

SKILL 1: Metric Units of Length

Student pages 1-2

Name _____ Date _____ Class _____



SKILL 1: Metric Units of Length

The **metric system** is a system of measurement used in most parts of the world. It uses prefixes to describe amounts that are much larger or smaller than the base unit. To convert a unit in the metric system, you need to multiply or divide by a power of 10. The information below can help you relate the millimeter (mm), centimeter (cm), and kilometer (km) to the meter (m). The prefixes tell you the meaning of each unit.

milli- means thousandth	1 mm = 0.001 m	1 m = 1,000 mm
centi- means hundredth	1 cm = 0.01 m	1 m = 100 cm
kilo- means thousand	1 km = 1,000 m	1 m = 0.001 km

Example 1

Convert 34,000 millimeters to meters.

You are converting from a smaller unit to a larger unit, so divide. When converting from millimeters to meters, divide by 1,000.
So, 34,000 millimeters = 34 meters.

Example 2

Convert 2.8 centimeters to millimeters.

You are converting from a larger unit to a smaller unit, so multiply. When converting from centimeters to millimeters, multiply by 10.
So, 2.8 centimeters = 28 millimeters.

Guided Practice

- Convert 16 kilometers to meters.
 - Are you converting from a smaller unit to a larger unit or from a larger unit to a smaller unit? larger to smaller
 - Will you multiply or divide? multiply
 - What number will you multiply or divide by? 1,000
 - 16 kilometers = 16,000 meters
- Convert.
- 6 meters = 600 centimeters
 - 162 kilometers = 162,000 meters
 - 4,000 meters = 4 kilometers
 - 25,000 millimeters = 25 meters

Section A: Units of Measure

Measurement 1

Name _____ Date _____ Class _____

SKILL 1: Practice

Convert.

- 90 mm = 9 cm
- 3 m = 3,000 mm
- 1,400 mm = 140 cm
- 48 cm = 0.48 m
- 50 cm = 500 mm
- 200 cm = 2 m
- 19 m = 0.019 km
- 8,000 mm = 8 m
- 40 mm = 4 cm
- 3,000 m = 3 km
- 2.3 km = 230,000 cm
- 4,000 mm = 400 cm
- 900 cm = 9,000 mm
- 50 m = 0.05 km
- 6 km = 6,000 m
- 7,000 mm = 7 m
- 7.4 km = 7,400 m
- 8 mm = 0.8 cm
- 17 cm = 170 mm
- 6.2 km = 6,200 m
- 100 cm = 1 m
- 36 mm = 3.6 cm

Solve.

- A tornado traveled 64,400 meters in an hour. Convert this distance to kilometers. 64.4 km
- Old Faithful, Yellowstone National Park's most famous geyser, shoots a spray of steam and hot water 50 m into the air. Is this height greater or less than 5,000 mm? greater



25. Convert 30 meters to centimeters.

- Skill 1
- | | |
|----------|------------|
| A 0.3 cm | C 300 cm |
| B 3 cm | D 3,000 cm |

26. Which length is the longest?

- Skill 1
- | | |
|---------|----------|
| F 6.7 m | H 670 m |
| G 67 cm | J 6.7 km |

Section A: Units of Measure

Measurement 1

SKILL 2:

Metric Units of Mass and Capacity

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Name _____ Date _____ Class _____



SKILL 2: Metric Units of Mass and Capacity

The kilogram (kg), gram (g), and milligram (mg) are metric units of mass.

1 kg = 1,000 g
1 g = 1,000 mg
0.001 kg = 1 g
0.001 g = 1 mg

The kiloliter (kL), liter (L), and milliliter (mL) are metric units of capacity.

1 kL = 1,000 L
1 L = 1,000 mL
0.001 kL = 1 L
0.001 L = 1 mL

Example 1

Convert 2.5 kilograms to grams.

To convert from a larger unit to a smaller unit, multiply.

When converting from kilograms to grams, multiply by 1,000.

So, 2.5 kilograms = 2,500 grams.

$$2.5 \times 1,000 = 2,500$$

Example 2

Convert 43 milliliters to liters.

To convert from a smaller unit to a larger unit, divide.

When converting from milliliters to liters, divide by 1,000.

So, 43 milliliters = 0.043 liters.

$$43 \div 1,000 = 0.043$$

Guided Practice

1. Convert 72 liters to kiloliters.

a. Will you multiply or divide? divide

b. What number will you multiply or divide by? 1,000

c. 72 liters = 0.072 kiloliters

Convert.

2. 3,950 milliliters = 3.95 liters

3. 5.1 kilograms = 5,100 grams

4. 22,000 liters = 22 kiloliters

5. 95 milligrams = 0.095 grams

Section A: Units of Measure

Measurement 3

Name _____

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SKILL 2: Practice

Convert.

1. 2,500 g = 2.5 kg

2. 0.22 kg = 220 g

3. 8,000 L = 8 kL

4. 750 mL = 0.75 L

5. 1.542 kg = 1,542 g

6. 6,000 mg = 6 g

7. 5 L = 5,000 mL

8. 3.75 L = 3,750 mL

9. 77 mg = 0.077 g

10. 2.21 kg = 2,210 g

11. 36 mL = 0.036 L

12. 0.4 L = 400 mL

13. 600 L = 0.6 kL

14. 30 L = 30,000 mL

15. 2 g = 0.002 kg

16. 86 g = 86,000 mg

17. 0.4 L = 400 mL

18. 1.75 kL = 1,750 L

19. 608 g = 0.608 kg

20. 20.4 kg = 20,400 g

21. 0.22 kL = 220 L

22. 0.059 L = 59 mL

23. 480 mL = 0.48 L

24. 15 kL = 15,000 L

Solve.

25. Apples cost \$2.20 per kilogram. Samuel needs 500 grams of apples to put in a fruit salad. How much money will he need to buy the apples? \$1.10

26. A carton of milk has a capacity of 3.5 liters. How many milliliters of milk does the carton hold? 3,500 mL



27. Convert 430 grams to kilograms.

A 0.43 kg
B 43 kg
C 4,300 kg
D 43,000 kg

28. Convert 8,100 meters to kilometers.

H 8.1 km
F 810 km
G 81 km
J 0.81 km

4. Measurement

Section A: Units of Measure

SKILL 3: Converting Units in the Customary System

Student pages 5-6

Name _____ Date _____ Class _____

SKILL 3: Converting Units in the Customary System

The customary system is another system of measurement. It is not based on powers of 10. In order to convert from one unit to another, you need to know the **conversion factor**, or the number of units that another unit is equal to.

Length	Weight	Liquid Capacity
1 foot (ft) = 12 inches (in.)	1 pound (lb) = 16 ounces (oz)	1 gallon (gal) = 4 quarts (qt)
1 yard (yd) = 3 feet (ft)		
1 mile (mi) = 5,280 feet (ft)		

To convert from a larger unit to a smaller unit, you multiply by the appropriate conversion factor. To convert from a smaller unit to a larger unit, you divide by the appropriate conversion factor.

Example 1

How many feet are in 3 yards?

When you convert from a larger unit (yard) to a smaller unit (foot), multiply the number of yards by the number of feet in a yard.

$$1 \text{ yard} = 3 \text{ feet}$$

$$3 \times 3 = 9$$

There are 9 feet in 3 yards.

Example 2

How many feet are in 24 inches?

When you convert from a smaller unit (inch) to a larger unit (foot), divide the number of feet by the number of inches in a foot.

$$1 \text{ foot} = 12 \text{ inches}$$

$$24 \div 12 = 2$$

There are 2 feet in 24 inches.

Guided Practice

1. Convert 48 ounces to pounds.

a. Are you converting from a smaller unit to a larger unit or from a larger unit to a smaller unit? smaller to larger unit

b. Will you multiply or divide? divide

c. What number will you multiply or divide by? 16

d. 48 ounces = 3 pounds

Convert.

2. 16 quarts = 4 gallons

4. 5 feet = 60 inches

6. 10,560 feet = 2 miles

3. 10 miles = 52,800 feet

5. 100 pounds = 1,600 ounces

7. 16 gallons = 64 quarts

Section A: Units of Measure

Measurement 5

Name _____ Date _____ Class _____

SKILL 3: Practice

Convert.

