a graph      A. coordinate plane
2. E the point on a coordinate plane where the x-axis and y-axis touch; it has coordinates (0,0).      B. x-axis
3. G the point that divides a segment into two equal segments      C. y-axis
4. A a plane that is divided into four regions by two two intersecting number lines that form right angles      D. ordered pair
5. C the vertical number line on a graph      E. origin
6. F one of the four regions determined by the axes on a coordinate plane      F. quadrant
7. D the two numbers, written as (x, y), that determine the location of a point on a coordinate plane      G. midpoint