

LESSON
16

Locating Points on a Coordinate Plane

Review It!

When you locate points on a coordinate plane, remember these words:

x-axis horizontal number line on a coordinate plane

y-axis vertical number line on a coordinate plane

ordered pair two numbers that can be graphed as a point on a coordinate plane

x-coordinate first number in an ordered pair

y-coordinate second number in an ordered pair

origin where the x-axis and the y-axis meet, at (0, 0)

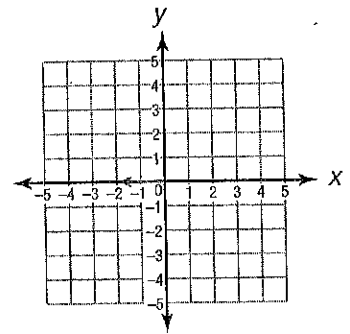
Locate the point on the coordinate plane for the ordered pair $(-2, 4)$.

Step 1 Start at the origin. Move along the x-axis.

The x-coordinate of $(-2, 4)$ is _____.

From $(0, 0)$, move _____ units to the _____.

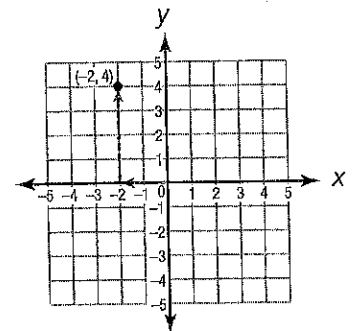
REMEMBER The x-coordinate is the first number.



Step 2 Move up or down to graph the point.

The y-coordinate of $(-2, 4)$ is _____.

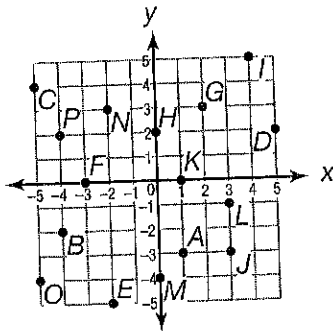
From $(-2, 0)$, move _____ units _____.



So, the point shows the location of $(-2, 4)$.

Try It!

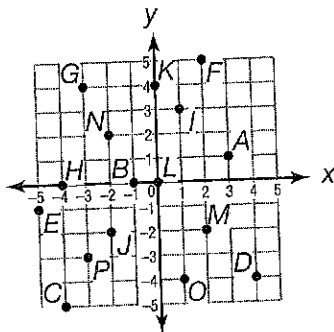
Use the graph for Questions 1–6.



Write the ordered pair for each point.

- | | | |
|-------|-------|-------|
| 1. A | 2. B | 3. C |
| _____ | _____ | _____ |
| 4. L | 5. O | 6. P |
| _____ | _____ | _____ |

Use the graph below for Questions 7–12. Name the point with the given coordinates.



- | | | |
|--------------|------------|-------------|
| 7. (3, 1) | 8. (4, -4) | 9. (-2, -2) |
| _____ | _____ | _____ |
| 10. (-4, -5) | 11. (1, 3) | 12. (2, -2) |
| _____ | _____ | _____ |

1.
Which comes first?
x-coordinate, or
y-coordinate?

2.
The y-value is what?
positive, or negative?

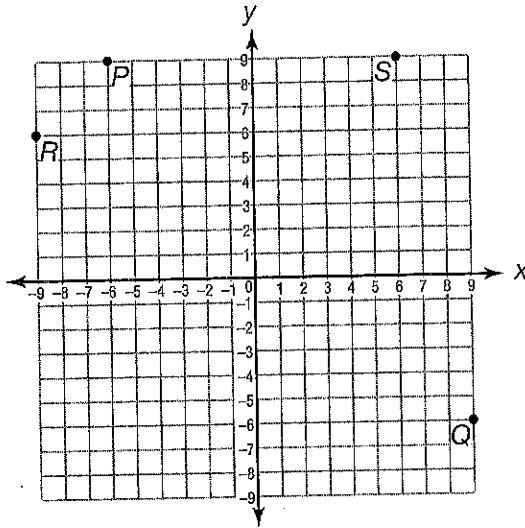
7.
Where is the
y-coordinate positive?
above the x-axis, or
below the x-axis?

Geometry

On Your Own!