- 21 feet = 252 inches
- 21 feet = 7 yards
- 4 miles = 21,120 feet
- 15 pounds = 240 ounces
- 36 quarts = 9 gallons
- 360 inches = 30 feet
- 48 ounces = 3 pounds
- 31 gallons = 124 quarts
- 35 yards = 105 feet
- 8 quarts = 2 gallons
- 42,240 feet = 8 miles
- 80 ounces = 5 pounds
- 63 gallons = 252 quarts
- 32 quarts = 8 gallons
- 39 feet = 13 yards
- 18 miles = 95,040 feet
- 23 gallons = 92 quarts
- 96 ounces = 6 pounds
- 132 inches = 11 feet
- 71 yards = 213 feet
- 60 quarts = 15 gallons
- 31 pounds = 496 ounces
- 23 gal = 92 qt
- 42 ft = 14 yd
- 84 qt = 21 gal
- 46 lb = 736 oz
- 276 in. = 23 ft
- 51 yd = 153 ft
- 656 oz = 41 lb
- 53 ft = 636 in.
- 26 lb = 416 oz
- 127 mi = 670,560 ft

Solve.

- A gray whale can be up to 540 inches in length. How many feet is that? 45 ft; 15 yd
- G. Graham of Edmond, Oklahoma, grew a pumpkin weighing 7.75 lb. How many ounces is that? 124 oz



- How many inches are in 36 feet? Skill 3
A 3 in. C 108 in.
B 12 in. D 432 in.
- How many kiloliters are in 800 liters? Skill 2
F 0.08 kL H 8 kL
G 0.8 kL J 80 kL

6 Measurement

Section A: Units of Measure

SKILL 4: Converting Rates

Student pages 7-8

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SKILL 4: Converting Rates

You can use conversion factors to convert from one rate to another. It is important to note whether the unit you wish to change is in the *numerator* or in the *denominator*.

To change a unit in the numerator of a rate, choose a conversion factor with that unit in the denominator. To change a unit in the denominator of a rate, choose a conversion factor with that unit in the numerator.

Example 1

Convert 7 feet per hour to inches per hour.

Use 12 inches = 1 foot to convert from feet to inches.

$$\frac{7 \text{ feet}}{1 \text{ hour}} \times \frac{12 \text{ inches}}{1 \text{ foot}} = \frac{7 \cancel{\text{feet}} \times 12 \text{ inches}}{1 \cancel{\text{hour}} \times 1 \cancel{\text{foot}}} = \frac{84 \text{ inches}}{1 \text{ hour}}$$

So, 7 feet per hour is equal to 84 inches per hour.

Example 2

Convert 56 packages per week to packages per day.

Use 1 week = 7 days to convert from week to days.

$$\frac{56 \text{ packages}}{1 \text{ week}} \times \frac{1 \text{ week}}{7 \text{ days}} = \frac{56 \cancel{\text{packages}} \times 1 \cancel{\text{week}}}{1 \cancel{\text{week}} \times 7 \text{ days}} = \frac{56 \text{ packages}}{7 \text{ days}}$$

Divide both numerator and denominator by 7 to find the packages per day.

So, 56 packages per week is equal to 8 packages per day.

Guided Practice

1. Convert 12 quarts per day to gallons per day.

$$\frac{12 \text{ quarts}}{1 \text{ day}} \times \frac{1 \text{ gallon}}{4 \text{ quarts}} = \frac{12 \cancel{\text{quarts}}}{1 \cancel{\text{day}} \times 4} = \frac{3 \text{ gallons}}{1 \text{ day}}$$

a. Write the conversion factor.

b. Multiply by the conversion factor. Then write the new rate.

$$\frac{12 \text{ quarts}}{1 \text{ day}} \times \frac{1 \text{ gallon}}{4 \text{ quarts}} = \frac{3 \text{ gallons}}{1 \text{ day}}$$

c. 12 quarts per day = 3 gallons per day

2. Convert 50 feet per minute to feet per second.

$$\frac{50 \text{ feet}}{1 \text{ minute}} \times \frac{1 \text{ minute}}{60 \text{ seconds}} = \frac{50 \cancel{\text{feet}} \times 1 \cancel{\text{minute}}}{1 \cancel{\text{minute}} \times 60 \text{ seconds}} = \frac{5 \text{ feet}}{6 \text{ seconds}}$$

a. Write the fraction for your conversion factor.

b. Multiply by your conversion factor. Then write the new rate.

$$\frac{50 \text{ feet}}{1 \text{ minute}} \times \frac{1 \text{ minute}}{60 \text{ seconds}} = \frac{5 \text{ feet}}{6 \text{ seconds}}$$

c. 50 feet per minute = 5/6 feet per second

Section A: Units of Measure

Measurement 7

Name _____

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SKILL 4: Practice

Convert each rate to an equivalent rate.

1. 35 pounds per minute to pounds per hour

2,100 pounds per hour
\$1.20 per minute

2. \$72.00 per hour to dollars per minute

4,500 feet per minute

3. 75 feet per second to feet per minute

0.0254 meters per inch

4. 2.54 centimeters per inch to meters per inch

1.5 quarts per minute

5. 90 quarts per hour to quarts per minute

453.6 grams per pound

6. 28.35 grams per ounce to grams per pound

0.6 feet per second

7. 7.2 inches per second to feet per second

36¢ per quart

8. \$1.44 per gallon to cents per quart

\$1.50 per ounce

9. \$8.00 per pound to dollars per ounce

Use conversion factors to complete the table.

Name of Animal	Maximum Speed (mi/hr)	Maximum Speed (ft/sec)
10. Elk	45	66
11. Grizzly bear	30	44
12. Spider	1.17	1.716
13. Three-toed sloth	0.15	0.22
14. Squirrel	12	17.6

Solve.

15. One year, American farmers produced 133.8 bushels of corn per acre of corn crops. Convert this rate to pecks per square foot. (A bushel is equal to 4 pecks, and an acre is equal to 43,560 square feet.)

about 0.0123 pecks per square foot



16. How many dollars per minute are equivalent to \$48.00 per hour?

- (A) \$0.80 C \$28.80
B \$8.00 D \$288

Skill 4

17. Which length is the shortest?

Skill 1

- F 0.25 m H 250 mm
G 2.5 cm J 2.5 km

Section A: Units of Measure

Measurement 8

SKILL 5: Computing with Customary Measures

Student pages 9–10

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SKILL 5: Computing with Customary Measures

Often when you solve problems with customary units of measure, you must change the units of measurement.

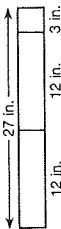
Example 1

Convert: 27 inches to feet and inches.

12 inches = 1 foot, so 24 inches = 2 feet.

27 in. – 24 in. = 3 in.

So, 27 inches = 2 feet 3 inches.



Example 2

Convert: 2 gallons 1 quart = 2 quarts.

1 gallon = 4 quarts, so 2 gallons = 8 quarts.

Add the extra quart: 8 quarts + 1 quart = 9 quarts.

So, 2 gallons 1 quart = 9 quarts.

Example 3

Suppose you need 4 feet 5 inches of ribbon to complete an art project. You have 2 feet 10 inches of ribbon. How much more ribbon do you need to complete the project?

Subtract:

$$\begin{array}{r} 4 \text{ ft } 5 \text{ in.} \rightarrow 3 \text{ ft } 17 \text{ in.} \leftarrow \text{Since } 1 \text{ ft} = 12 \text{ in., rename } 4 \text{ ft } 5 \text{ in. as } 3 \text{ ft } 17 \text{ in.} \\ - 2 \text{ ft } 10 \text{ in.} \\ \hline \end{array}$$

1 ft 7 in. ← Subtract.

So, you need 1 foot 7 inches more ribbon to complete the project.

Guided Practice

- Convert: 2 yards 2 feet = 2 feet

$$\begin{array}{r} 3 \text{ feet} = 1 \text{ yard} \\ 2 \text{ yards} = 6 \text{ feet} \\ \hline \end{array}$$

So, 2 yards 2 feet = 8 feet.
- Convert: $6\frac{1}{2}$ quarts = 2 gallons 2 quarts

$$\begin{array}{r} 4 \text{ quarts} = 1 \text{ gallon} \\ 6\frac{1}{2} \text{ quarts} - 4 \text{ quarts} = 2\frac{1}{2} \text{ quarts} \\ \hline \end{array}$$

So, $6\frac{1}{2}$ quarts = 1 gal $2\frac{1}{2}$ qt.

Name _____ Date _____ Class _____

SKILL 5: Practice

Convert.

- 31 inches = 2 feet 7 inches
- 2 pounds 2 ounces = 34 ounces
- $4\frac{1}{2}$ feet = 1 yard $\frac{1}{2}$ feet
- 6 gallons 2 quarts = 26 quarts
- 3 pounds 8 ounces = 56 ounces
- 24 ounces = 1 pounds 8 ounces
- 6 feet 3 inches = 75 inches
- 1 yard 3 inches = 39 inches
- 15 quarts = 3 gallons 3 quarts
- $7\frac{1}{3}$ feet = 2 yards $\frac{1}{3}$ feet

Add or subtract. Rename when necessary.

