

## Connecting Algebra and Geometry Through Coordinates

## Unit Assessment

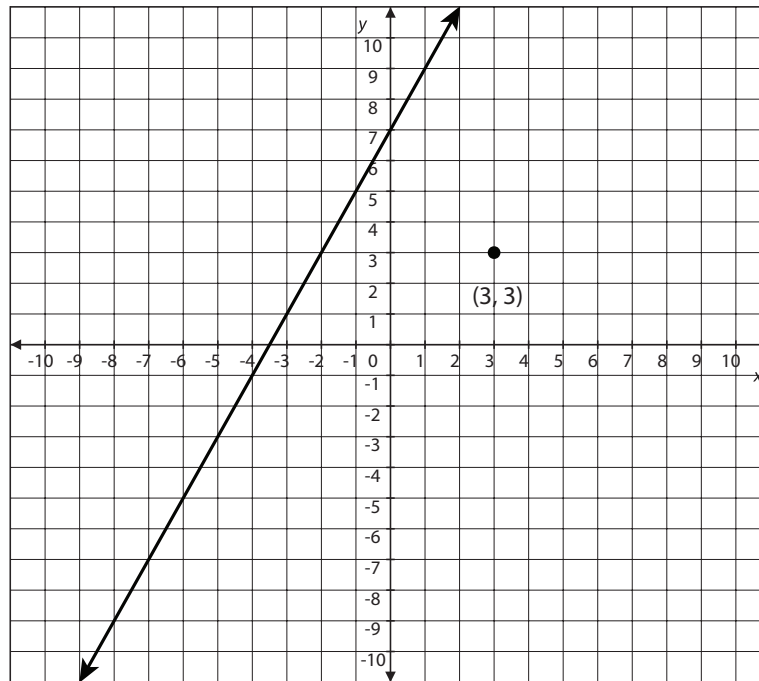


Circle the letter of the best answer.

- A line segment has endpoints at  $(-4, 5)$  and  $(4, -11)$ . A point on the segment has a distance that is  $\frac{1}{4}$  of the length of the segment from endpoint  $(-4, 5)$ . What are the coordinates of the point?
  - $(2, 7)$
  - $(-4, -8)$
  - $(-2, 1)$
  - $(0, 3)$
- What point lies midway between  $(2, 4)$  and  $(3, 6)$ ?
  - $(3, 4.5)$
  - $(2.5, 5)$
  - $(3.5, 4)$
  - $(4, 3.5)$
- A line segment has endpoints  $(-2, 5)$  and  $(0, 7)$ . What point on the segment is  $\frac{1}{5}$  of the distance from  $(-2, 5)$ ?
  - $(-1, 6)$
  - $(-1.5, 5.5)$
  - $(-0.2, 1.2)$
  - $(-1.6, 5.4)$
- What is the distance between the points  $(-2, 4)$  and  $(10, -1)$ ?
  - $\sqrt{89}$  units
  - 13 units
  - 169 units
  - $\sqrt{119}$  units
- The town of Ocean Hills is located on a map at the point  $(9, -8)$ . Sandy Shores is located on the same map at the point  $(1, 7)$ . What is the approximate distance between the towns if each unit represents 10 miles?
  - 127 miles
  - 81 miles
  - 170 miles
  - 2,890 miles

**continued**

6. Which equation represents a line that is perpendicular to the graph and passes through (3, 3)?



- a.  $y = -\frac{1}{2}x + \frac{9}{2}$
- b.  $y = \frac{1}{2}x + \frac{9}{2}$
- c.  $y = 2x - 3$
- d.  $y = 2x + 9$
7. The line through the points  $(-3, 8)$  and  $(2, -7)$  is parallel to the line through which of the following points?
- a.  $(2, 3)$  and  $(5, 4)$
- b.  $(2, 3)$  and  $(-4, 1)$
- c.  $(2, 3)$  and  $(3, 6)$
- d.  $(2, 3)$  and  $(4, -3)$

**continued**



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

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

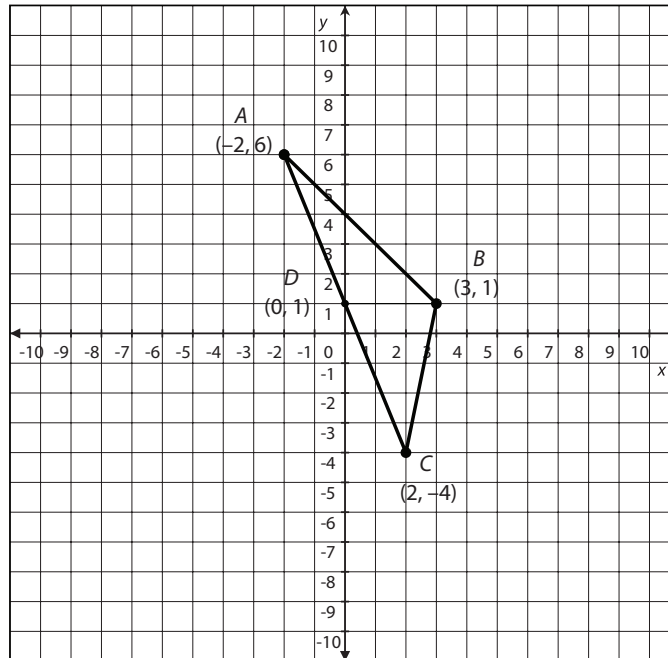
**Assessment**

Use the given information to solve all parts of the following problems.

13. A right triangle has exactly one  $90^\circ$  angle. The equation of the line that represents  $\overline{AB}$  of triangle  $ABC$  is  $y = x + 3$ . Vertex  $A$  is located at the point  $(-3, 0)$  and vertex  $B$  is located at the point  $(3, 6)$ . Is a right triangle formed if vertex  $C$  is located at the point  $(-1, -6)$ ? If a right triangle is formed, what is the equation of the line that represents  $\overline{AC}$ ?
14. Segment  $\overline{AC}$  has endpoints  $A(-4, 5)$  and  $C(4, -11)$ . A perpendicular bisector of  $\overline{AC}$  passes through the point  $(8, 1)$ . Point  $B$  is the point of intersection of the perpendicular bisector and  $\overline{AC}$ .
- What is the equation of the perpendicular bisector?
  - What are the coordinates of point  $B$ ? Explain how you found these coordinates.
  - Using the distance formula, verify that  $AB = BC$ .

*continued*

Use the following graph and the given information to complete problem 15.



15. The median of a triangle is the line segment from one vertex to the midpoint of the opposite side. The midpoint is the point that is half the distance between the two endpoints of a segment.
- Verify that  $\overline{BD}$  is the median of the triangle.
  - What is the area of triangle  $ABD$ ?
  - What is the area of triangle  $ABC$ ?
  - If the area of triangle  $CBD$  is  $7.5 \text{ units}^2$ , how does the area of the smaller triangles compare to the area of the original triangle?