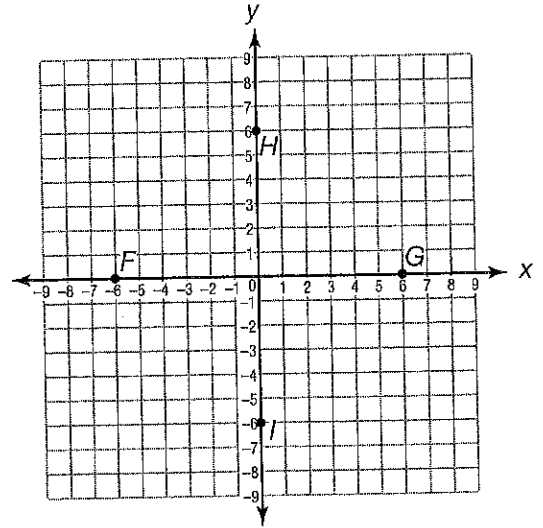
Circle the answer for each question.

Use this graph for Questions 1 and 2.



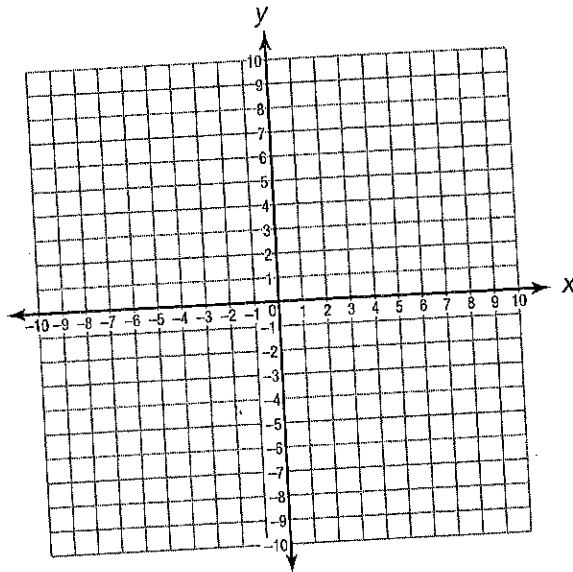
- Which point has coordinates $(9, -6)$?
 - P
 - Q
 - R
 - S
- What are the coordinates of point R?
 - $(-9, 6)$
 - $(-6, 9)$
 - $(9, -6)$
 - $(6, 9)$

Use this graph for Questions 3 and 4.



- Which point has coordinates $(0, -6)$?
 - F
 - G
 - H
 - I
- What are the coordinates of point F?
 - $(0, 6)$
 - $(6, 0)$
 - $(-6, 0)$
 - $(0, -6)$

Use this coordinate grid for Questions 5 and 6.



5. Graph a point at $(8, -5)$ and label it A .
6. Graph a point at $(-7, 9)$ and label it B .

Math Words

Fill in the blanks.

7. The x -axis and y -axis cross at the _____.
8. The first number of an ordered pair is the _____.
9. The second number of an ordered pair is the _____.
10. A pair of numbers is a(n) _____.