- $\begin{array}{r} 4 \text{ ft } 8 \text{ in.} \\ + 5 \text{ ft } 6 \text{ in.} \\ \hline \end{array}$
- $\begin{array}{r} 8 \text{ gal } 1 \text{ qt} \\ + 3 \text{ gal } 1 \text{ qt} \\ \hline \end{array}$
- $\begin{array}{r} 10 \text{ ft } 2 \text{ in.} \\ + 5 \text{ ft } 6 \text{ in.} \\ \hline \end{array}$
- $\begin{array}{r} 11 \text{ gal } 2 \text{ qt} \\ + 2 \text{ gal } 2 \text{ qt} \\ \hline \end{array}$
- $\begin{array}{r} 5 \text{ gal } 3 \text{ qt} \\ + 2 \text{ gal } 2 \text{ qt} \\ \hline \end{array}$
- $\begin{array}{r} 5 \text{ lb } 3 \text{ oz} \\ - 2 \text{ lb } 11 \text{ oz} \\ \hline \end{array}$
- $\begin{array}{r} 8 \text{ gal } 1 \text{ qt} \\ + 2 \text{ gal } 2 \text{ qt} \\ \hline \end{array}$
- $\begin{array}{r} 4 \text{ yd } 2 \text{ ft} \\ + 3 \text{ yd } 1 \text{ ft} \\ \hline \end{array}$
- $\begin{array}{r} 8 \text{ yd} \\ + 5 \text{ lb } 6 \text{ oz} \\ \hline \end{array}$
- $\begin{array}{r} 7 \text{ lb } 6 \text{ oz} \\ + 5 \text{ lb } 9 \text{ oz} \\ \hline \end{array}$
- $\begin{array}{r} 12 \text{ lb } 15 \text{ oz} \\ + 3 \text{ lb } 12 \text{ oz} \\ \hline \end{array}$
- $\begin{array}{r} 7 \text{ yd } 1 \text{ ft} \\ - 4 \text{ yd } 2 \text{ ft} \\ \hline \end{array}$
- $\begin{array}{r} 6 \text{ ft } 7 \text{ in.} \\ + 5 \text{ ft } 8 \text{ in.} \\ \hline \end{array}$
- $\begin{array}{r} 8 \text{ ft } 3 \text{ in.} \\ - 4 \text{ ft } 8 \text{ in.} \\ \hline \end{array}$
- $\begin{array}{r} 10 \text{ lb } 5 \text{ oz} \\ - 5 \text{ lb } 10 \text{ oz} \\ \hline \end{array}$
- $\begin{array}{r} 4 \text{ lb } 11 \text{ oz} \\ + 3 \text{ lb } 10 \text{ oz} \\ \hline \end{array}$

Solve.

- Alicia bought 3 containers of yogurt. Each container weighs 12 oz. How many pounds and ounces of yogurt did she buy? 2 lb 4 oz
- Jacob cut a piece of wood 2 feet 4 inches long from a board that was 6 feet long. How long was the remaining piece of board? 3 ft 8 in.



- Subtract: 9 ft – 4 ft 8 in. 4 ft 4 in.
- How many feet per minute are equivalent to 12 feet per second? 2 ft/min
- Subtract: 9 ft – 4 ft 8 in. 4 ft 4 in.
- How many feet per minute are equivalent to 12 feet per second? 2 ft/min

Skill 5

Skill 4

F 2 ft/min

G 3 ft/min

H 72 ft/min

J 720 ft/min

SKILL 6: Computing with Time

Student pages 11-12

Name _____ Date _____ Class _____



SKILL 6: Computing with Time

Sometimes when you add or subtract units of time, you must convert between the units.

Example 1

Add: 2 hours 45 minutes + 45 minutes.

$$\begin{array}{r} 2 \text{ h } 45 \text{ min} \\ + 45 \text{ min} \\ \hline 2 \text{ h } 90 \text{ min} = 3 \text{ h } 30 \text{ min} \end{array}$$

Since 60 min = 1 h, rename 90 min as 1 h 30 min.

So, 2 hour 45 minutes + 45 minutes = 3 hours 30 minutes.

Example 2

Subtract: 8 hours 12 minutes - 3 hours 27 minutes.

Subtract: You cannot subtract 27 from 12.

8 h 12 min → 7 h 72 min ← Since 1 h = 60 min, rename 8 h 12 min as 7 h 72 min.

$$\begin{array}{r} 7 \text{ h } 72 \text{ min} \\ - 3 \text{ h } 27 \text{ min} \\ \hline 4 \text{ h } 45 \text{ min} \end{array}$$

So, 8 hours 12 minutes - 3 hours 27 minutes = 4 hours 45 minutes

Guided Practice

Add or subtract. Rename when necessary.

$$\begin{array}{r} 1. \quad 12 \text{ hours} \quad \rightarrow \quad 11 \text{ hours } 60 \text{ minutes} \\ - \quad \quad \quad 38 \text{ minutes} \quad \quad \quad 38 \text{ minutes} \\ \hline 11 \text{ hours } 22 \text{ minutes} \end{array}$$

$$\begin{array}{r} 2. \quad 9 \text{ minutes } 5 \text{ seconds} \quad \rightarrow \quad 8 \text{ minutes } 65 \text{ seconds} \\ - 3 \text{ minutes } 40 \text{ seconds} \quad \quad \quad 40 \text{ seconds} \\ \hline 5 \text{ minutes } 25 \text{ seconds} \end{array}$$

$$\begin{array}{r} 3. \quad 2 \text{ h } 38 \text{ min} \\ + 3 \text{ h } 53 \text{ min} \\ \hline 6 \text{ h } 31 \text{ min} \end{array}$$

$$\begin{array}{r} 4. \quad 4 \text{ min } 17 \text{ sec} \\ + 2 \text{ min } 48 \text{ sec} \\ \hline 7 \text{ min } 5 \text{ sec} \end{array}$$

$$\begin{array}{r} 5. \quad 6 \text{ h } 22 \text{ min} \\ - 4 \text{ h } 50 \text{ min} \\ \hline 1 \text{ h } 32 \text{ min} \end{array}$$

Section A: Units of Measure

Measurement 11

Name _____

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SKILL 6: Practice

Add or subtract. Rename when necessary.

$$\begin{array}{r} 1. \quad 4 \text{ h } 25 \text{ min} \\ + 2 \text{ h } 35 \text{ min} \\ \hline 7 \text{ h} \end{array}$$

$$\begin{array}{r} 2. \quad 1 \text{ h } 40 \text{ min} \\ + 3 \text{ h } 17 \text{ min} \\ \hline 4 \text{ h } 57 \text{ min} \end{array}$$

$$\begin{array}{r} 3. \quad 2 \text{ h } 10 \text{ min} \\ - 45 \text{ min} \\ \hline 1 \text{ h } 25 \text{ min} \end{array}$$

$$\begin{array}{r} 4. \quad 2 \text{ h } 55 \text{ min} \\ + 1 \text{ h } 40 \text{ min} \\ \hline 4 \text{ h } 35 \text{ min} \end{array}$$

$$\begin{array}{r} 5. \quad 7 \text{ h } 3 \text{ min} \\ - 2 \text{ h } 20 \text{ min} \\ \hline 4 \text{ h } 43 \text{ min} \end{array}$$

$$\begin{array}{r} 6. \quad 1 \text{ h } 29 \text{ min} \\ + 1 \text{ h } 59 \text{ min} \\ \hline 3 \text{ h } 28 \text{ min} \end{array}$$

$$\begin{array}{r} 7. \quad 4 \text{ min } 12 \text{ sec} \\ + 3 \text{ min } 38 \text{ sec} \\ \hline 7 \text{ min } 50 \text{ sec} \end{array}$$

$$\begin{array}{r} 8. \quad 8 \text{ min } 15 \text{ sec} \\ + 4 \text{ min } 51 \text{ sec} \\ \hline 13 \text{ min } 6 \text{ sec} \end{array}$$

$$\begin{array}{r} 9. \quad 42 \text{ min } 18 \text{ sec} \\ - 17 \text{ min } 12 \text{ sec} \\ \hline 25 \text{ min } 6 \text{ sec} \end{array}$$

$$\begin{array}{r} 10. \quad 4 \text{ h } 47 \text{ min} \\ + 2 \text{ h } 36 \text{ min} \\ \hline 7 \text{ h } 23 \text{ min} \end{array}$$

$$\begin{array}{r} 11. \quad 8 \text{ h } 40 \text{ min} \\ - 3 \text{ h } 28 \text{ min} \\ \hline 5 \text{ h } 12 \text{ min} \end{array}$$

$$\begin{array}{r} 12. \quad 10 \text{ h } 19 \text{ min} \\ - 5 \text{ h } 25 \text{ min} \\ \hline 4 \text{ h } 54 \text{ min} \end{array}$$

