LESSON 11·1 Estimating Weights in Grams and Kilograms

A nickel weighs about 5 grams (5 g).
A liter of water weighs about 1 kilogram (1 kg).

In Problems 1–7, circle a possible weight for each object.

1. A dog might weigh about

20 kg   200 kg   2,000 kg

2. A can of soup might weigh about

4 g   40 g   400 g

3. A newborn baby might weigh about

3 kg   30 kg   300 kg

4. An adult ostrich might weigh about

1.5 kg   15 kg   150 kg

5. A basketball might weigh about

0.6 kg   6 kg   60 kg

6. The weight limit in an elevator might be about

100 kg   1,000 kg   10,000 kg

7. A pencil might weigh about

4.5 g   45 g   450 g

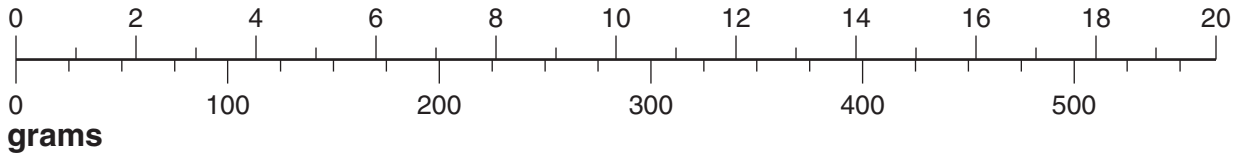**8.** Choose one of the problems above. Explain why you chose your answer.

_____

_____

LESSON 11·1

Metric and Customary Weight

The number line below has ounces on the top and grams on the bottom.
It shows, for example, that 7 ounces are about equal to 200 grams.

ounces

```
0    2    4    6    8   10   12   14   16   18   20
|----|----|----|----|----|----|----|----|----|----|
0        100       200       300       400       500
```

grams

Use the number line to give the approximate weight of each object in grams.
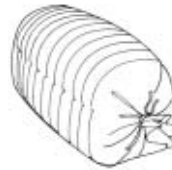
1.   PRETZELS

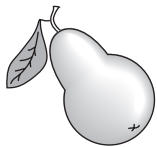15 ounces

About _____ grams

2.

16 ounces

About _____ grams

3.

8 ounces

About _____ grams

4.   CANDY BAR

2.3 ounces

About _____ grams

Use the number line to give the approximate weight of each object in ounces.

5.

100 grams

About _____ ounces
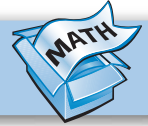
6.

500 grams

About _____ ounces
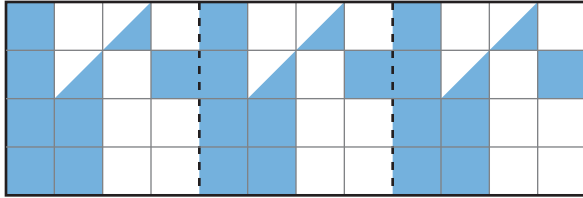
7.

140 grams

About _____ ounces

8.   PASTA

454 grams

About _____ ounces

LESSON 11·1

Math Boxes

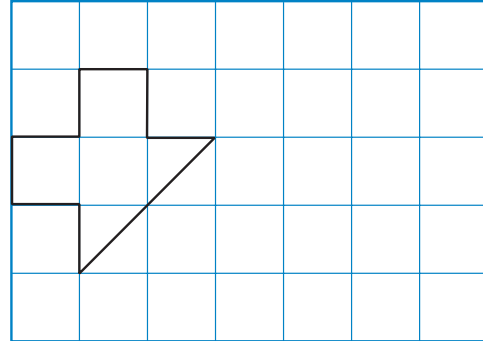**1. a.** Explain how you know that the pattern below is an example of a translation.

_____

_____

_____

b. Draw the figure after it is translated to the right.

SRB 107

---

2. Find the solution of each open sentence.

a. $\frac{6}{7} - y = \frac{4}{7}$　　　$y =$ _____

b. $\frac{3}{10} + a = \frac{9}{10}$　　　$a =$ _____

c. $\frac{3}{5} - r = \frac{1}{10}$　　　$r =$ _____

d. $\frac{3}{4} + m = \frac{7}{8}$　　　$m =$ _____

SRB 55 148

---

3. Circle the numbers that are multiples of 6. Put an X through the numbers that are multiples of 5.

38

84

150

198

540

3,500

SRB 9

---

4. Insert parentheses to make each number sentence true.

a. $14 * 18 - 15 = 42$

b. $13 - 6 * 5 = 56 - 21$

c. $48 / 6 + 2 = 10 - 4$

d. $150 / 10 + 5 < 4 * 4$

SRB 150

---

5. If you use an average of 7 sheets of paper per day, about how many sheets would you use in

a. 1 week?　_____ sheets

b. 4 weeks?　_____ sheets

**c.** 52 weeks? _____ sheets

d. 2 years?　_____ sheets

SRB 47

LESSON 11·2 **Geometric Solids**

Geometric shapes like these 3-dimensional ones are also called **geometric solids.**

SRB
101 102

| Rectangular Prism | Cylinder | Triangular Prism | Cone | Sphere | Square Pyramid |

Look around the classroom. Try to find examples of the geometric solids pictured above. Draw a picture of each. Then write its name (for example: book).

