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Words to Know

Below are words about **measurement** and **data analysis**. Read each word and its meaning. Knowing what these words mean will help you solve measurement and data analysis problems.

Favorable Outcome	A favorable outcome is an outcome that is wanted.
Formula	A formula is an equation that explains a math rule.
Line Graph	A line graph uses a line to show changes over time.
Mode	The mode of a set of numbers is the number that occurs most.
Ordered Pair	An ordered pair is a set of two numbers that shows where a point is on a coordinate grid.
Median	The median of a set of numbers is the middle number.
Origin	The origin on a grid is usually in the lower left-hand corner. It is the zero point for the horizontal and vertical scales.
Outcome	Something that happens is an outcome.
Probability	Probability is how likely an outcome is to happen.
Range	The range of a set of numbers is the difference between the greatest and least numbers.
Rectangular Prism	A rectangular prism is a solid figure like a box where all 6 faces are rectangles.
Scale	The scale of a scale drawing relates the size of the drawing to the size of the actual object.
Scale Drawing	A scale drawing is a drawing of an object that is the same shape but usually a smaller size.
Solid	A solid is a figure that has a length, a width, and a height.
Tree Diagram	A tree diagram has branches to show possible outcomes.
Volume	Volume is the measure of the space inside a solid figure. Volume is measured in square units.

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Unit 5

Measurement and Data Analysis

What is happening in this picture? What kinds of things do you sometimes measure and write down in science class?

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Partner Work

Make a list of things that you measure and numbers you record. Think of things at school, at home, and at play.

_____

_____

_____

Hands On

Lesson 4

Scale Drawings

The drawing in Step 1 shows Maria's garden. Use a centimeter ruler to measure the sides of the garden to the nearest centimeter. Then find the length and width for the actual garden.

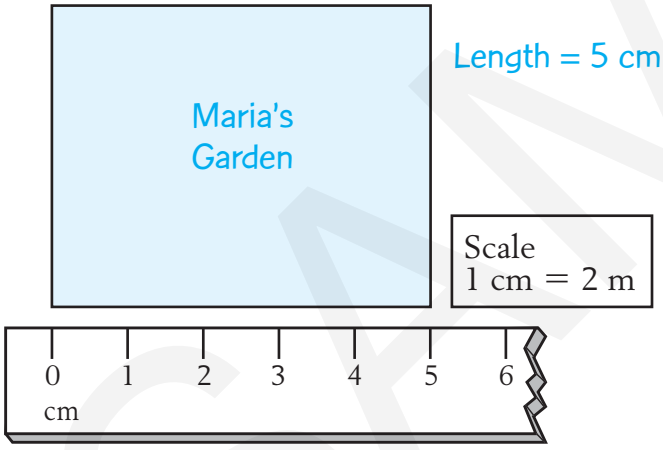
Stop & Think

The drawing of Maria's garden is a scale drawing. A **scale drawing** is the same shape as the actual object. The **scale** shows how the drawing's size is related to the actual object. This scale tells you that 1 cm on the drawing equals _____ meters in the garden. The measurements of the garden drawing are in centimeters. The measurements of the actual garden are in meters.

Solve the Problem

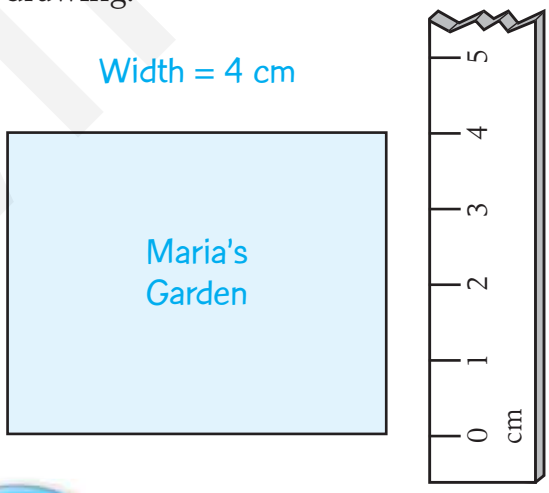
Step 1

Measure the length of the garden in the drawing with a centimeter ruler.



Step 2

Measure the width of the garden in the drawing.