$$\begin{array}{r} 13. \quad 15 \text{ min } 12 \text{ sec} \\ + 5 \text{ min } 53 \text{ sec} \\ \hline 21 \text{ min } 5 \text{ sec} \end{array}$$

$$\begin{array}{r} 14. \quad 3 \text{ h } 44 \text{ min} \\ + 55 \text{ min} \\ \hline 4 \text{ h } 39 \text{ min} \end{array}$$

$$\begin{array}{r} 15. \quad 12 \text{ h } 18 \text{ min} \\ - 10 \text{ h } 39 \text{ min} \\ \hline 1 \text{ h } 39 \text{ min} \end{array}$$

$$\begin{array}{r} 16. \quad 7 \text{ h } 16 \text{ min} \\ - 1 \text{ h } 19 \text{ min} \\ \hline 5 \text{ h } 57 \text{ min} \end{array}$$

$$\begin{array}{r} 17. \quad 35 \text{ min } 12 \text{ sec} \\ - 24 \text{ min } 53 \text{ sec} \\ \hline 10 \text{ min } 19 \text{ sec} \end{array}$$

$$\begin{array}{r} 18. \quad 3 \text{ h } 26 \text{ min} \\ + 4 \text{ h } 43 \text{ min} \\ \hline 8 \text{ h } 9 \text{ min} \end{array}$$

Solve.

19. In a relay race with three runners, the times of the runners were 1 minute 12 seconds, 1 minute 36 seconds, and 1 minute 25 seconds. What was their total time for the race? 4 min 13 sec

20. It took Anna 1 hour 15 minutes to ride to the summit from the trailhead. It took her 28 minutes to ride back to the trailhead. How much longer did it take her to ride to the summit than to return to the trailhead? 47 min



21. Subtract: 5 h 12 min - 4 h 38 min. Skill 6

A 26 min C 1 h 26 min
B 34 min D 1 h 34 min

22. Add: 3 ft 8 in. + 4 ft 6 in. Skill 5

F 7 ft 2 in. H 8 ft 2 in.
G 7 ft 4 in. J 8 ft 4 in.

12 Measurement

Section A: Units of Measure

SKILL 7: Perimeter

Student pages 15-16

Name _____ Date _____ Class _____



SKILL 7: Perimeter

The distance around the outside of a figure is known as the perimeter. To find the perimeter of a given geometric figure, you add the lengths of the sides.

Example

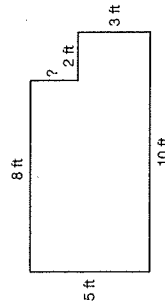
Find the length of the unknown side. Then find the perimeter.

In a rectangle, opposite sides are equal, so the right side is equal to the left side.

The left side is 5 ft, so the two segments on the right side also equal 5 ft. One segment is 3 ft, so, the other is $5 - 3$, or 2 ft.

$$8 + 2 + 2 + 3 + 10 + 5 = 30$$

The perimeter is 30 feet.



Guided Practice

Find each perimeter by adding the lengths of the sides.

-
-

31 ft

12 yd

Find the length of the unknown side.

-
-
-

a. In a rectangle, opposite sides are equal.

$$b. 6 - 2 = 4$$

c. The unknown side is 4 in.

-
-

13 yd

40 ft

Name _____ Date _____ Class _____

SKILL 7: Practice

Find the perimeter.

-
-
-
-
-
-

20 cm

36 ft

12 m

3.5 mi

18 in.

44 km

Find the length of each unknown side.

-
-
-

$$a = 2 \text{ cm } b = 4 \text{ cm } c = 8 \text{ in. } d = 28 \text{ in.}$$

$$x = 3 \text{ ft } y = 2 \text{ ft}$$

Solve.

- The triangular base of a skyscraper has a perimeter of 89 m. If two of the sides have lengths 30 m and 35 m, what is the length of the third side?

24 m



- Each side of a hexagonal sign is 8 inches long. What is the perimeter of the sign?

- A bottle holds 0.3 L. How many milliliters is this?

Skill 7

Skill 2

- A 16 in. C 64 in.
B 48 in. D 80 in.

- F 0.03 mL H 30 mL
G 0.3 mL I 300 mL

SKILL 8: Area of Rectangles and Squares

Student pages 17-1

Name _____ Date _____ Class _____



SKILL 8: Area of Rectangles and Squares

The area of a figure is the amount of surface it covers. Area is usually measured by the number of unit squares of the same size that fit into the figure. If a figure is labeled with inches, then the area is expressed in square inches (in^2). A square inch is a square whose sides measure one inch. A square centimeter (cm^2) is a square whose sides measure one centimeter.

The base of a square or rectangle is the distance across the bottom. The height is the distance up a side. The area of any square or rectangle is equal to the base times the height.

Example

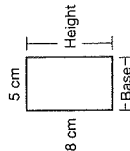
Find the area of the rectangle.

Each side is measured in centimeters, so the area will be measured in square centimeters (cm^2).

Find the area by multiplying base and height.

$$5 \text{ cm} \times 8 \text{ cm} = 40 \text{ cm}^2$$

The area of the rectangle is 40 square centimeters.



Guided Practice

Find the area of each rectangle.

- What is the base? 10 mi
 - What is the height? 6 mi
 - Multiply base and height to find the area. 60 mi^2

- What is the base? 36 m
 - What is the height? 4 in.
 - Multiply base and height to find the area. 100 in^2

- What is the base? 21 yd
 - What is the height? 6 cm
 - Multiply base and height to find the area. 18 cm^2

- What is the base? 40,000 in
 - What is the height? 20 cm
 - Multiply base and height to find the area. 20 cm^2

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Name _____

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SKILL 8: Practice

Find the missing measurement for each rectangle.

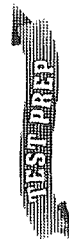
- Area = 63 ft^2 2. Area = 24 cm^2 3. Area = 84 in^2
Base = 7 ft Base = 4 cm Base = 7 in.
Height = 9 ft Height = 6 cm Height = 12 in.
- Area = 11.5 m^2 5. Area = 23.5 in^2 6. Area = 12.46 cm^2
Base = 5 m Base = 5.875 in. Base = 1.78 cm
Height = 2.3 m Height = 4 in. Height = 7 cm

Find the area of each figure.

- Square with sides of length 8 ft 64 ft^2
- Rectangle with sides 4.7 m and 7.3 m 34.31 m^2
- Square with sides of length 21 cm 441 cm^2
- Rectangle with sides 8.3 m and 5.2 m 43.16 m^2
- Rectangle with sides 9 in. and 4 in. 36 in^2

Solve.

- Shelly plans to paint a wall in her bedroom. The wall is 11 ft long and 8 ft high. She needs enough paint to cover how much area? 88 ft^2
- The Food Bank for Monterey County (California) set a record by baking a lasagne with an area of 490 ft^2 . If the lasagne was 70 ft long, how wide was it? 7 ft



- A map of the Yellowstone area showed an area 60 mi by 60 mi. How many square miles were shown on the map? Skill 8
A 120 mi^2 C 360 mi^2 H 180 m
B 240 mi^2 D $3,600 \text{ mi}^2$ J 1,800 m

- The length of a box is 18 cm. How many meters long is the box? Skill 1
F 0.18 m H 180 m
G 1.8 m J 1,800 m

SKILL 9: Area of Triangles

Student pages 19–20

Name _____ Date _____ Class _____



SKILL 9: Area of Triangles

The area of a triangle equals half the area of a rectangle whose base and height are the same as the triangle's. You can find the area of a triangle by calculating the area of the rectangle that surrounds it and dividing that in half. You can also use the area formula for a triangle.

Example

Find the area of this triangle.

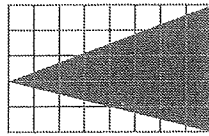
Method One: The area of the rectangular grid is 5×8 , or 40 square units. Since the triangle on the grid covers only half of the squares, the area of the triangle is half of 40, or 20 square units.

Method Two: Use the formula $\text{base} \times \text{height} \div 2 = \text{area}$.

The base of the triangle is 5 units.

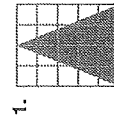
The height of the triangle is 8 units. $5 \times 8 \div 2 = 20$

The area of the triangle is 20 square units.

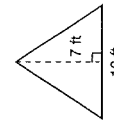


Guided Practice

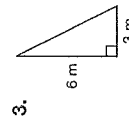
Find each area.