Example of rectangular prism:	Example of cylinder:	Example of triangular prism:
Name of object:	Name of object:	Name of object:
_____	_____	_____
Example of cone:	Example of sphere:	Example of square pyramid:
Name of object:	Name of object:	Name of object:
_____	_____	_____

LESSON 11·2 Modeling a Rectangular Prism

After you construct a rectangular prism
with straws and twist-ties, answer
the questions below.

vertices

edges
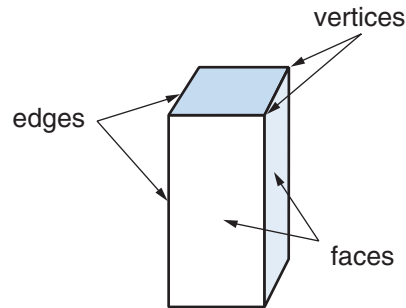
faces

1. How many faces does your rectangular prism have? _____ face(s)

2. How many of these faces are formed by rectangles? _____ face(s)

3. How many of these faces are formed by squares? _____ face(s)

4. Pick one of the faces. How many other faces are parallel to it? _____ face(s)

5. How many edges does your rectangular prism have? _____ edge(s)

6. Pick an edge. How many other edges are parallel to it? _____ edge(s)

7. How many vertices does your rectangular prism have? _____ vertices

8. Write T (true) or F (false) for each of the following statements about the rectangular prism
you made. Then write one true statement and one false statement of your own.

a. _____ It has no curved surfaces.

b. _____ All of the edges are parallel.

c. _____ All of the faces are polygons.

d. _____ All of the faces are congruent.

e. True _____

f. False _____

LESSON 11·2

Making a 1-Ounce Weight

SRB 140

1. Estimate how many of each coin you think it will take to make a 1-ounce weight. Then use a balance or scale to determine exactly how many of each coin are needed.

Coin	Estimated Number of Coins	Actual Number of Coins
penny		
nickel		
dime		
quarter		

2. Describe how you estimated how many of each coin it might take to make a 1-ounce weight.

_____

_____

_____

_____

_____

_____

_____

Try This

3. About what fraction of an ounce does each coin weigh?

1 penny = _____ oz   1 nickel = _____ oz   1 dime = _____ oz   1 quarter = _____ oz

Explain how you found your answers.

_____

_____

_____
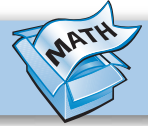
1. The object below has the shape of a geometric solid. What is the name of the solid? Circle the best answer.

    A. rectangular prism

    B. cone

    C. cylinder

    D. square pyramid

SRB 101 102
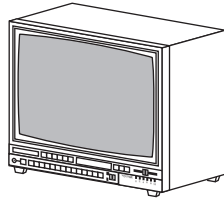
2. Draw the figure after it is rotated clockwise $\frac{1}{4}$-turn.

SRB 106 107
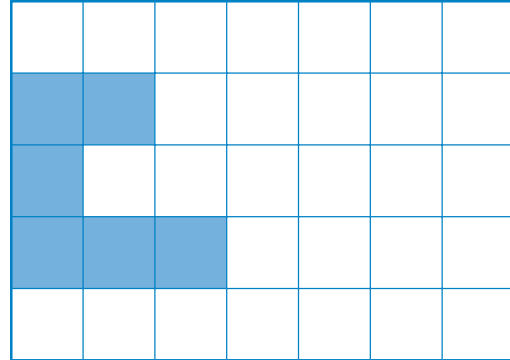
3. Write a number model to estimate the answer. Then correctly place the decimal point.

    a. $0.97 * 4 = 3\ 8\ 8$

    Number model: _____

    b. $1\ 8\ 7 = 74.8 \div 4$

    Number model: _____

4. Insert $<$, $>$, or $=$ to make a true number sentence.

    a. -12 _____ -19

    b. -44 _____ 26

    c. -64 _____ -0.43

    d. $-\frac{1}{2}$ _____ $-\frac{4}{8}$

    e. -0.28 _____ -0.37

SRB 6 60

5. Round each number to the nearest tenth.

    a. 2.34 _____

    b. 0.68 _____

    c. 14.35 _____

    d. 1.62 _____

    e. 5.99 _____

SRB 182 183

6. A cinnamon raisin bagel has about 230 calories. How many calories are in one dozen bagels?

About _____ calories

SRB 47

LESSON 11·3 Construction of Polyhedrons

SRB 102

Polyhedrons are geometric solids with flat surfaces formed by polygons.

