

Data Displays

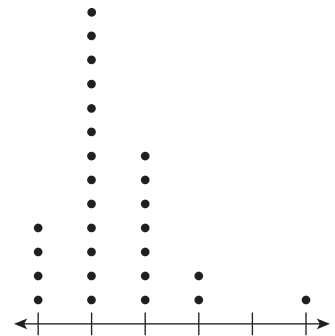
GUIDED SKILL SUPPORT

Overview

Distributions of single-variable, numerical data can be represented by using dot plots and histograms. Categorical one-variable data can be represented on bar graphs and Venn diagrams. Each representation communicates information in a slightly different way.

DOT PLOTS

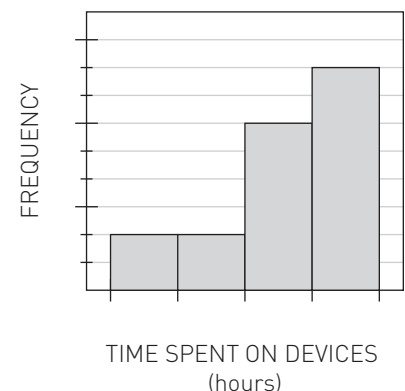
Dot plots display data points in numerical order along a number line to represent the frequency of distinct data values. Dot plots consist of points stacked vertically above a number line. The number of dots above each value represents the frequency of that value. Dot plots are generally used when the data is discrete (separate and distinct) and numerous pieces of data fall on most values.



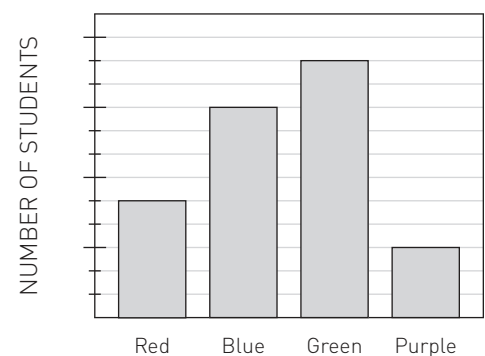
HISTOGRAMS AND BAR GRAPHS

Histograms and bar graphs are data representations that use bars to organize and display information. Each type of representation is suited to specific kinds of data and serves a different purpose.

Histograms are used to display the distribution of continuous numerical data. They divide numbers into equal-sized intervals, called bins, with the height of each bar representing how many numbers fall within that interval. The bars in a histogram touch each other to show that the data is continuous. In this course, a value is included in a bin if it matches the left end of the interval but not the right end. In the example shown, a value of 5 would be included in the bin from 5 to 10, while a value of 10 would be included in the bin from 10 to 15.

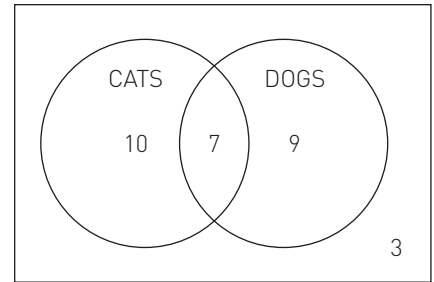


Bar graphs are used to display and compare categorical data. Each bar represents a category, and the height of the bar shows how many items are in that category. The bars do not touch, making it clear that the categories are separate, and the categories can occur in any order. The following bar graph shows that green is the favorite color of 11 students, with other bars showing how many students chose other colors.



VENN DIAGRAMS

Venn diagrams also display categorical data, but they do this by using two or more overlapping circles. The following diagram shows that 7 students have both dogs and cats, 9 students have only dogs, 10 have only cats, and 3 students do not have a dog or a cat. It also shows that 16 students total have dogs and 17 students total have cats.



For additional information and examples, see the Methods & Meanings boxes in Lessons 2.1.2 and 2.2.1 of the *Core Connections Course 1* text. For additional examples and practice, see the *Core Connections Course 1* Checkpoint 9A materials.