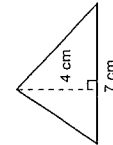
Base 4 units Height 5 units
 $4 \times 5 \div 2 = 10$
 Area 10 square units



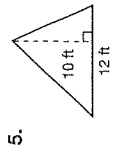
Base 10 ft Height 7 ft
 $10 \times 7 \div 2 = 35$
 Area 35 square feet



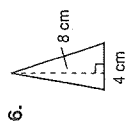
9 m²



14 cm²



60 ft²



16 cm²

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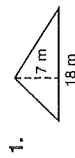
Section B: Perimeter and Area

Measurement 19

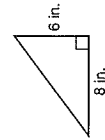
Name _____ Date _____ Class _____

SKILL 9: Practice

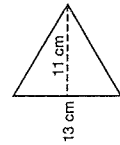
Find the area of each triangle. The dashed line is a height.



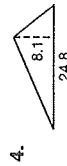
63 m²



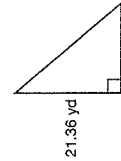
24 in²



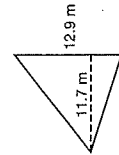
71.5 cm²



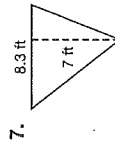
100.44



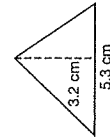
192.24 yd²



75.465 m²



29.05 ft²



8.48 cm²



18.33 mi²

Find the area if b is the base and h is the height of the triangle.

10. $b = 12$ ft, $h = 5$ ft 30 ft² 11. $h = 9$ cm, $b = 11$ cm 49.5 cm² 12. $b = 4.2$ mi, $h = 6$ mi 12.6 mi²

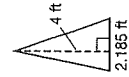
13. $h = 7.3$, $b = 12.4$ 45.26 14. $b = 8.37$ in., $h = 10.4$ in. 43.524 in² 15. $h = 2.8$ km, $b = 5.8$ km 8.12 km²

Solve.

16. The state of New Hampshire has the approximate shape of a triangle with base 90 mi and height 180 mi. Estimate the area of New Hampshire. 8,100 mi²



17. What is the area of the triangle?



- A 6.1 ft²
 B 4.37 ft²
 C 7.34 ft²
 D 8.74 ft²

18. Which of the following is the number of grams in 5.8 kilograms?

- F 0.58 g
 G 58 g
 H 580 g
 J 5,800 g

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Section B: Perimeter and Area

SKILL 10: Area of Parallelograms and Trapezoids

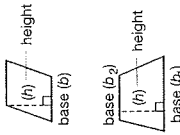
Student pages 21-22

Name _____ Date _____ Class _____



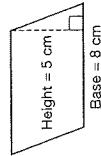
SKILL 10: Area of Parallelograms and Trapezoids

The height of a parallelogram or trapezoid is the length of a perpendicular segment that connects two parallel bases. The formula to find the area of a parallelogram is $A = bh$ where A is area, b is the base, and h is height. The formula to find the area of a trapezoid is $A = \frac{1}{2}h(b_1 + b_2)$ where A is area, b_1 is one base, and b_2 is the other base.



Example 1

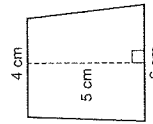
Find the area of the parallelogram.



Use the formula for area of a parallelogram.
 $A = bh$
 $= 8 \cdot 5$
 $= 40$
 Multiply.
 The area is 40 cm².

Example 2

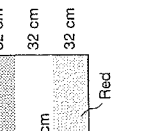
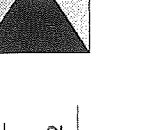
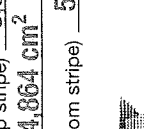
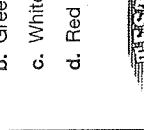
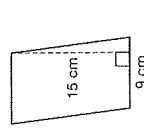
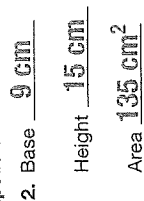
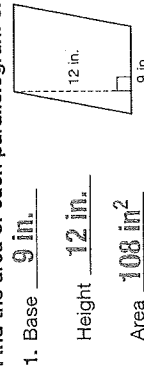
Find the area of the trapezoid.



Use the formula for area of a trapezoid.
 $A = \frac{1}{2}h(b_1 + b_2)$
 $= \frac{1}{2} \cdot 5(4 + 6)$
 $= \frac{1}{2} \cdot 5(10)$
 Add.
 $= 25$
 Multiply.
 The area is 25 cm².

Guided Practice

Find the area of each parallelogram or trapezoid.



1. Base 9 in.
 Height 12 in.
 Area 108 in²

2. Base 9 cm
 Height 15 cm
 Area 135 cm²

3. Height 10 in.
 Base b_1 6 in.
 Base b_2 8 in.
 $b_1 + b_2$ 14 in. Area 70 in²

4. Height 30 cm
 Base b_1 20 cm
 Base b_2 50 cm
 $b_1 + b_2$ 70 cm Area 1,050 cm²

5. Base 15 cm
 Height 10 in.
 Area 150 in²

6. Base 15 cm
 Height 10 in.
 Area 150 in²

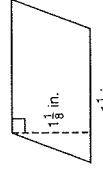
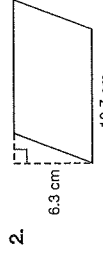
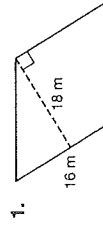
7. Base 15 cm
 Height 10 in.
 Area 150 in²

8. Base 15 cm
 Height 10 in.
 Area 150 in²

Name _____ Date _____ Class _____

SKILL 10: Practice

Find the area of each parallelogram.

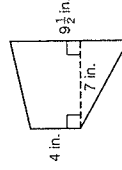
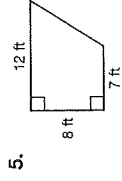
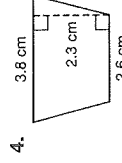


1. 288 m²

2. 67.41 cm²

3. 1 11/16

Find the area of each trapezoid.



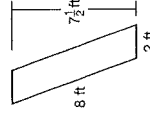
4. 7.36 cm²

5. 76 ft²

6. 47 1/4 in²

Solve.

7. A section of a sidewalk is shown at the right. It is shaped like a parallelogram. The measurements are shown. Find the area.
15 ft²



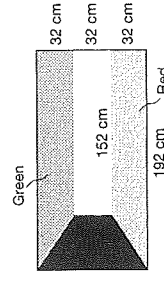
8. The flag of Kuwait is shown at the right. Find each area.

a. Black region 2,560 cm²

b. Green region (top stripe) 5,504 cm²

c. White region 4,864 cm²

d. Red region (bottom stripe) 5,504 cm²



9. What is the area of the parallelogram?
16 yd
9.4 yd
 Skill 10



10. What is the perimeter of the figure?
12.6 cm
14.5 cm
 Skill 7



A 28.2 yd²

B 30.8 yd²

C 54.2 yd²

D 56.4 yd²

F 27.1 cm

G 54.2 cm

H 91.35 cm

J 182.7 cm

Section B: Perimeter and Area

22 Measurement

Measurement 21

SKILL 11: Area of Compound Shapes

Name _____ Date _____ Class _____

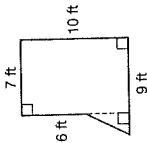


SKILL 11: Area of Compound Shapes

Not all geometric figures are shapes with which you are familiar. Some of them, however, can be divided into familiar shapes.

Example

Find the area of the figure.



This shape can be divided into a triangle and a rectangle.

Find the height of the triangle. Subtract the length of the known portion from the length of the opposite side: $10 - 6 = 4$.

Find the base of the triangle. Subtract the side of the rectangle from the base of the figure: $9 - 7 = 2$.

$$\begin{aligned} \text{Area of a triangle} &= \frac{1}{2}(b \times h) \\ &= \frac{1}{2}(2 \times 4) \\ &= \frac{1}{2}(8) \\ &= 4 \text{ ft}^2 \end{aligned}$$

$$\begin{aligned} \text{Total area} &= \text{area of triangle} + \text{area of rectangle} \\ &= 4 + 70 \\ &= 74 \end{aligned}$$

The total area is 74 ft².

Guided Practice

Find the area of the figure shown.

1. Divide the figure into two squares. See dotted line.

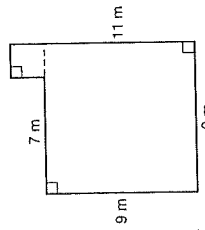
2. Find the length of a side of the large square. 9 m

3. Find the length of a side of the small square. 2 m

4. Find the area of the large square. 81 m²

5. Find the area of the small square. 4 m²

6. Find the total area. 81 m² + 4 m² = 85 m²



Name _____ Date _____ Class _____

SKILL 11: Practice

Find the area of each figure.