For each problem below—

◆ Decide what the polyhedron should look like.

◆ Use straws and twist-ties to model the polyhedron.

◆ Answer the questions about the polyhedron.

Look at page 102 of the *Student Reference Book* if you need help with the name.

1. I am a polyhedron.
I have 5 faces.
Four of my faces are formed by triangles.
One of my faces is a square.

a. After you make me, draw a picture of me in the space to the right.

b. What am I? _____

c. How many corners (vertices) do I have? _____

d. What shape is my base? _____

2. I am a polyhedron.
I have 4 faces.
All of my faces are formed by equilateral triangles.
All of my faces are the same size.

a. After you make me, draw a picture of me in the space to the right.

b. What am I? _____

c. How many corners (vertices) do I have? _____

d. What shape is my base? _____

LESSON 11·3 Drawing a Cube

Knowing how to draw is a useful skill in mathematics. Here are a few ways to draw a cube. Try each way. Tape your best work at the bottom of page 295.

A Basic Cube

Draw a square.

Draw another square that overlaps your first square.
The second square should be the same size as the first.
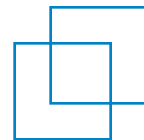
Connect the corners of your 2 squares as shown.
This picture does not look much like a real cube. One problem
is that the picture shows all 12 edges, even though not all the
edges of a real cube can be seen at one time. Another problem is
that it is hard to tell which face of the cube is in front.
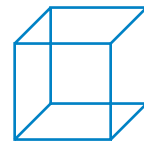
A Better Cube

Begin with a square.

Next, draw 3 parallel line segments going right and up from
3 corners of your square. The segments should all be the
same length.
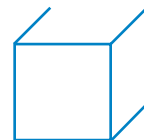
Finally, connect the ends of the 3 line segments.
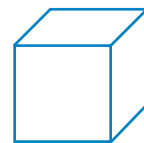
This cube is better than before, but it shows only the edges
and corners, not the faces. If you want, try shading your cube
to make it look more realistic.
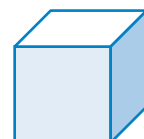
LESSON 11·3 **Drawing a Cube** *continued*

A Cube with Hidden Edges

Sometimes people draw cubes and other shapes with dashed line segments.
The dashed line segments show edges that are hidden. Here is one way to draw
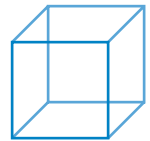a cube with hidden edges. Use a pencil.

Draw a square.

Draw a faint square that overlaps your first square.
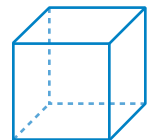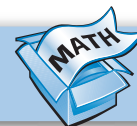The second square should be the same size as the first.
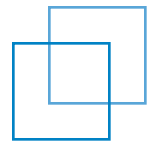
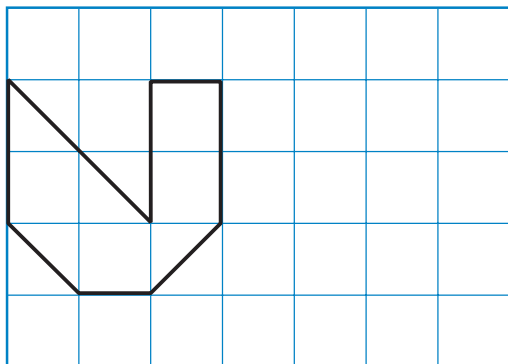Connect the corners of your 2 squares with faint line segments.

Trace over 5 of your faint line segments with solid lines
and 3 with dashed lines. The dashed line segments show the
3 edges that are hidden.

Tape your best work here.