Geometry

1.6**The Coordinate Plane**

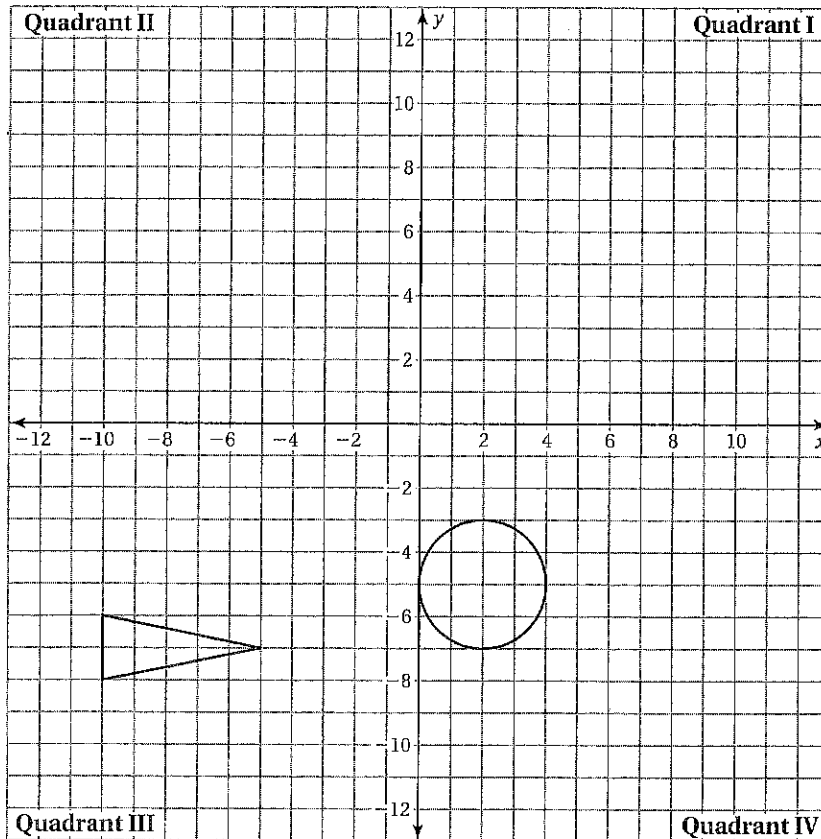
For use with Activity 1.6

Essential Question How can you use ordered pairs to locate points in a coordinate plane?

1 EXAMPLE: Plotting Points in a Coordinate Plane

Plot the ordered pairs. Connect the points to make a picture. Color the picture when you are done.

- | | | | | |
|-------------|--------------|-------------|-------------|-------------|
| 1(4, 12) | 2(9, 9) | 3(12, 4) | 4(12, -3) | 5(10, -9) |
| 6(9, -10) | 7(7, -9) | 8(2, -11) | 9(-1, -11) | 10(-3, -10) |
| 11(-4, -8) | 12(-11, -10) | 13(-12, -9) | 14(-11, -8) | 15(-11, -6) |
| 16(-12, -5) | 17(-11, -4) | 18(-4, -6) | 19(-3, -3) | 20(-4, 0) |
| 21(-8, 2) | 22(-8, 3) | 23(-5, 8) | 24(-1, 11) | |



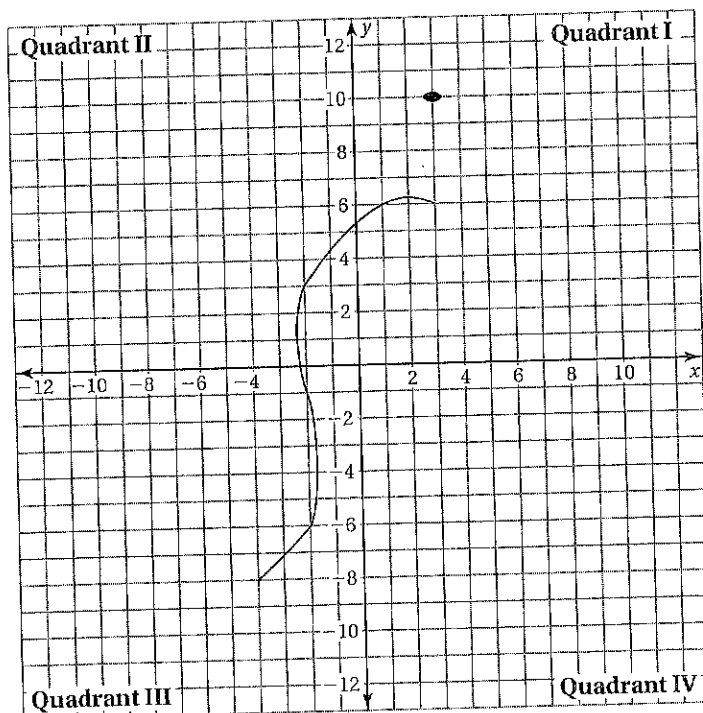
1.6 The Coordinate Plane (continued)

2 ACTIVITY: Plotting Points in a Coordinate Plane

Work with a partner.

Plot the ordered pairs. Connect the points to make a picture. Describe and color the picture when you are done.

- | | | | | |
|-------------|-------------|-------------|-------------|-------------|
| 1(6, 9) | 2(4, 11) | 3(2, 12) | 4(0, 11) | 5(-2, 9) |
| 6(-6, 2) | 7(-9, 1) | 8(-11, -3) | 9(-7, 0) | 10(-5, -1) |
| 11(-5, -5) | 12(-4, -8) | 13(-6, -10) | 14(-3, -9) | 15(-3, -10) |
| 16(-4, -11) | 17(-4, -12) | 18(-3, -11) | 19(-2, -12) | 20(-2, -11) |
| 21(-1, -12) | 22(-1, -11) | 23(-2, -10) | 24(-2, -9) | 25(1, -9) |
| 26(2, -8) | 27(2, -10) | 28(1, -11) | 29(1, -12) | 30(2, -11) |
| 31(3, -12) | 32(3, -11) | 33(4, -12) | 34(4, -11) | 35(3, -10) |
| 36(3, -8) | 37(4, -6) | 38(6, 0) | 39(9, -3) | 40(9, -1) |
| 41(8, 1) | 42(5, 3) | 43(3, 6) | 44(3, 7) | 45(4, 8) |



LESSON

21

Rules for Patterns

Review It!