1. 1,001 ft²

2. 249 km²

3. 984 yd²

4. 86 cm²

5. 289 in²

6. 33 cm²

7. 5.46 cm²

8. 785 mi²

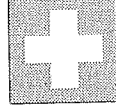
9. 51.5 ft²

Solve.

10. The flag of Switzerland features a white cross on a red background.

a. Each of the 12 sides of the cross has length 15 cm. Find the area of the white cross.

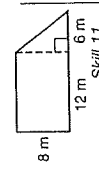
b. The flag has dimensions 60 cm by 80 cm. Find the area of the red region.



$$\begin{aligned} &\underline{1,125 \text{ cm}^2} \\ &\underline{2,475 \text{ cm}^2} \end{aligned}$$



11. What is the area of the figure?



- A 72 m²
B 102 m²
C 120 m²
D 144 m²

12. The area of a rectangle is 120 m². The length of the rectangle is 15 m. What is the width?

- F 1,800 m
G 105 m
H 8 m
J 7 m

Skill 8

SKILL 12: PROBLEM SOLVING: Changing Dimensions and Effect on Area and Perimeter

Student pages 25-26

Name _____ Date _____ Class _____

SKILL 12: PROBLEM SOLVING: Changing Dimensions and Effect on Area and Perimeter

When you change the dimensions of a rectangle, the perimeter and the area change.

Example

Patty Petunia has a rectangular garden 5 m long and 4 m wide. She decides to enlarge the garden by doubling the dimensions. What is the effect on the perimeter of the garden? What is the effect on the area?

Add the lengths of the sides to find the perimeter of the original garden:

$$5 \text{ m} + 4 \text{ m} + 5 \text{ m} + 4 \text{ m} = 18 \text{ m}$$

Add the lengths of the sides of the enlarged garden:

$$10 \text{ m} + 8 \text{ m} + 10 \text{ m} + 8 \text{ m} = 36 \text{ m}$$

Compare the perimeter of the original garden to the enlarged garden.

$$\text{Think: } 18 \times 2 = 36.$$

Doubling the dimensions of the original garden doubles the perimeter.

Multiply to find the area of the original garden: $5 \text{ m} \times 4 \text{ m} = 20 \text{ m}^2$

Multiply to find the area of the enlarged garden: $10 \text{ m} \times 8 \text{ m} = 80 \text{ m}^2$

Compare the area of the original garden to the area of the enlarged garden.

$$\text{Think: } 20 \times 4 = 80.$$

Doubling the dimensions of the original garden multiplies the area by 4.

Guided Practice

Find the effect of changing dimensions on the perimeter and area.

1. What is the perimeter of the original square? 8 cm

2. What is the perimeter of the enlarged square? 24 cm

3. How has the perimeter changed? $8 \times \underline{3} = 24$

Multiplying the dimensions of a square by 3

changes the perimeter of the square by a factor of 3.

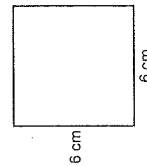
4. What is the area of the original square? 4 cm²

5. What is the area of the enlarged square? 36 cm²

6. How has the area changed? 2 $\times 4 = 36$

Multiplying the dimensions of a square by 3

changes the area of the square by a factor of 9.



Name _____ Date _____ Class _____

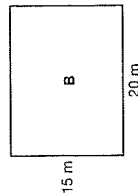
SKILL 12: Practice

1. Rectangle A has been enlarged to make Rectangle B.
- a. The dimensions of Rectangle B are each how many times as long as the dimensions of Rectangle A? 5



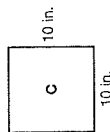
- b. The perimeter of Rectangle B is 5 times as great as the perimeter of Rectangle A.

- c. The area of Rectangle B is 25 times as great as the area of Rectangle A.



2. Square C has been reduced to make Square D.

- a. The dimensions of Square D are each how many times as long as the dimensions of Square C? 1/2



- b. The perimeter of Square D is 1/2 times as great as the perimeter of Square C.



- c. The area of Square D is 1/4 times as great as the area of Square C.

Solve.

3. A fenced-in garden is 30 ft by 60 ft. A new garden is planned that will have dimensions $\frac{1}{3}$ the size of the original garden. How does the length of fence around the new garden compare with the length of fence around the original garden?

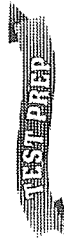
It is $\frac{1}{3}$ as long.

4. A corral measures 10 ft by 12 ft. The corral is rebuilt with the dimensions doubled. How does the area of the rebuilt corral compare with the area of the original corral?

It is 4 times the original area.

5. Taylor has a pattern for a flag that is 100 cm long on each side. He decides to reduce the pattern by halving the dimensions. What is the effect on the area?

It is $\frac{1}{4}$ as large.



6. The dimensions of a square are 6 m by 6 m. How does the area of the square change if the dimensions of the square are multiplied by 4?

Skill 12

- A The area is doubled.
B The area is multiplied by 4.
C The area is multiplied by 8.
D The area is multiplied by 16.

7. The area of a parallelogram is 522 m². If the height of the parallelogram is 18 m, how long is the base?

Skill 10

- F 28 m H 208 m
G 29 m J 209 m

SKILL 13: Pi and Circumference

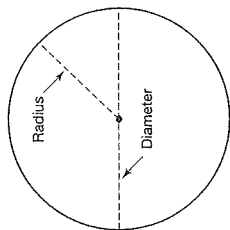
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SKILL 13: Pi and Circumference

There are three measurements of a circle that can be used to describe its size. The **diameter** of a circle is the distance across the circle through its center. The **radius** is the distance from the center to any point on the circle. The perimeter of a circle is its **circumference**.



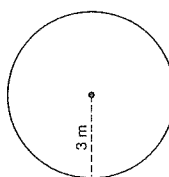
The diameter of a circle is twice its radius: $d = 2 \times r$.
The circumference of a circle is given by
 $C = \pi \times d = 2 \times \pi \times r$.
The value for π is approximately equal to 3.14, or $\frac{22}{7}$.

Example

Find the diameter and circumference of the circle. Use 3.14 for π .

The radius of the circle is 3 m.
The diameter is equal to two times the radius, so the diameter is 2×3 , or 6 m.
Use the formula to find the circumference. $C = 2 \times \pi \times r$
Substitute.
 $\approx 2 \times 3.14 \times 3$
Multiply.
 ≈ 18.84

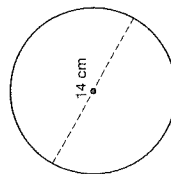
The diameter of the circle is 6 m. The circumference is about 18.84 m.



Guided Practice

Find the radius and circumference of the circle.

- What is the diameter? 14 cm
- What is the radius? 7 cm
- Substitute for the diameter and π in the formula
 $C = \pi \times d$. Use $\frac{22}{7}$ for π . $C = \frac{22}{7} \cdot 14$
- What is the circumference? 44 cm



Find the diameter and radius of a circle with a circumference of 28.26 ft.

- Substitute for the circumference and π in the formula $C = \pi \times d$.
 $C = 28.26$ ft. Use 3.14 for π . $28.26 = 3.14 \cdot d$
- What is the diameter? 9 ft
- What is the radius? 4.5 ft

Section B: Perimeter and Area

Measurement 27

Name _____ Date _____ Class _____

SKILL 13: Practice

Find the circumference of each circle given its diameter or radius. Use 3.14 for π .

- 37.68 in.
- 113.04 cm
- 65.94 ft

Find the circumference of each circle given its diameter or radius. Use $\pi \approx \frac{22}{7}$. Express answers in lowest terms.

- 22 m
- 51 1/2 ft
- 88 km

Given the radius, diameter, or circumference of a circle, find the other two measurements. Use $\pi \approx 3.14$. Round answers to the nearest tenth.

- $r = \frac{22}{7}$ cm $d = \frac{44}{7}$ cm $C \approx 138.2$ cm
- $r = 9$ mm $d = 18$ mm $C \approx 56.5$ mm
- $r = 3.4$ mi $d = 6.8$ mi $C \approx 21.4$ mi

Solve.

- The radius of Pluto is about 1,145 km. Find the length of Pluto's equator. about 7,191 km
- The diameter of a circular track at the park is 25 meters. Haley ran around the track one time. How far did she run? 78.5 m



- What is the circumference of the circle? Use 3.14 for π .



Skill 13

- 18.84 cm
- 37.68 cm
- 56.52 cm
- 75.36 cm

- Eric makes two triangular bandannas from a square piece of fabric that is 18 in. on each side. What will be the area of each bandanna?

Skill 9

- 36 in²
- 162 in²
- 81 in²
- 324 in²

Section B: Perimeter and Area

Measurement 28

SKILL 14: Area of Circles

Student pages 29-30

Name _____ Date _____ Class _____



SKILL 14: Area of Circles

The circumference and the diameter of a circle are related by the number π . The radius and the area of a circle are also related by the number π . If you know the radius of a circle, you can use π to find the area.