Step 3

The key says that 1 cm in the drawing equals 2 meters in the actual garden. The length of the garden in the drawing is 5 cm. To find the actual length, multiply.
$5 \times 2 = 10$
The length of the actual garden is 10 m.

Step 4

The width of the garden in the drawing is 4 cm. To find the actual width, multiply.
$4 \times 2 = 8$
The width of the actual garden is 8 m.

Read **Stop & Think** again. Make sure the answers in Steps 3 and 4 are in the correct units.

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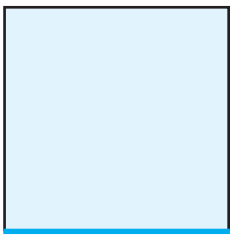
Skill Check

Use a centimeter ruler to measure each scale drawing. Then find the length on the actual object.

1. This is a scale drawing of the playground at a park. The playground is in the shape of a square. Find the length of the side in green.



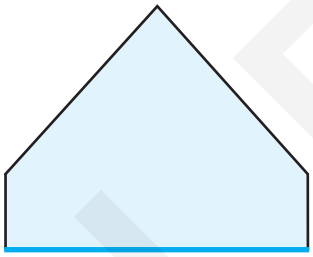
Scale
1 cm = 5 m

One side = _____.

In this drawing, 1 cm = _____.

The length of one side of the playground is _____.

2. This is a scale drawing of a summer cabin. What is the width of the side of the cabin shown in green?



Scale
1 cm = 4 m

Width = _____.

In this drawing, 1 cm = _____.

The width of the cabin is _____.

Skill Practice

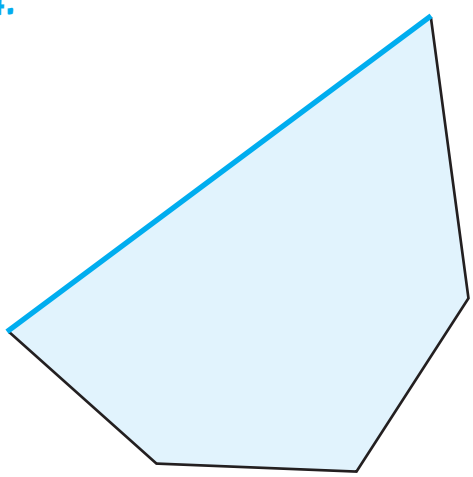
Use a centimeter ruler to measure the green side of each scale drawing. Then find the length on the actual object.

3.

Scale
1 cm = 10 m

Length = _____

4.



Scale
1 cm = 6 m

Length = _____

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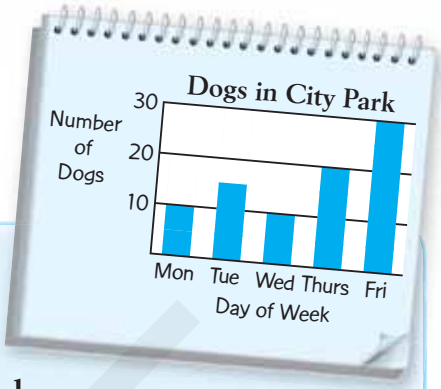
Lesson 7

Finding Median, Mode, and Range



Elena counted the number of dogs she saw in the park each day for a week. She put the data into this bar graph. Find the median, mode, and range of the data shown on this graph.

Stop & Think

The **median** of a set of numbers tells you the number in the middle. The **mode** is the number that occurs most often in a set of numbers. The **range** is the difference between the largest and smallest number. You have to read the graph to find the median, mode, and range.

Solve the Problem

Step 1 Read the graph. It shows the number of dogs Elena saw in the park each day. You can make a list of these numbers.

Monday 10
Tuesday 15
Wednesday 10
Thursday 20
Friday 30

Step 2 Next, put these numbers in order from least to greatest.

10, 10, 15, 20, 30

Step 3 The median is the number in the middle of the list. Look at the numbers. 15 is in the middle. So, 15 is the median.

Middle number

10, 10, 15, 20, 30

Step 4 The mode is a number that occurs most often. There can be more than one mode, or no mode. Look at the list again. Is there a number that is listed more than once? Yes. 10 is listed two times. So, 10 is the mode.

10 occurs two times

10, 10, 15, 20, 30

Step 5 The range is the difference between the largest and smallest numbers in the list. Find the largest and smallest numbers. Then subtract the smallest from the largest. The range is 20.

smallest largest

10, 10, 15, 20, 30

30 − 10 = 20

Step 6 Look back at the median, mode, and range you found. Make sure you picked the right numbers from the list.