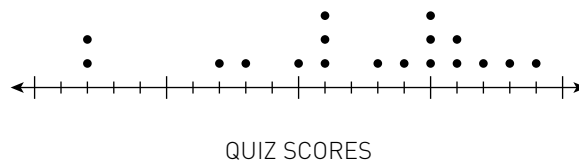
Examples

1. The scores for a 25-point quiz are arranged from least to greatest.

7, 7, 12, 13, 15, 16, 16, 16, 18, 19, 20, 20, 20, 21, 21, 22, 23, 24

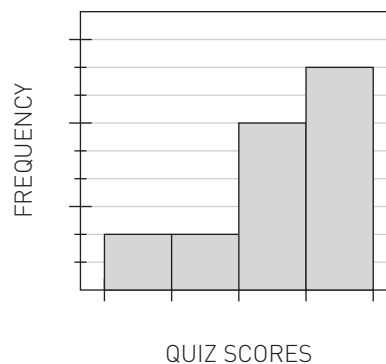
- a. Create a dot plot to represent the scores.

The lowest score is 7 and the highest score is 24. On a number line, place a dot for each score that is represented in the data set.

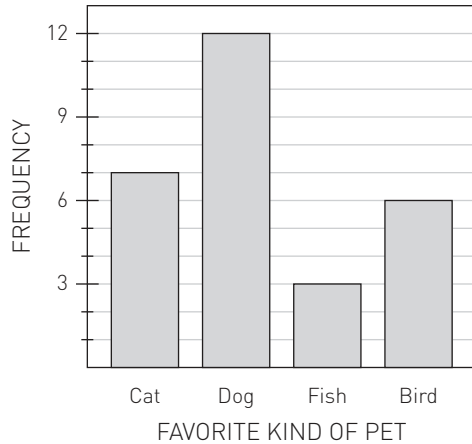


- b. Create a histogram for the quiz scores and use a bin width (interval) of 5 points.

The lowest score is 7 and the highest score is 24. With intervals of 5, the first bin chosen is 5 to 10. Scores on the right end of the interval are included in the next interval, so the interval between 10 and 15 only includes the two scores of 12 and 13. The interval between 15 and 20 only includes the six scores of 15, 16, 16, 16, 18, and 19.



2. Ms. Lim asked each of her students about their favorite kind of pet. Based on their responses, she created the bar graph shown. Use the bar graph to answer each question.



- a. Which pet was chosen the most?

dog (12 responses)

- b. How many students chose a bird as their favorite pet?

6

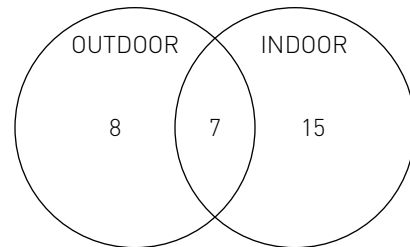
- c. What pet was chosen the least?

fish (3 responses)

- d. If every student voted once, how many students are in the class?

28

3. Daniel asked the students in his class what they did in the hour after school the day before. He categorized the activities as “outdoor” or “indoor” and created the following Venn diagram. Use the diagram to answer each question.



- a. How many students participated in an outdoor activity?

15; 8 students participated in an outdoor activity only and 7 participated in both indoor and outdoor activities.

- b. How many students participated in an indoor activity?

22; 15 students participated in an indoor activity only and 7 participated in both indoor and outdoor activities.

- c. What does the 7 in the diagram represent?

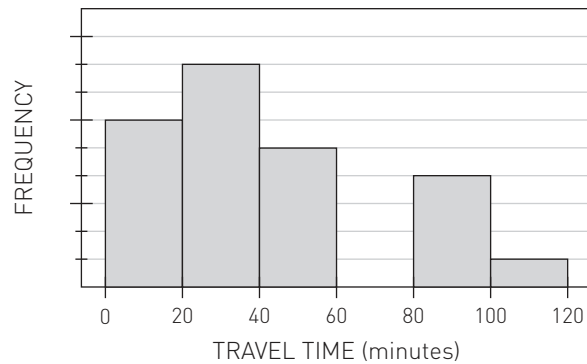
7 represents the students who participated in both indoor and outdoor activities.