LESSON 11·3   **Math Boxes**

---

1. Draw the figure after it is translated to the right.

SRB 107

2. Find the solution of each open sentence.

a. $\frac{7}{8} - s = \frac{1}{8}$ $s =$ _____

b. $t + \frac{1}{4} = \frac{1}{2}$ $t =$ _____

c. $\frac{3}{10} - m = \frac{1}{5}$ $m =$ _____

d. $\frac{2}{8} + x = \frac{3}{4}$ $x =$ _____

SRB 55 148

---

3. Name the first ten multiples of each number.

a. 6 _____, _____, _____, _____, _____, _____, _____, _____, _____

b. 86 _____, _____, _____, _____, _____, _____, _____, _____, _____

SRB 9

---

4. Insert parentheses to make each number sentence true.

a. $98.3 + 1.7 * 2.5 = 250$

b. $21.7 / 3 + 4 = 3.1$

c. $56.3 + 3.7 * 3 > 5 * 30$

d. $13.8 - 8.3 = 26.15 - 23.4 * 2$

SRB 150

5. Gum costs $0.80 per pack. What is the cost of

a. 4 packs of gum?   _____

b. 10 packs of gum?   _____

c. 16 packs of gum?   _____

d. 33 packs of gum?   _____
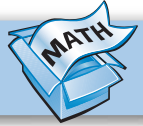
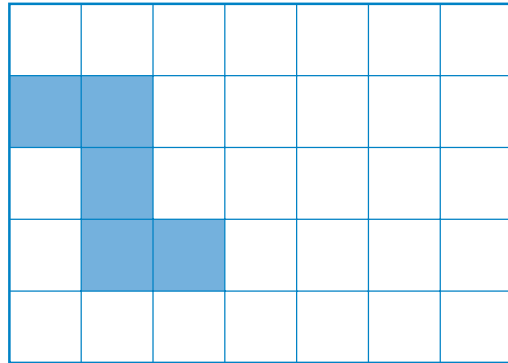**LESSON 11·4   Math Boxes**

1. The object below has the shape of a geometric solid. Name the solid.

_____

SRB
101

2. Draw the figure after it is rotated counterclockwise $\frac{1}{4}$-turn.

SRB
106 107

3. Write a number model to estimate the answer. Then correctly place the decimal point.

a. $7.56 * 4 = 3\ 0\ 2\ 4$

Number model: _____

b. $563.2 \div 4 = 1\ 4\ 0\ 8$

Number model: _____

4. Insert $<$, $>$, or $=$ to make a true number sentence.

a. -14 _____ -6

b. -123 _____ -241

c. -8.9 _____ -5.7

d. $-\frac{1}{4}$ _____ $-\frac{2}{5}$

e. $-\frac{3}{9}$ _____ $-\frac{1}{3}$

SRB
6   60

5. Round each number to the nearest tenth.

a. 3.46   _____

b. 0.71   _____

c. 4.35   _____

d. 9.60   _____

e. 22.89   _____

SRB
182 183

6. Jake can ride his bike 5 miles in 40 minutes. At this rate, how long does it take him to ride 1 mile? Circle the best answer.

A. 200 minutes

B. 40 minutes

C. 20 minutes
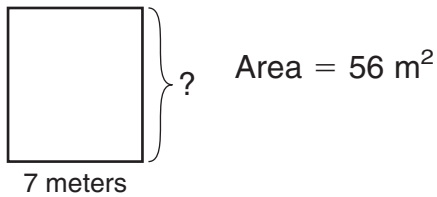
D. 8 minutes

LESSON 11·5

Area of a Rectangle

SRB 134

1. Write a formula for the area of a rectangle. In your formula, use *A* for area. Use *l* and *w* for length and width, or *b* and *h* for base and height.

   _____

2. Draw a rectangle with sides measuring 3 centimeters and 9 centimeters. Find the area.

   Number model: _____   Area = _____ square centimeters
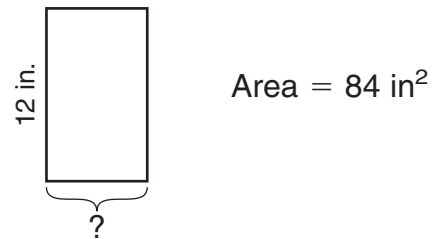
3. Find the height of the rectangle.

   ? Area = 56 m²

   7 meters

   Number model: _____

   height = _____ m

4. Find the length of the base of the rectangle.

   12 in.   Area = 84 in²

   ?

   Number model: _____

   length of base = _____ in.

Try This

5. Find the area of the rectangle.

   5 cm

   11.3 cm
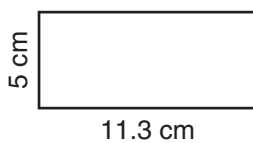
   Number model: _____

   Area = _____ cm²

6. Find the height of the rectangle.

   ? Area = 403 cm²

   26 cm
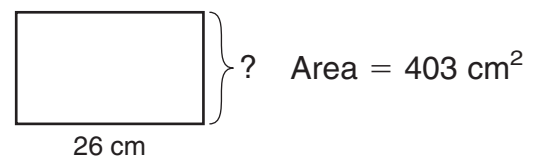
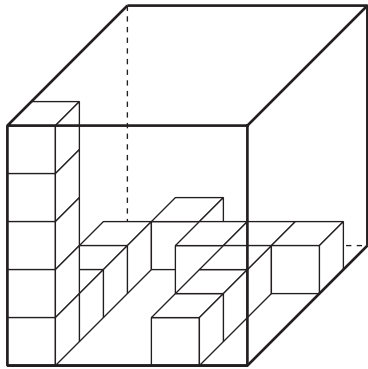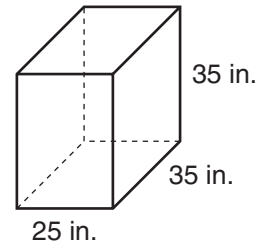   Number model: _____

   height = _____ cm
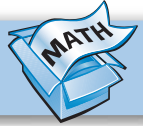
LESSON 11·5 Math Boxes

1. What is the total number of cubes needed to completely fill the box?

_____ cubes

SRB 138

2. Calculate the volume.

35 in.