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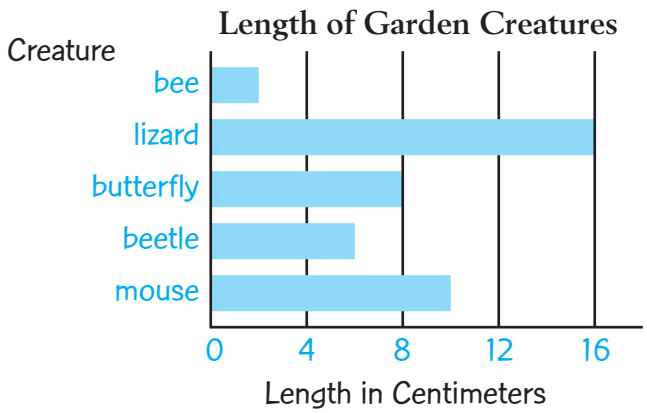
Skill Check

Use the data in the graph to find the median, mode, and range.



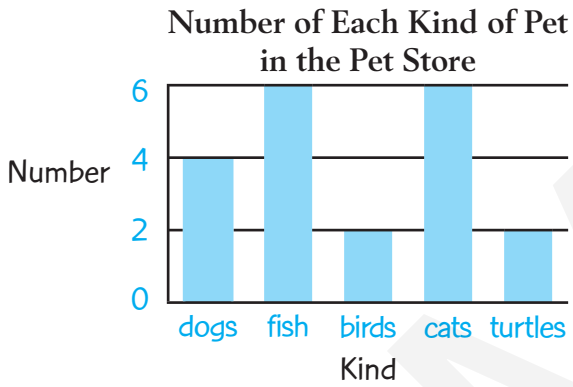
1. Order the data from least to greatest.

   _____

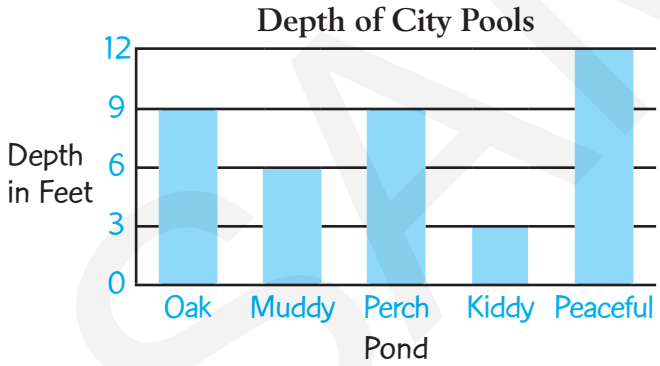
2. What is the median? _____
3. There is _____ mode for these numbers.
4. What is the range? _____

Skill Practice

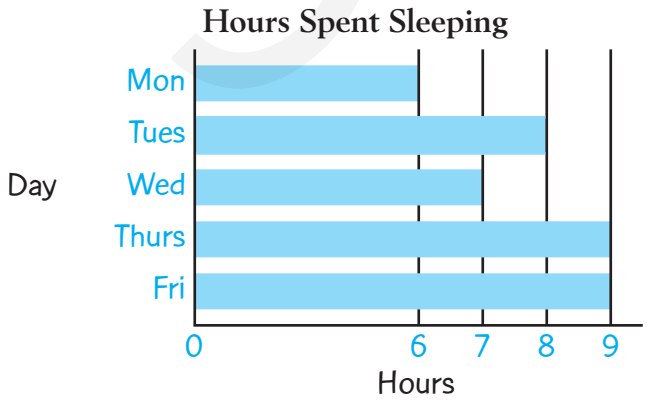
Use the data in the graph to find the median, mode, and range.