- d. How many students did Daniel survey in his class?

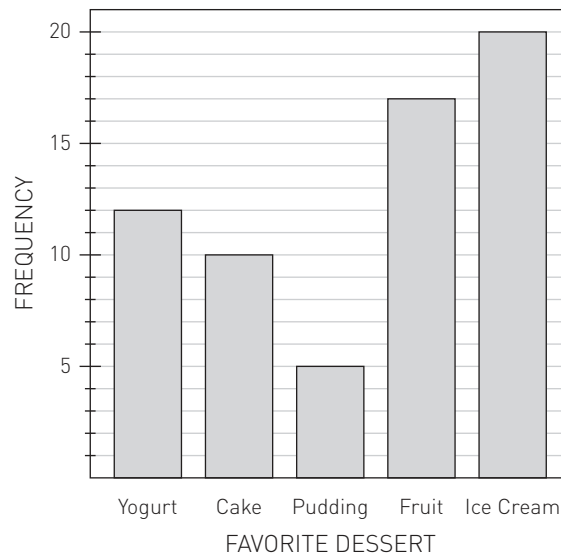
30; $8 + 7 + 15$

Practice

1. Mr. Diaz surveyed his employees about the amount of time it takes them to get to work. The results are shown in the following histogram.



- a. How many employees completed the survey?
- b. How many employees get to work in less than 20 minutes?
- c. How many employees get to work in less than 40 minutes?
- d. How many employees could there be who take exactly 60 minutes to get to work?
2. The two 6th grade classes at Vista Middle School voted for their favorite dessert. The results are shown in the following bar graph.



- a. What was the favorite dessert (the one chosen most) and how many students made that choice?
- b. How many students selected cake as their favorite dessert?
- c. How many students selected yogurt as their favorite?
- d. How many more students selected ice cream than pudding?

3. Mr. Fernandez asked 30 people at work how many pets they owned. The results are shown. Create a histogram to display this data. Use intervals of one pet.

Number of Pets	Number of People
0	5
1	8
2	10
3	3
4	2
5	1
9	1

4. During the first week of school, Ms. Chan asked her students to name the country where they were born. There were so many different countries that she grouped them by continent:

North America: 14 students, South America: 2 students, Europe: 3 students,
Asia: 10 students, Africa: 1 student, Australia: 0 students

Create a bar graph to display this information.

5. A six-sided dice was rolled 20 times and the results are shown.

1, 4, 6, 4, 2, 5, 2, 6, 6, 2, 6, 4, 5, 3, 5, 2, 5, 4, 2, 4

Create a dot plot to display the results.

6. The physical education teacher at West Middle School asked the students in a class to do as many push-ups as they could in a minute. The results are shown.