35 in.

25 in.

Number model: _____

Volume = _____ in³

SRB 138

3. When you roll a 6-sided die, about what fraction of the time would you expect

a. a multiple of 2 to come up? _____

b. a factor of 20 to come up? _____

SRB 81

4. Complete.

a. 13 ft = _____ yd _____ ft

b. 18 ft 6 in. = _____ yd _____ in.

c. 972 in. = _____ yd

d. 15,840 ft = _____ mi

e. 24,640 yd = _____ mi

SRB 129

5. Add.

a. $-54 + 28 =$ _____

b. $-62 + (-15) =$ _____

c. _____ $= 51 + (-139)$

d. _____ $= -\$23.56 + \$87.45$

e. $\$71.08 + (-\$85.79) =$ _____

6. If 4 shirts cost $76, what is the cost of

a. 2 shirts? _____

b. 6 shirts? _____

c. 1 dozen shirts? _____

d. 75 shirts? _____

SRB 47

299

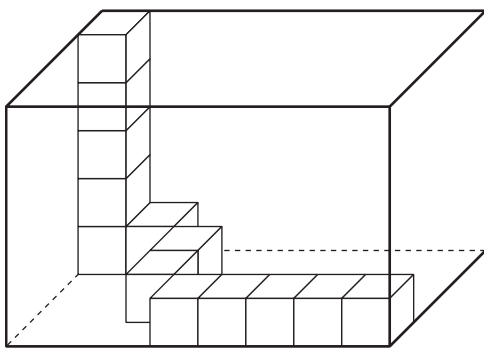## LESSON 11·5   Cube-Stacking Problems

Each picture at the bottom of this page and on the next page shows a box that is partially filled with cubes. The cubes in each box are the same size. Each box has at least one stack of cubes that goes to the top.

Your task is to find the total number of cubes needed to completely fill each box.

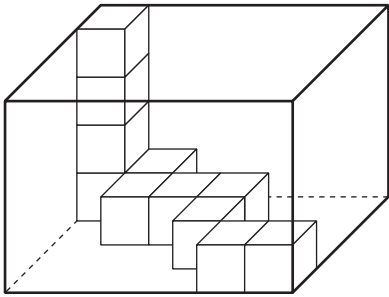Record your answers in the table below.

Table of Volumes						
Placement of Cubes	**Box 1**	**Box 2**	**Box 3**	**Box 4**	**Box 5**	**Box 6**
Number of cubes needed to cover the bottom						
Number of cubes in the tallest stack (Be sure to count the bottom cube.)						
Total number of cubes needed to fill the box						

Box 1

Box 2

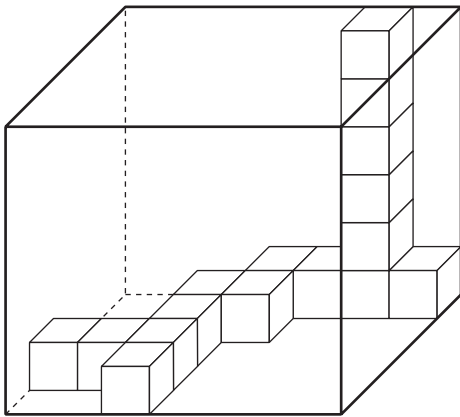# Cube-Stacking Problems *continued*
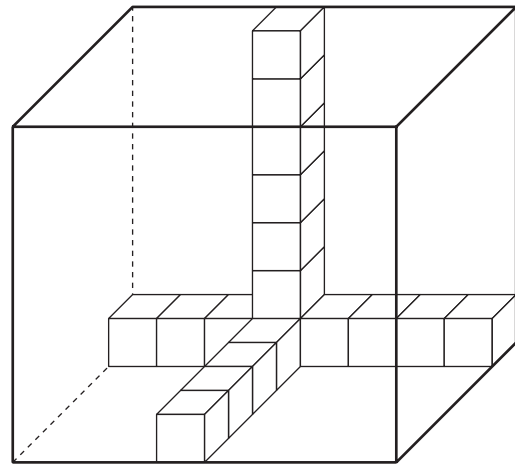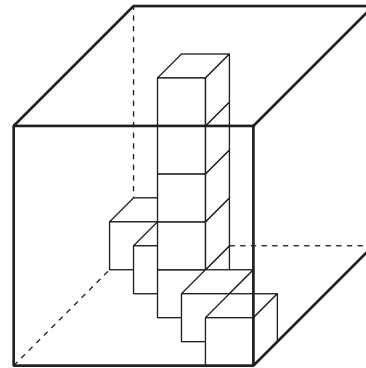
Box 3
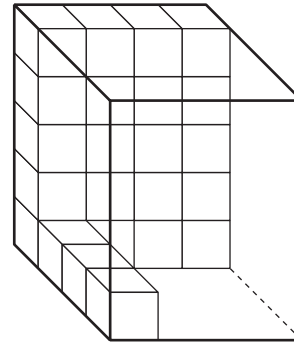
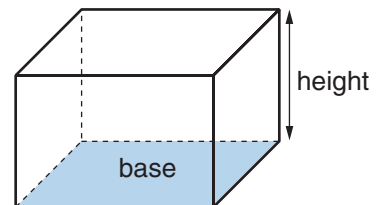**Box 4**

Box 5

Box 6

Formula for the volume of a rectangular prism:

_____

B is the **area** of a base.