5. The median is _____.
6. There are two modes: _____ and _____.
7. The range is _____.



8. The median is _____.
9. The mode is _____.
10. The range is _____.



11. The median is _____.
12. The mode is _____.
13. The range is _____.

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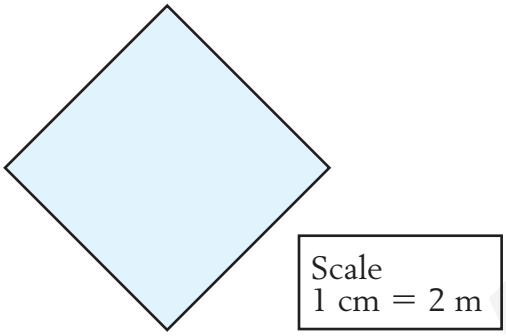
Unit 5 Review

Skill Practice

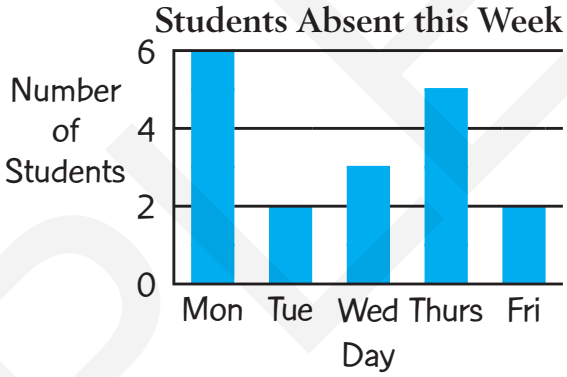
Answer each question about measurement or data.

1. This scale drawing shows a design to be painted on a wall. Measure the drawing to the nearest centimeter. Then find the length of one side of the actual design.



The side length of the actual design is _____.

2. Find the median, mode, and range of the data shown on this graph.

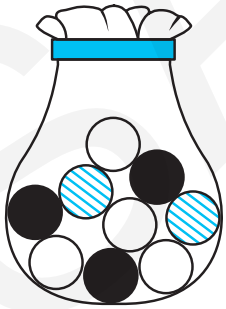


The median is _____.

The mode is _____.

The range is _____.

You choose a marble from this bag without looking.



3. What is the probability of choosing a marble that is NOT black? _____

4. What is the probability of choosing a white marble? _____

5. The probability of choosing a gray marble is _____

6. The probability of choosing a marble that is black or white or striped is _____

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Solve each problem. Circle the letter for the correct answer.

7. A table is 3 yards wide. How many inches is this? 1 yd = 36 inches.

A 9 in. **C** 36 in.

B 12 in. **D** 108 in.

8. Lily's freezer is 2 feet long, 3 feet tall, and 2 feet deep. What is the volume of the freezer?

A 6 cubic ft **C** 12 cubic ft

B 7 cubic ft **D** 144 cubic ft

9. Jill buys 10 quarts of milk. How many cups does she buy? 1 qt = 4 cups.

A 5 cups **C** 20 cups

B 10 cups **D** 40 cups

10. Yoli needs 144 inches of rope. How many yards is this? 1 yd = 36 inches.

A 4 yards **C** 12 yards

B 10 yards **D** 432 yards

Solve each problem. Write your answer in a complete sentence.

Use this table to answer Problems 11—12.

Birds Counted Each Hour

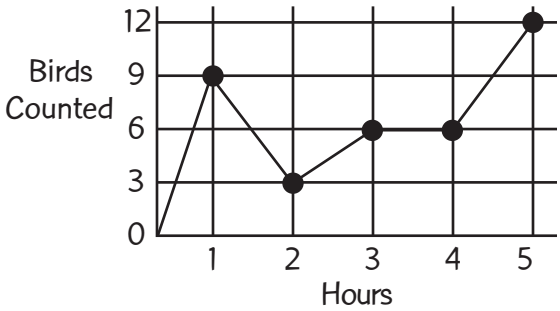
Hour	Birds Counted
1 PM	9
2 PM	3
3 PM	6
4 PM	6
5 PM	12

11. What is the mode of the data in the table?

12. What is the median of the data in the table?

Use this graph to answer Problems 13–14.

Birds Counted Each Hour



13. Which ordered pair names the point showing the birds counted at 3 pm?

14. What time is shown by the ordered pair (2, 3)?

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Shape Up!

Purpose:

Players draw figures on coordinate grids based on sets of ordered pairs. Points are awarded for correctly drawing and naming figures. The player with the most points wins.

