Chapter 1 Functions and Their Graphs

Course Number

Instructor

Date

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.

Important Vocabulary Define each term or concept.

Rectangular coordinate system

Ordered pair

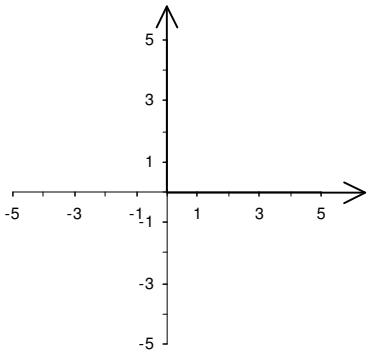
What you should learn
How to plot points in the Cartesian plane

I. The Cartesian Plane (Pages 2–3)

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

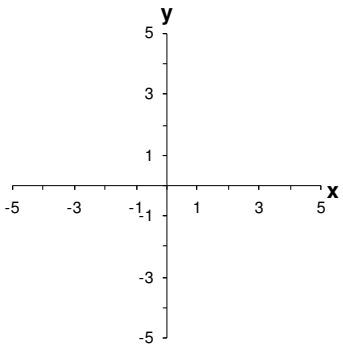
On the Cartesian plane, the horizontal real number line is usually called the _____, and the vertical real number line is usually called the _____. The origin is the _____ _____ of these two axes, and the two axes divide the plane into four parts called _____.

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)

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

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 . . .

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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)

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

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

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)

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

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

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.

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: $A =$ _____

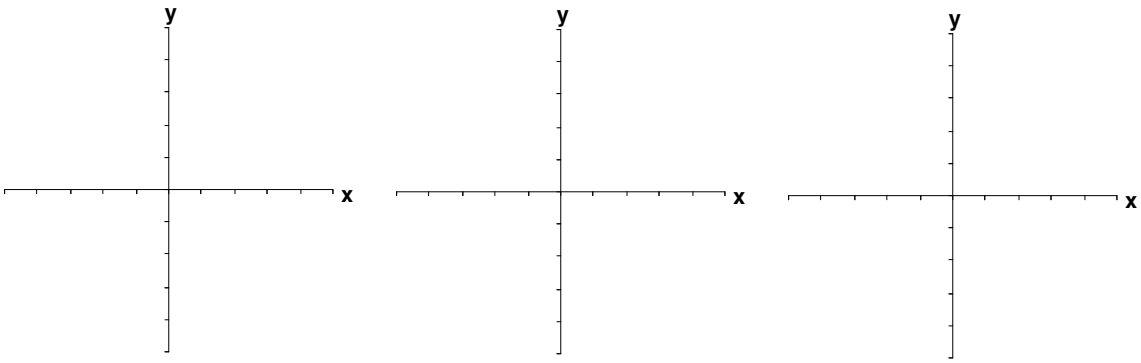
Circle with radius r: $A =$ _____

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: $V =$ _____



Homework Assignment

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Exercises