

# Chapter 1 Functions and Their Graphs

## Section 1.1 Rectangular Coordinates

**Objective:** In this lesson you learned how to plot points in the coordinate plane and use the Distance and Midpoint Formulas.

Course Number

Instructor

Date

### Important Vocabulary

Define each term or concept.

**Rectangular coordinate system**

**Ordered pair**

### I. The Cartesian Plane (Pages 2–3)

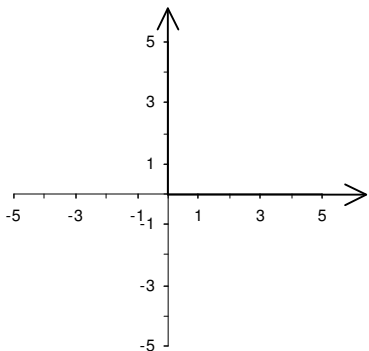
The **Cartesian plane**, named after the French mathematician René Descartes, is formed by . . .

#### *What you should learn*

How to plot points in the Cartesian plane

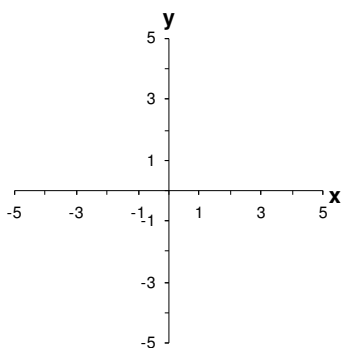
On the Cartesian plane, the horizontal real number line is usually called the \_\_\_\_\_, and the vertical real number line is usually called the \_\_\_\_\_. The origin is the \_\_\_\_\_ of these two axes, and the two axes divide the plane into four parts called \_\_\_\_\_.

On the Cartesian plane shown below, label the  $x$ -axis, the  $y$ -axis, the origin, Quadrant I, Quadrant II, Quadrant III, and Quadrant IV.



To sketch a **scatter plot** of paired data given in a table, . . .

**Example 1:** Explain how to plot the ordered pair  $(3, -2)$ , and then plot it on the Cartesian plane provided.



## II. The Pythagorean Theorem and the Distance Formula (Pages 4–5)

The **Pythagorean Theorem** states that for a right triangle with hypotenuse of length  $c$  and sides of lengths  $a$  and  $b$ , the mathematical relationship between  $a$ ,  $b$ , and  $c$  is . . .

*What you should learn*  
How to use the Distance Formula to find the distance between two points

The **Distance Formula** states that . . .

**Example 2:** Explain how to use the Distance Formula to find the distance between the points  $(4, 2)$  and  $(5, -1)$ . Then find the distance and round to the nearest hundredth.

**III. The Midpoint Formula** (Page 5)

To find the **midpoint** of a line segment that joins two points in a coordinate plane, simply . . .

*What you should learn*  
How to use the Midpoint Formula to find the midpoint of a line segment

The **Midpoint Formula** gives the midpoint of the segment joining the points  $(x_1, y_1)$  and  $(x_2, y_2)$  as . . .

**Example 3:** Explain how to find the midpoint of the line segment with endpoints at  $(-8, 2)$  and  $(6, -10)$ . Then find the coordinates of the midpoint.

**IV. Applications of the Coordinate Plane** (Pages 6–8)

To shift a figure plotted in the rectangular coordinate system by  $a$  units to the left and  $b$  units upward, . . .

*What you should learn*  
How to use a coordinate plane and geometric formulas to model and solve real-life problems

Give an example of a real-life situation in which representing data graphically would be useful.

Describe a real-life situation in which the Distance Formula could be used to solve a problem.

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Complete the following list of common formulas for basic geometric figures.

**Perimeter/Circumference**

Rectangle with width  $w$  and length  $l$ :  $P =$  \_\_\_\_\_

Triangle with sides  $a$ ,  $b$ , and  $c$ :  $P =$  \_\_\_\_\_

Circle with radius  $r$ :  $C =$  \_\_\_\_\_

**Area**

Rectangle with width  $w$  and length  $l$ :  $A =$  \_\_\_\_\_

Triangle with base  $b$  and height  $h$ :  $A =$  \_\_\_\_\_

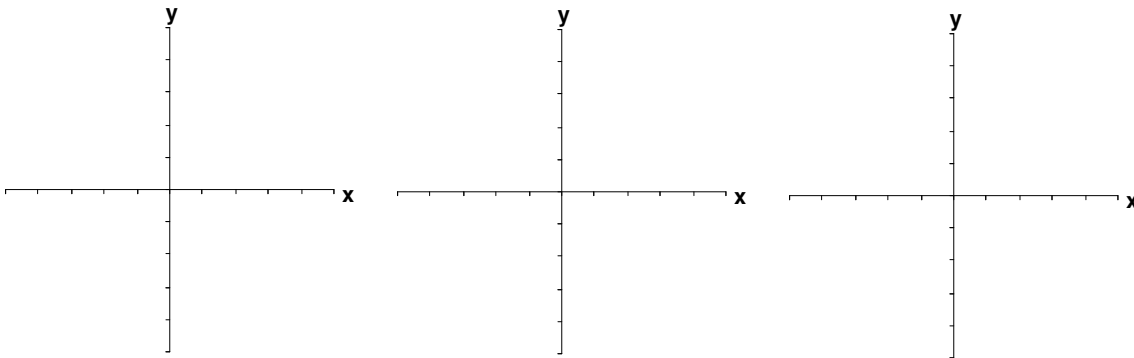
Circle with radius  $r$ :  $A =$  \_\_\_\_\_

**Volume**

Rectangular solid with width  $w$ , length  $l$ , and height  $h$ :  $V =$  \_\_\_\_\_

Circular cylinder with radius  $r$  and height  $h$ :  $V =$  \_\_\_\_\_

Sphere with radius  $r$ :  $V =$  \_\_\_\_\_



<p><b>Homework Assignment</b></p> <p>Page(s)</p> <p>Exercises</p>
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