5, 15, 14, 33, 8, 11, 13, 8, 21, 8, 4, 17, 20, 7, 4, 16, 8, 9, 10, 12

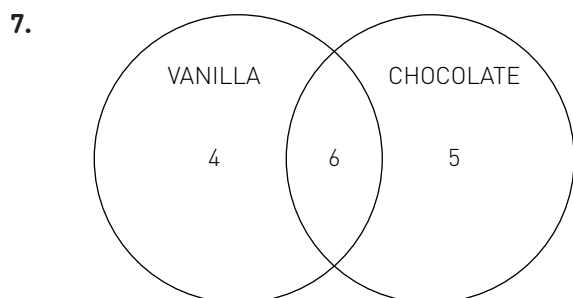
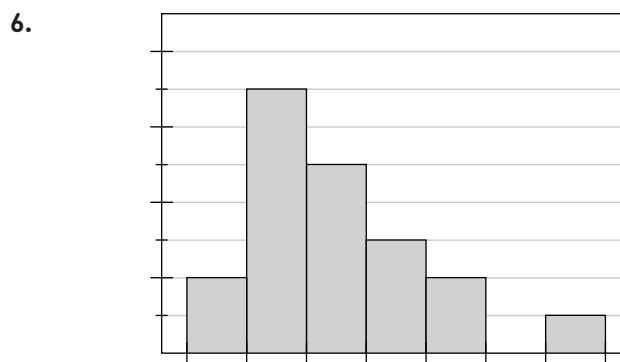
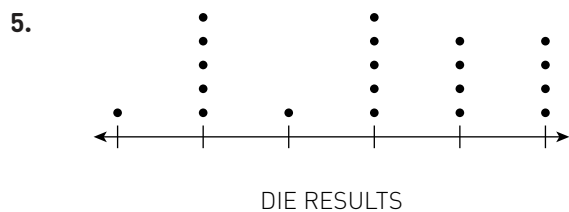
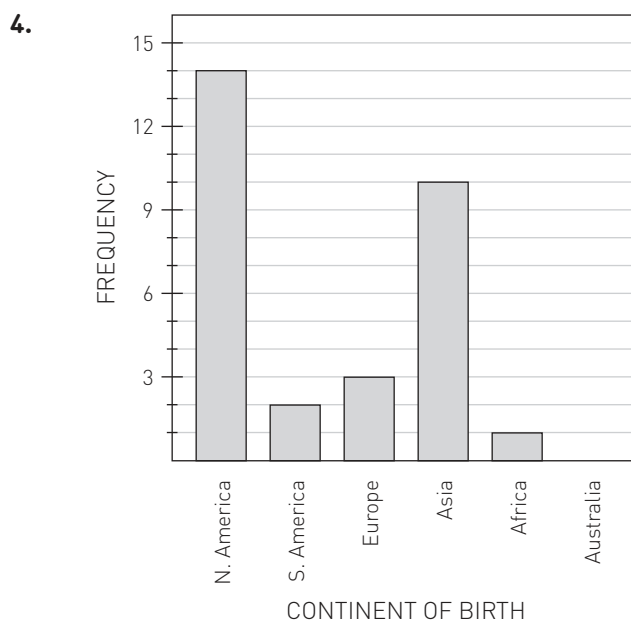
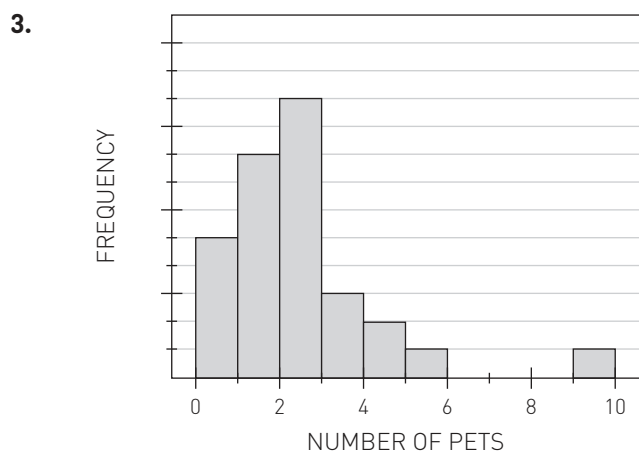
Create a histogram to display the results.

7. The after school math club was having an ice cream party. Students were given the choice of vanilla, chocolate, or both flavors of ice cream. Four students chose vanilla, five chose chocolate, and six chose both. Create a Venn diagram to display the ice cream flavor data.