Area = $\pi \times r^2$, where r is the radius.

Example 1

Find the area of this circle. Use 3.14 for π .

Use the formula $A = \pi \times r^2$.

Substitute 10 for r , the radius, and 3.14 for π .

The area is 314 square meters, or 314 m^2 .



$$3.14 \times 10^2 = 3.14 \times 100 = 314$$

Example 2

Given the area of a circle, find its radius.

$$A = 200.96 \text{ m}^2$$

Use the formula $A = \pi \times r^2$.

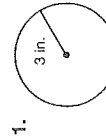
Substitute 200.96 for the area, A , and 3.14 for π .

$$\begin{aligned} 200.96 &= 3.14 \times r^2 \\ \frac{200.96}{3.14} &= r^2 \\ 64 &= r^2 \\ 8 &= r \end{aligned}$$

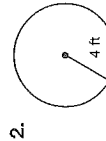
The radius is 8 m.

Guided Practice

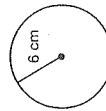
Find the area of each circle. Use 3.14 for π .



$$28.26 \text{ in}^2$$



$$50.24 \text{ ft}^2$$



$$113.04 \text{ cm}^2$$

Given the area of a circle, find its radius or diameter. Use 3.14 for π .

$$4. A = 153.86 \text{ in}^2$$

$$\text{Think: } r^2 = 153.86 \div 3.14 = 49$$

$$r = 7 \text{ in.}$$

$$5. A = 452.16 \text{ m}^2$$

$$\text{Think: } r^2 = 452.16 \div 3.14 = 144$$

$$r = 12 \text{ m;}$$

$$d = 24 \text{ m}$$

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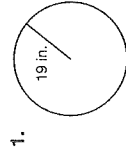
Name _____

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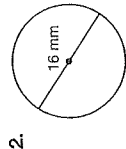
Class _____

SKILL 14: Practice

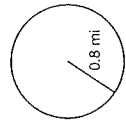
Find the area of each circle given its diameter or radius. Use 3.14 for π .



$$1,133.54 \text{ in}^2$$

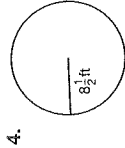


$$200.96 \text{ mm}^2$$

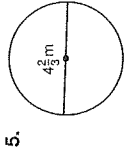


$$2,009.6 \text{ mi}^2$$

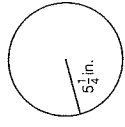
Find the area of each circle given its diameter or radius. Use $\pi \approx \frac{22}{7}$. Express answers in simplest form.



$$227 \frac{1}{14} \text{ ft}^2$$



$$17 \frac{1}{9} \text{ m}^2$$



$$86 \frac{5}{8} \text{ in}^2$$

Given the area of a circle, find its radius or diameter. Use $\pi \approx 3.14$. Round answers to the nearest tenth.

$$7. A \approx 31,400 \text{ in}^2$$

$$r \approx 100 \text{ in.}$$

$$8. A \approx 113.04 \text{ cm}^2$$

$$d \approx 12 \text{ cm}$$

$$9. A \approx 379.94 \text{ mi}^2$$

$$r \approx 11 \text{ mi}$$

Solve. Round answers to the nearest tenth.

10. Find the area of a pizza if the diameter is 15 in.

$$\text{about } 176.6 \text{ in}^2$$

11. The radius of a U.S. quarter is about 12 mm. Find the area of a quarter.

$$\text{about } 452.2 \text{ mm}^2$$



12. The diameter of a pizza is 14 in. Find the area of the pizza rounded to the nearest tenth.

$$A \ 21.9 \text{ in}^2$$

$$B \ 43.9 \text{ in}^2$$

$$C \ 153.9 \text{ in}^2$$

$$D \ 615.4 \text{ in}^2$$



Skill 14

13. Which parallelogram has the greatest area?

$$F \ h = 3.4 \text{ m, } b = 2.8 \text{ m}$$

$$G \ h = 2.8 \text{ m, } b = 3.4 \text{ m}$$

$$H \ h = 4 \text{ m, } b = 3 \text{ m}$$

$$J \ h = 5 \text{ m, } b = 2 \text{ m}$$

Skill 10

SKILL 15: Surface Area of Prisms

Student pages 33–34

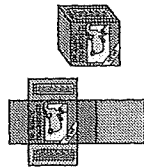
Name _____ Date _____ Class _____



SKILL 15: Surface Area of Prisms

The surface area (SA) of a prism is the sum of the areas of all of its faces. A net is a flat pattern that can be folded into a solid. To find the surface area of a prism such as this rectangular prism, unfold it into a net of polygons and then add their areas.

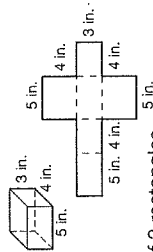
Like the area for a single polygon, surface area is measured in square units, such as cm^2 .



Example

Find the surface area of the prism.

The net consists of two rectangles with lengths of 5 in. and widths of 4 in., two 4 in.-by-3 in. rectangles, and two 5 in.-by-3 in. rectangles.

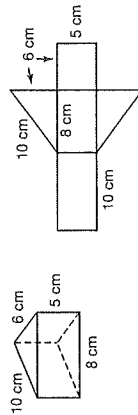


$$\begin{aligned} \text{SA} &= \text{area of 2 rectangles} + \text{area of 2 rectangles} + \text{area of 2 rectangles} \\ \text{SA} &= 2 \times (5 \times 4) + 2 \times (4 \times 3) + 2 \times (5 \times 3) \\ &= 2 \times (20) + 2 \times (12) + 2 \times (15) \\ &= 40 + 24 + 30 \\ &= 94 \text{ in}^2 \end{aligned}$$

The surface area of the rectangular prism is 94 in^2 .

Guided Practice

Find the surface area of the prism.



1. a. Which polygons make up the net?
3 rectangles, 2 triangles

$$\begin{aligned} \text{b. SA} &= \text{area of rectangle} + \text{area of rectangle} + \text{area of 2 triangles} \\ &= (8 \times 5) + (6 \times 5) + 2 \times \left(\frac{1}{2} \times 6 \times 5 \right) \\ &= 40 + 30 + 45 \\ &= 115 \text{ cm}^2 \end{aligned}$$

2. 24 ft^2

3. 22 m^2

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Name _____ Date _____ Class _____

SKILL 15: Practice

Find the surface area of each prism.

1. 726 in^2

2. 418 cm^2

3. 270 yd^2

4. $3,174 \text{ mm}^2$

5. $1,632 \text{ yd}^2$

6. $10,584 \text{ m}^2$

7. 28 ft^2

8. $4,800 \text{ in}^2$

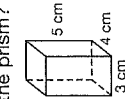
9. A music company wants to design a cardboard box for mailing a 2-CD set measuring 14.2 cm by 12.4 cm by 2.5 cm. What amount of surface area will the box have?
 485.16 cm^2

Find the surface area of the prism.

10. A cereal box measures 16 cm by 6 cm by 25 cm. What is the surface area of the box?
 $1,292 \text{ cm}^2$



11. What is the surface area of the prism?
 120 ft^2



A 60 cm^2
B 64 cm^2
C 70 cm^2
D 94 cm^2

Skill 15

12. What is the area of a rectangle that has a length of 12 ft and a width of 10 ft?
 120 ft^2

Skill 8

H 44 ft^2
J 22 ft^2

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SKILL 16: Surface Area of Cylinders

Name _____ Date _____ Class _____



SKILL 16: Surface Area of Cylinders

All of a prism's faces are flat. Other three-dimensional objects have circular faces and curved sides. A **cylinder** has two parallel circular bases with the same radius. You can use a net to see shapes and dimensions of the faces. Then you can use area formulas to calculate surface areas.

Example

Find the surface area of the cylinder. Use $\pi = 3.14$.

Find the area of each part of the net.

First find the area of each circle.

$$A = \pi \times r^2 = 3.14 \times 4^2 = 3.14 \times 4 \times 4 \approx 50.24 \text{ cm}^2$$

The length of the rectangle is equal

to the circumference of the circle.

The width of the rectangle is equal

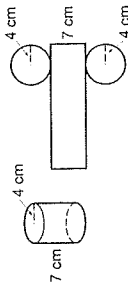
to the height of the cylinder, 7.

Multiply 25.12 by 7.

Add the areas to find the

surface area.

So, the surface area of the cylinder is 276.32 cm^2 .



Guided Practice

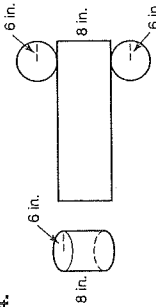
Find the surface area of the cylinder. Use $\pi = 3.14$.