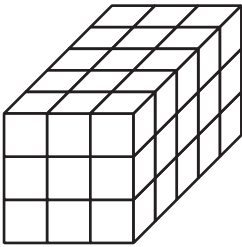*h* is the height from that base.

Volume units are cubic units.

height

base

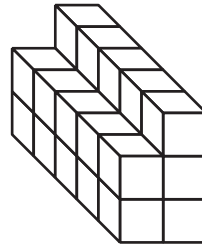**LESSON 11·5**   **Cube-Stacking Problems** *continued*
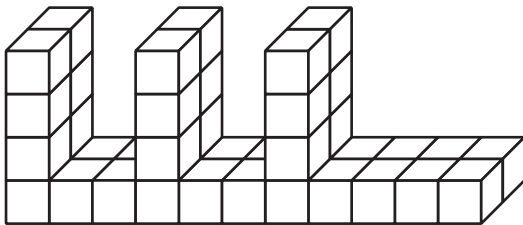
SRB
138

Find the volume of each stack of centimeter cubes.
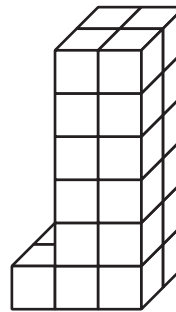
1.

Volume = _____ cm^3

2.

Volume = _____ cm^3

3.

Volume = _____ cm^3

4.

Volume = _____ cm^3

5. Choose one of the problems from above. Describe the strategy that you used to find the volume of the stack of centimeter cubes.
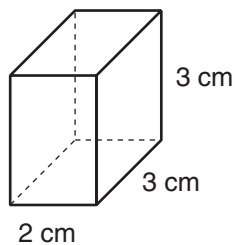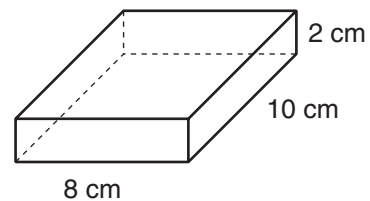
_____

_____

_____

Try This

6.

3 cm

3 cm

2 cm

Number model: _____

Volume = _____ cm^3

7.

2 cm

10 cm

8 cm

Number model: _____

Volume = _____ cm^3

LESSON 11·6

Gram and Ounce Museum

SRB
140

1. a. What was the heaviest item in the class Gram and Ounce Museum? _____

    b. How much did it weigh? _____ grams   _____ ounces

2. a. What was the lightest item in the class Gram and Ounce Museum? _____

    b. How much did it weigh? _____ grams   _____ ounces

Complete.

3. 6 g = _____ mg

4. _____ g = 7,000 mg

5. 3 kg = _____ g

6. _____ kg = 8,000 g

7. 2.9 g = _____ mg

8. _____ kg = 4,500 g

9. 6 lb = _____ oz

10. _____ lb = 144 oz

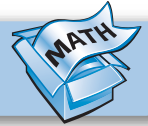**11.** 3.5 lb = _____ oz

12. 8 T = _____ lb

Use the Rules of Thumb below to solve Problems 13–15. Write number models to show how you estimated.

> **Rules of Thumb**
>
> 1 kilogram equals about 2.2 pounds
> 1 ounce equals about 30 grams

13. A video camera weighs about 120 grams. About how many ounces is that?

    Number model: _____ _____ oz

14. A baby weighs about 3.5 kilograms at birth. About how many pounds is that?

    Number model: _____ _____ lb

15. An African elephant weighs 11,023 pounds. About how many kilograms is that?

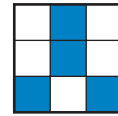   Number model: _____ _____ kg

LESSON 11·6   **Math Boxes**

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1. The object below has the shape of a geometric solid. Name the solid.
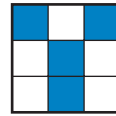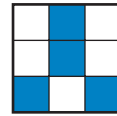
_____

SRB 101
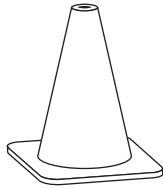
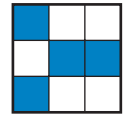**2.** Which figure below shows the original figure rotated clockwise $\frac{1}{2}$-turn?