Answers

1. a. 24 b. 6
c. 14 d. 0

2. a. ice cream, 20 b. 10
c. 12 d. 15



Area and Perimeter

GUIDED SKILL SUPPORT

Overview

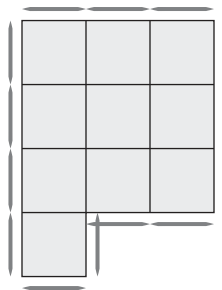
The **area** of a shape is a measure of the number of square units needed to cover that shape on a flat surface. The **perimeter** of a shape is the number of units needed to surround it. To calculate the perimeter of a quadrilateral, triangle, or any shape, add up the lengths of its sides.

A quadrilateral is a polygon with four sides. A **rectangle** is a quadrilateral with four right angles. The opposite sides of a rectangle are equal in length. Two sides that come together (meet) at a right angle are referred to as the length and width, or base and height, of the rectangle. The area (A) of any rectangle is found by the relationship $A = (\text{length}) \cdot (\text{width})$ or $A = (\text{base}) \cdot (\text{height})$.

For additional information, see the Methods & Meanings boxes in Lesson 1.1.2 and 2.2.3 of the *Core Connections Course 1* text.

Examples

- Determine the area and perimeter of the figure shown.

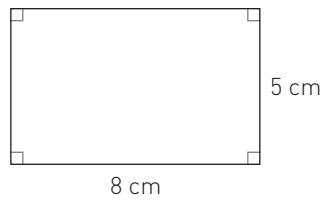


The area of the figure is 10 square units since the interior of the shape is made up of 10 squares of 1 unit each.

To determine the perimeter, determine the sum of the side lengths:

4 units + 3 units + 3 units + 2 units + 1 unit + 1 unit = 14 units. The perimeter of the figure is 14 units.

2. Determine the area and perimeter of the rectangle shown.

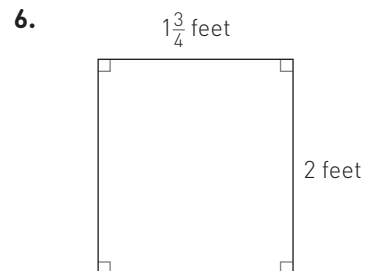
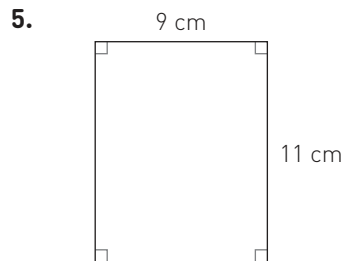
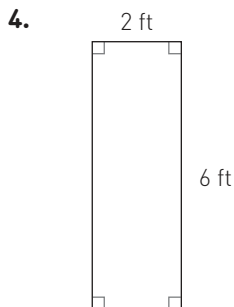
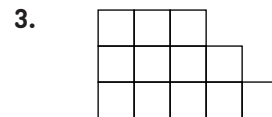
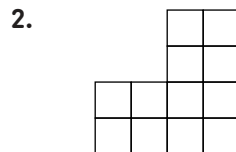
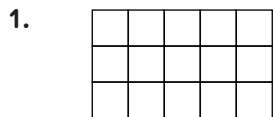


The area of the rectangle can be calculated by multiplying the base and the height.

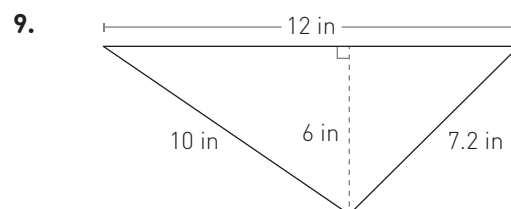
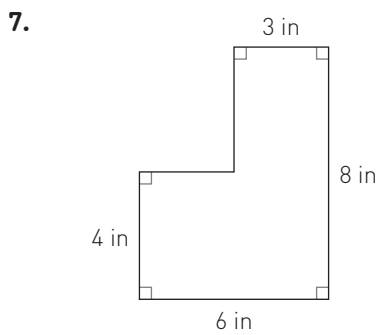
$8\text{ cm} \cdot 5\text{ cm} = 40$ square centimeters, which can also be written as 40 cm^2 . The perimeter is the sum of all four side lengths: $8\text{ cm} + 5\text{ cm} + 8\text{ cm} + 5\text{ cm} = 26\text{ cm}$.