When you use rules for patterns, remember these words:

variable a letter that represents a number

equation a math sentence with an equal (=) sign

Look at the table of values.

<i>x</i>	1	2	3	4
<i>y</i>	10	11	12	13

Write an equation that represents the relationship of *x* to *y*.

Step 1 Decide whether the values are increasing or decreasing.

The *x*-values and *y*-values are both increasing.

THINK These *y*-values are always greater than the *x*-values.

Step 2 Find a pattern that relates *x*-values to the *y*-values.

$$1 + \underline{\hspace{2cm}} = 10$$

$$2 + \underline{\hspace{2cm}} = 11$$

$$3 + \underline{\hspace{2cm}} = 12$$

$$4 + \underline{\hspace{2cm}} = 13$$

REMEMBER A pattern repeats.

Step 3 Write the rule.

Each *y*-value is more than its corresponding *x*-value.

Step 4 Write an equation for the rule.

$$y = x + \underline{\hspace{2cm}}$$

So, the equation is $y = \underline{\hspace{2cm}} + \underline{\hspace{2cm}}$.

Try It!

Write the equation that represents the relationship of x to y .



1.

x	y
1	7
2	8
3	9
4	10

2.

x	y
1	-1
2	-2
3	-3
4	-4

3.

x	y
2	1
4	2
6	3
8	4

1.

Which values are increasing?
 x , y , both values, or no values?

Algebraic Concepts

4.

x	y
2	10
4	20
6	30
8	40

5.

x	y
1	-5
3	-3
5	-1
7	1

6.

x	y
0	0
4	12
8	24
12	36

2.

What are the y -values doing?
increasing, or decreasing?

Solve.

7.

Look at this table of values:

x	0	1	2	3	4	5
y	0	7	14	21		35

Find the missing value in the table. _____

7.

What is the pattern?
multiply, or divide?

8.

Look at this table of values:

x	0	1	2	3	4	5
y	2	5	8	11		17

Find the missing value in the table. _____

On Your Own!

Circle the answer for each question.

1. Look at this table of values:

x	0	1	2	3	4
y	8	9	10	11	12

Which equation represents the relationship of x to y ?

- A. $y = x + 8$
- B. $y = x - 8$
- C. $y = x + 9$
- D. $y = 8x$

2. Look at this table of values:

x	1	2	3	4	5
y	-1	0	1	2	3

Which equation represents the relationship of x to y ?

- A. $y = x + 2$
- B. $y = x - 2$
- C. $y = \frac{1}{2}x$
- D. $y = 2x$

3. Which number is missing from the following table?

x	0	1	2	3	4
y	-1	3	7	11	

- A. 13
- B. 14
- C. 15
- D. 16

4. Look at this table of values:

x	3	5	7	9	11
y	33	55	77	99	121

Which equation represents the relationship of x to y ?

- A. $y = x + 30$
- B. $y = x - 30$
- C. $y = \frac{1}{11}x$
- D. $y = 11x$

5. Look at this table of values:

x	0	1	2	3	4
y	3	5	7	9	11

Which equation represents the relationship of x to y ?

- A. $y = x + 3$
- B. $y = x - 3$
- C. $y = 2x + 3$
- D. $y = 3x + 2$

6. Which number is missing from the following table?

x	1	2	3	4	5
y	2	0	-2		-6

- A. -4
- B. -3
- C. -1
- D. 1



Fill in the blanks.

- 9. You can write a rule for a pattern as $a(n)$ _____
- 8. A letter that represents a number is $a(n)$ _____

Part C Use what you know about finding rules for patterns to explain why your answer is correct. Use words and/or numbers in your explanation.

Part B Find the number that is missing from the table.

Part A Write the equation that shows the rule in the table.

x	0	1	2	3	4	5
y	0	9	18	27	36	

7. Look at this x/y table.

Algebraic Concepts