_____

Original   A   B   C

SRB 106 107

---

3. Write a number model to estimate the answer. Then correctly place the decimal point.

a. 6 * 32.9 = 1 9 7 4

Number model: _____

b. 3 2 9 = 98.7 ÷ 3

Number model: _____

4. Insert $<$, $>$, or $=$ to make a true number sentence.

a. -34 _____ -9

b. -89 _____ -99

c. -2.99 _____ -2.9

d. $-\frac{1}{4}$ _____ $-\frac{1}{3}$

e. $-\frac{18}{9}$ _____ $-2\frac{1}{4}$

SRB 6 60

---

5. Round 8.99 to the nearest tenth. Circle the best answer.

A. 8.0

B. 9.0

C. 9.1

D. 8.09

SRB 182 183

6. It takes 2 cups of flour to make about 20 medium-size peanut butter cookies. How many cups of flour will you need to make about

a. 40 cookies? _____ cups

b. 60 cookies? _____ cups

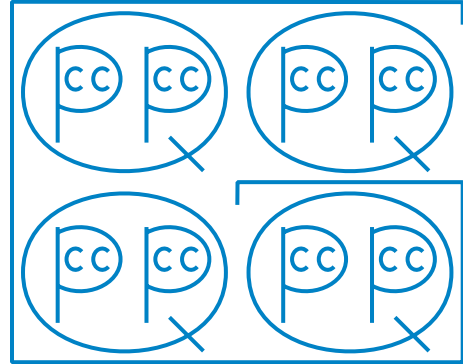**c.** 50 cookies? _____ cups

d. 740 cookies? _____ cups

SRB 47

LESSON 11·7 Converting Measurements

SRB 137

Math Message

1 pint = _____ cups

1 quart = _____ pints

1 half-gallon = _____ quarts

1 gallon = _____ quarts

Think: How can the picture above help you remember how many cups are in a pint, how many pints are in a quart, and how many quarts are in a gallon?

Rice Consumption

1. Round your answer to the nearest ounce.

   One cup of dry (uncooked) rice weighs about _____ ounces.

2. Use the answer in Problem 1 to complete the following:

   a. 1 pint of rice weighs about _____ ounces.

   b. 1 quart of rice weighs about _____ ounces.

   c. 1 gallon of rice weighs about _____ ounces.

   d. 1 gallon of rice weighs about _____ pounds. (1 pound = 16 ounces)

3. On average, a family of 4 in Bangladesh eats about 170 pounds of rice per month.

   a. That is about how many pounds per year? _____ pounds

   b. How many gallons? _____ gallons

4. On average, a family of 4 in the United States eats about 120 pounds of rice per year. That is about how many gallons per year? _____ gallons

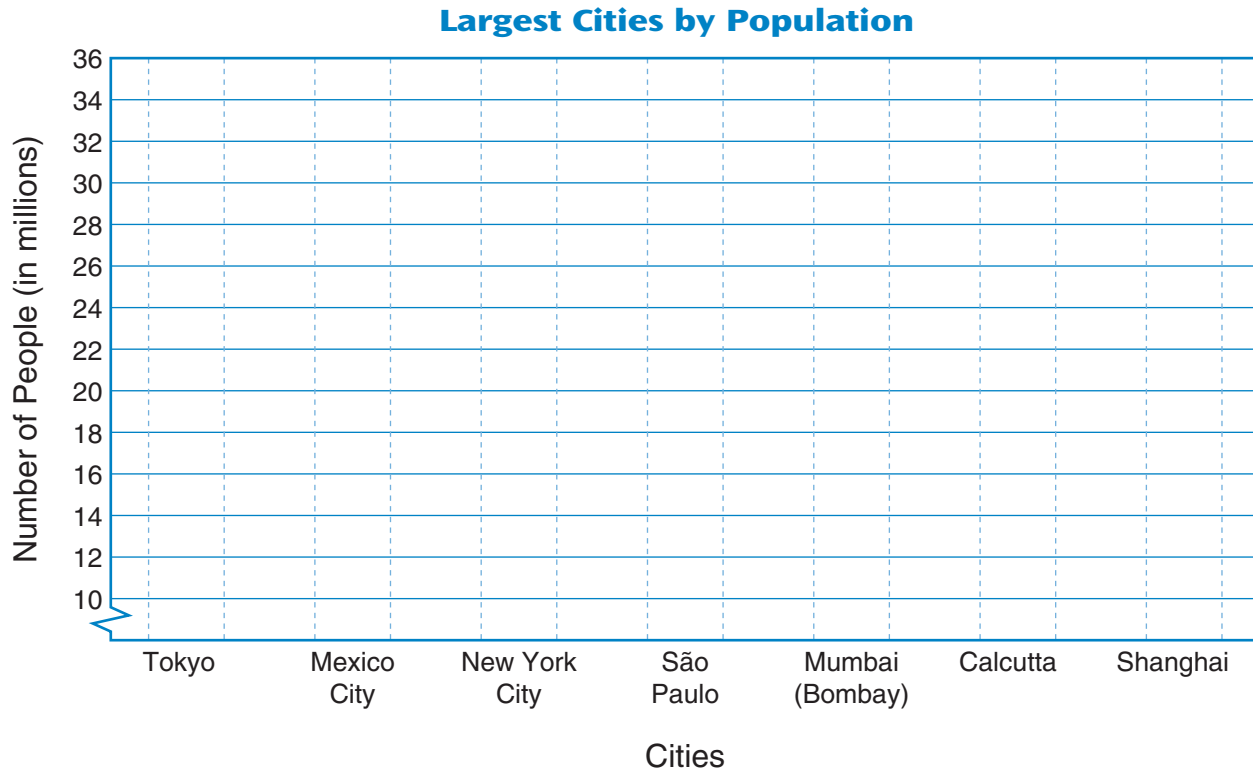5. On average, a family of 4 in Thailand eats about $3\frac{1}{2}$ gallons of rice per week.