Practice

What are the area and perimeter of each shape? For problems 1 through 3, each figure is made up of squares with a side length of 1 centimeter.



For problems 7 through 9, what is the perimeter of each shape?



Answers

1. area = 15 cm^2 , perimeter = 16 cm
2. area = 12 cm^2 , perimeter = 16 cm
3. area = 12 cm^2 , perimeter = 16 cm
4. area = 12 ft^2 , perimeter = 16 ft
5. area = 99 cm^2 , perimeter = 40 cm
6. area = $3\frac{1}{2} \text{ ft}^2$, perimeter = $7\frac{1}{2} \text{ ft}$
7. 28 in
8. 26 m
9. 29.2 in

Describing and Extending Patterns

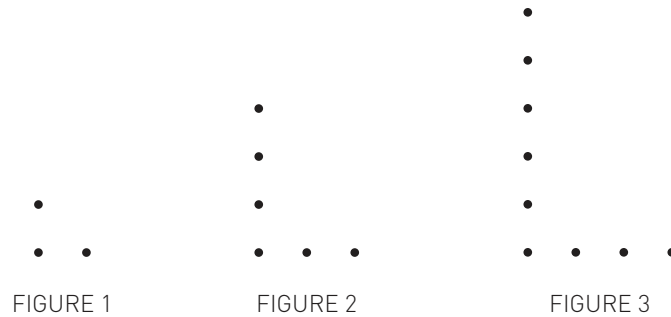
GUIDED SKILL SUPPORT

Overview

Looking for structures and describing patterns is a skill that students will use often in this course. Observations and pattern recognition skills can be used to extend patterns and make predictions. The dot pattern examples shown challenge students to predict the number of dots that will be in a figure that is too large to draw. Later, variables will be used to describe the patterns.

Examples

1. Examine the dot pattern shown. Assume the pattern continues.



- a. Draw Figure 4.

The figure has two parts: a vertical stack and a horizontal string of dots. The number of vertical dots is twice the figure number and the number of horizontal dots is the same as the figure number, not counting the dot in the vertical stack.



FIGURE 4

- b. How many dots will be in Figure 10?

Figure 1 has 3 dots, Figure 2 has 6 dots, and Figure 3 has 9 dots. The number of dots is the figure number multiplied by three.

Figure 10 has 30 dots.

Practice

For each dot pattern, draw the next figure and determine the number of dots in Figure 10.

1.



FIGURE 1



FIGURE 2



FIGURE 3

2.



FIGURE 1



FIGURE 2



FIGURE 3

3.



FIGURE 1



FIGURE 2



FIGURE 3

4.



FIGURE 1



FIGURE 2



FIGURE 3

5.



FIGURE 1



FIGURE 2

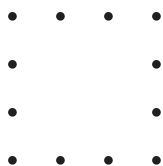


FIGURE 3

6.



FIGURE 1



FIGURE 2

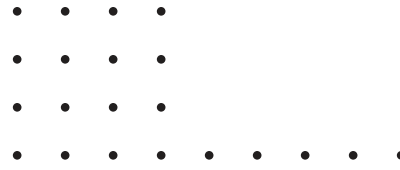


FIGURE 3

Answers

1.

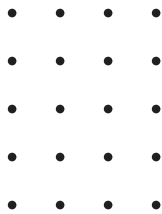


FIGURE 4

50 dots

2.



FIGURE 4

53 dots

3.

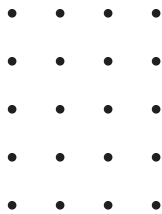


FIGURE 4

110 dots

4.