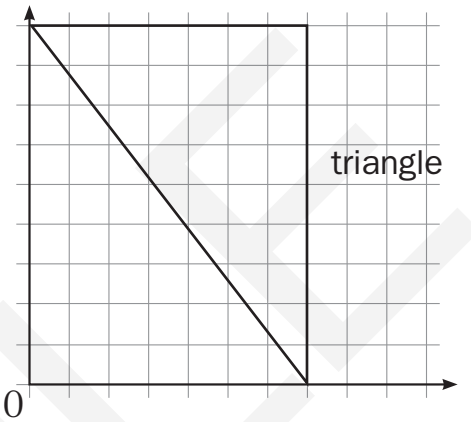
What you need:

grid paper for each player
cut-out cards on the next page

What you do:

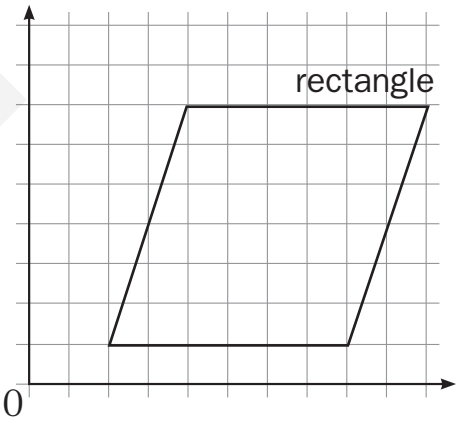
- Cut out the cards and mix them up. Place the cards in a deck facedown on a table or desk top.
- One player takes the top card and reads the ordered pairs to the other players.
- Players plot the ordered pairs and join the points to make a figure.
- Players then name the figures they have drawn. These examples show some correct and some incorrect responses.
- Each player wins one point for a correctly drawn figure and a second point for giving the correct name.
- Used cards are put on a discard pile. The game is over when all the cards in the deck have been used. The player with the most points wins.

(0, 10), (0, 7), (7, 10), (3, 10)



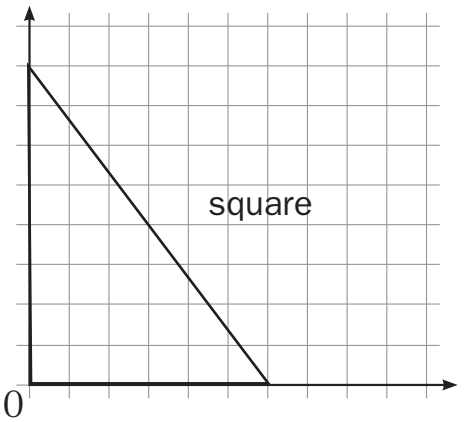
(incorrect drawing, correct name)

(2, 1), (4, 7), (10, 7), (8, 1)



(correct drawing, incorrect name)

(8, 0), (6, 1), (4, 2), (0, 4)



(incorrect drawing, incorrect name)

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Cut out the cards for *Shape Up!*

(3, 4) (3, 8) (7, 4) (7, 8)	(2, 3) (8, 3) (5, 8) (5, 3)	(2, 1) (3, 3) (4, 5) (6, 9)	(0, 6) (5, 3) (5, 5) (5, 9)	(2, 1) (4, 5) (10, 5) (8, 1)
(2, 2) (2, 8) (8, 2) (8, 8)	(0, 5) (2, 4) (4, 3) (8, 1)	(6, 6) (6, 3) (6, 1) (6, 0)	(2, 3) (2, 7) (6, 3) (2, 6)	(0, 2) (3, 6) (8, 7) (5, 3)
(5, 8) (2, 5) (5, 2) (8, 5)	(0, 6) (4, 2) (8, 6) (4, 10)	(1, 3) (1, 7) (1, 9) (1, 10)	(5, 8) (5, 4) (9, 8) (6, 8)	(4, 5) (10, 5) (6, 0) (0, 0)
(2, 2) (2, 4) (7, 4) (7, 2)	(6, 6) (7, 5) (6, 4) (5, 5)	(1, 9) (1, 5) (3, 5) (3, 9)	(1, 2) (3, 4) (5, 6) (7, 8)	(4, 3) (4, 7) (6, 3) (5, 3)
(0, 0) (0, 3) (4, 3) (4, 0)	(10, 10) (7, 10) (7, 7) (10, 7)	(2, 8) (6, 8) (6, 0) (2, 0)	(1, 9) (2, 7) (3, 5) (4, 3)	(0, 5) (0, 10) (5, 10) (10, 10)

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