   a. That is about how many gallons per year? _____ gallons

   b. How many pounds? _____ pounds

LESSON 11·7 **Largest Cities by Population**

1. Use the data in the Largest Cities by Population table at the top of *Student Reference Book,* page 302 to complete the bar graph. Round each figure to the nearest million.

Largest Cities by Population

Number of People (in millions)

y-axis values: 36, 34, 32, 30, 28, 26, 24, 22, 20, 18, 16, 14, 12, 10

x-axis labels: Tokyo, Mexico City, New York City, São Paulo, Mumbai (Bombay), Calcutta, Shanghai

Cities

2. Make three statements comparing the cities in the bar graph.

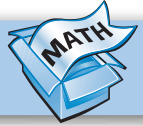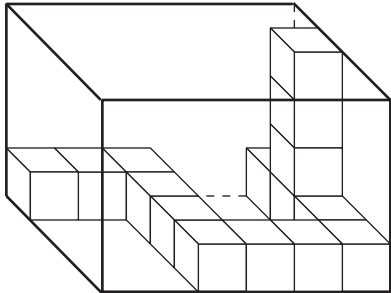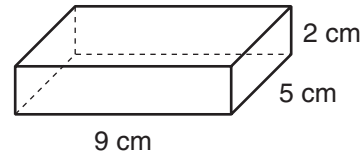**Example:** *About 21 million more people live in Tokyo than in Shanghai.*

_____

_____

_____

_____

_____

LESSON 11·7 | **Math Boxes**

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1. What is the total number of cubes needed to completely fill the box?

_____ cubes

SRB 138

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2. Calculate the volume.

2 cm
5 cm
9 cm

Number model: _____

Volume = _____ cm^3

SRB 138

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3. When you roll a 10-sided die, about what fraction of the time would you expect a multiple of 3 to come up?

_____

Use a probability term to describe the likelihood of this event.

_____

SRB 81

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4. Complete.

a. 321 cm = _____ m

b. 56 cm = _____ mm

c. 14 ft 4 in. = _____ in.

d. 2 mi = _____ ft

e. 5.3 km = _____ m

f. _____ mi = 7,040 yd

SRB 129

---

5. Add.

a. $-46 + 20 =$ _____

b. $-23 + (-18) =$ _____

c. _____ $= 33 + (-17)$

d. _____ $= \$36.54 + (-\$57.81)$

e. $-\$131.09 + (-\$76.98) =$ _____

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6. If you travel at an average speed of 50 miles per hour, how far will you travel in
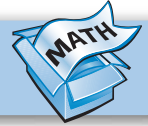
a. 3 hours? _____ miles

b. $\frac{1}{2}$ hour? _____ miles

c. $2\frac{1}{2}$ hours? _____ miles

d. $5\frac{3}{5}$ hours? _____ miles

SRB 47

LESSON 11·8 **Math Boxes**

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1. If you use the telephone an average of 4 times per day, about how many times would you use it in

   a. 1 week? _____ times

   b. 4 weeks? _____ times

   c. 52 weeks? _____ times

SRB 47

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2. A cup of orange juice has about 110 calories. About how many calories are in a quart of orange juice?

   _____ calories

SRB 47

---

3. Pears cost $0.55 each. What is the cost of

   a. 4 pears? _____

   b. 10 pears? _____

   c. 18 pears? _____

SRB 47

---

4. If you walk at an average speed of 3.5 miles per hour, how far will you travel in

   a. 2 hours? _____ miles

   b. 6 hours? _____ miles

   c. $\frac{1}{2}$ hour? _____ miles

SRB 47

---

5. Michelle can run 5 miles in 35 minutes. At this rate, how long does it take her to run 1 mile?

   _____ minutes

SRB 47

---

6. Round each number to the nearest tenth.

   a. 5.87 _____

   b. 0.32 _____

   c. 9.65 _____

   d. 3.40 _____

   e. 93.29 _____

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