FIGURE 4

22 dots

5.

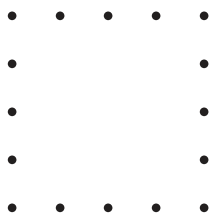


FIGURE 4

40 dots

6.

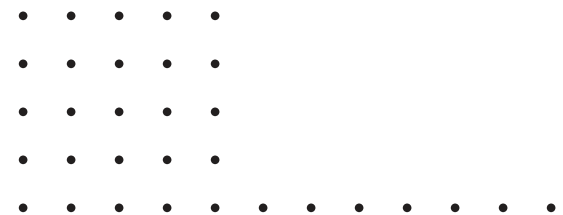


FIGURE 4

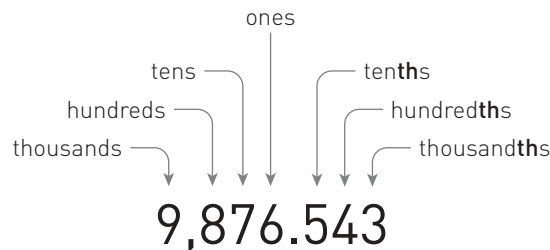
140 dots

Place Value and Rounding

GUIDED SKILL SUPPORT

Overview

Place value is the value of each digit in a number. In our number system, the place values are all powers of ten. The value of a decimal becomes clearer when the place value is spoken or written as the number it names. For example, 0.1 makes more sense if it is read as “one-tenth” rather than “zero point one.”



The number shown is read, “*Nine thousand, eight hundred seventy-six and five hundred forty-three thousandths.*”

Rounding provides an approximation of a number.

To round a whole number:

1. Determine the place to which the number will be rounded.
2. Examine the digit one place to the right of that place.
3. If that digit is 5 or greater, round up (add 1 to the place you are rounding). If that digit is less than 5, do not change the digit in the place you are rounding to.
4. Replace any digits to the right of the place you rounded to with zeros.

To round a decimal number:

1. Determine the place to which the number will be rounded.
2. Examine the digit one place to the right of that place.
3. If that digit is 5 or greater, round up (add 1 to the place you are rounding). If that digit is less than 5, do not change the digit in the place you are rounding to.
4. Remove any digits to the right of the place you rounded to.

For additional examples and practice, see the *Core Connections Course 1* Checkpoint 1 materials.

Examples

1. Round 24,638 to the nearest hundred.

The digit 6 is in the hundreds place. The digit to the right is 3, which is less than 5. Round down, and the answer is 24,600.

2. Round 24,638 to the nearest thousand.

The digit 4 is in the thousands place. The digit to the right is 6, which is greater than 5. Round up, and the answer is 25,000.

3. Round 62.974 to the nearest hundredth.

The digit 7 is in the hundredths place. The digit to the right is 4, which is less than 5. Round down, and the answer is 62.97.

4. Round 62.974 to the nearest tenth.

The digit 9 is in the tenths place. The digit to the right is 7, which is greater than 5. When 0.9 or nine-tenths is rounded up, it becomes 1.0 or ten-tenths. The answer is 63.0. Note that the zero is present to show that this number has been rounded to the nearest tenth.

Practice

Round each number to the place value given.

- | | |
|----------------------------|--------------------------|
| 1. 1,019.041, tenths | 2. 1,019.041, tens |
| 3. 11,632, hundreds | 4. 11,632, ten thousands |
| 5. 4,295, hundreds | 6. 4,295, thousands |
| 7. 5,034.9536, thousandths | 8. 5,034.9536, tens |
| 9. 591.34, tenths | 10. 591.34, ones |
| 11. 83, tens | 12. 835, tens |

Answers

1. 1,019.0

3. 11,600

5. 4,300

7. 5,034.954

9. 591.3

11. 80

2. 1,020

4. 10,000

6. 4,000

8. 5,030

10. 591

12. 840