- Area of each base = $\pi \times r^2$

$$= 3.14 \times \frac{6^2}{8} = 3.14 \times \frac{36}{8} = 113.04 \text{ in}^2$$
- Length of rectangle (circumference of circle) = $2 \times \pi \times r$

$$= 2 \times 3.14 \times \frac{6}{8} = 37.68 \text{ in.}$$
- Width of the rectangle = $\frac{8}{6} \text{ in.}$
- Area of the rectangle = length $\times$ width = $\frac{37.68}{8} \times \frac{8}{6} = 301.44 \text{ in}^2$
- Surface area of the cylinder = area of both bases + area of rectangle

$$= (\frac{2}{2} \times 113.04) + \frac{301.44}{6} = 527.52 \text{ in}^2$$



SKILL 16: Practice

Find the surface area of each cylinder. Use 3.14 for π .

- 6 ft, 32 ft, 1,431.84 ft²
- 6 in., 12 in., 1,356.48 in²
- 9 m, 4 m, 138.16 m²
- 7 cm, 17 cm, 1,055.04 cm²
- 1.6 m, 1.8 m, 38.43 m²
- 7 yd, 6 yd, 571.48 yd²
- 8 in., 3 in., 276.71 in²
- 98 cm, 41 cm, 15,255.69 cm²

Given the radius and height of each cylinder, find the surface area (SA). Use 3.14 for π . Round to the nearest whole number.

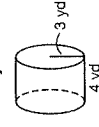
- $r = 3.8 \text{ ft}$, $h = 15 \text{ ft}$ SA = 449 ft²
- $r = 21 \text{ m}$, $h = 4 \text{ m}$ SA = 3,297 m²
- $r = 12 \text{ in.}$, $h = 13 \text{ in.}$ SA = 1,884 in²

Solve. Round to the nearest whole number.

- An oatmeal box has the shape of a cylinder with diameter $3\frac{7}{8} \text{ in.}$ and height 7 in. What is the surface area of the box? about 109 in²

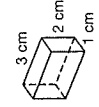


13. What is the surface area of the cylinder? Use 3.14 for π .



- A 75.36 yd² C 103.62 yd²
 B 131.88 yd² D 150.72 yd²

14. What is the surface area of the prism?



- F 6 cm² H 18 cm²
 G 11 cm² J 22 cm²

Skill 16

Skill 15

SKILL 17: Volume of Rectangular Prisms

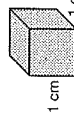
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SKILL 17: Volume of Rectangular Prisms

The volume is the number of cubic units in a solid. The volume of this solid is 1 cm^3 .
The volume of a rectangular prism is found by multiplying the area of the base (B) times the height (h) of the prism. Remember that the area of the base is length $\times$ width.



$$V = B \times h \text{ or}$$

$$V = l \times w \times h$$

Example 1

Find the volume of the rectangular prism shown.

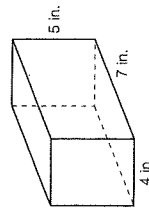
Step 1: Find the area of the rectangular base.

$$B = 4 \times 7 = 28 \text{ in}^2$$

Step 2: Find the volume.

$$V = B \times h = 28 \times 5 = 140 \text{ in}^3$$

So, the volume of the rectangular prism is 140 in^3 .



Example 2

Find the height of the rectangular prism with volume 225 cm^3 and base dimensions 5 cm by 5 cm.

Step 1: Find the area of the rectangular base.

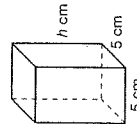
$$B = 5 \times 5 = 25 \text{ cm}^2$$

Step 2: Substitute in the volume formula to find the height.

$$V = B \times h \quad 225 = 25 \times h$$

$$9 = h$$

So, the height of the rectangular prism is 9 cm.

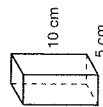


Guided Practice

1. Find the volume of the rectangular prism.

a. Find the area of the base. 20 cm^2

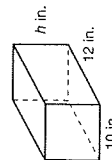
b. Find the volume. 200 cm^3



2. Find the height of the figure. The volume is 960 in^3 .

a. Find the area of the base. 120 in^2

b. Substitute in the volume formula to find the height. 8 in.



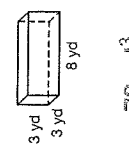
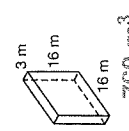
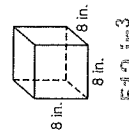
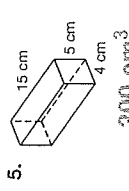
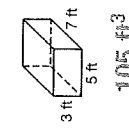
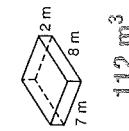
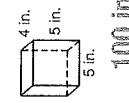
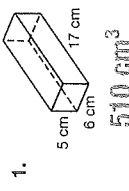
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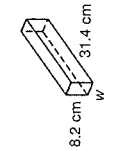
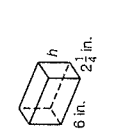
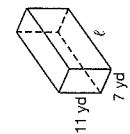
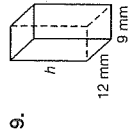
Class _____

SKILL 17: Practice

Find the volume of each rectangular prism.



Find the length, width, or height of the rectangular prism with the given volume.



$$V = 1,338.896 \text{ cm}^3$$

$$V = 50 \frac{5}{8} \text{ in}^3$$

$$h = 3 \frac{3}{4} \text{ in.}$$

Solve.

13. The Panama Canal has a length of 89,200 yd, a width of 37 yd, and a depth of 14 yd. Estimate the volume of water in the canal by assuming it has the shape of a rectangular prism.

$$\underline{46,205,600 \text{ yd}^3}$$

14. The freezer compartment in a refrigerator is 20 in. long, 16 in. wide, and 11 in. deep. What is the volume of the freezer compartment?

$$\underline{3,520 \text{ in}^3}$$



15. What is the volume of a cube that has sides of length 7 cm?

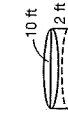
Skill 17

(A) 343 cm^3

(B) 294 cm^3

(C) 98 cm^3

(D) 49 cm^3



16. What is the surface area of the cylinder? Use 3.14 for π .

(F) 94.2 ft^2

(H) 188.4 ft^2

(J) 753.6 ft^2

Skill 16

SKILL 18: PROBLEM SOLVING: Choosing Between Surface Area and Volume

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SKILL 18: PROBLEM SOLVING: Choosing Between Surface Area and Volume

When solving word problems involving surface area and volume, it is important to ask yourself if you are filling up or covering the solid.

Example

A can of dog food has diameter 7.4 cm and height 10.3 cm. How much metal was used to make the can?

Read The diameter of the can is 7.4 cm, and the height is 10.3 cm.

Plan You are asked how much metal it would take to make the can, not how much it takes to fill the can. So, find the surface area.

Solve Find the surface area. The radius of the can is 3.7 cm.

Areas of 2 congruent circular bases:

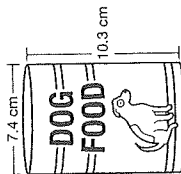
$$\begin{aligned} 2 \times \text{area of 1 circle} &= 2 \times \pi \times r^2 \\ &\approx 2 \times 3.14 \times 3.7^2 \\ &= 85.9732 \text{ cm}^2 \end{aligned}$$

Area of curved side of the can:

$$\begin{aligned} \text{circumference of base} \times \text{height} &= 2 \times \pi \times r \times h \\ &\approx 2 \times 3.14 \times 3.7 \times 10.3 \\ &= 239.3308 \text{ cm}^2 \end{aligned}$$

Add the areas: $85.9732 \text{ cm}^2 + 239.3308 \text{ cm}^2 = 325.304 \text{ cm}^2$
It takes about 325.3 cm^2 of metal to make the can.

Look Back See whether your answer makes sense. The areas of both circular bases and the area of the curved side were used. The multiplication and addition are correct. So, the answer seems to be the correct surface area.



Guided Practice

- The tunnel on Yerba Buena Island near San Francisco, California, is about 78 ft wide, 56 ft tall, and 540 ft long. Find the amount of air in the tunnel by assuming that the tunnel has the shape of a rectangular prism.

a. Will you find surface area or volume? volume

b. What dimensions are you given?

length: 540 ft; width: 78 ft; height: 56 ft

c. What equation for rectangular prisms can you use? $V = B \times h$

d. What is the amount of air in the tunnel? 2,358,720 ft³

Section C: Surface Area and Volume

Measurement 39

Name _____

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SKILL 18: Practice

- Juan is wrapping a box that contains a surprise gift for his mother. The box is 9 in. long, 7 in. wide, and 3 in. tall. How much wrapping paper will he use if he cuts paper to exactly fit the sides of the box? 222 in²

- At a winter festival, a city hires local artists to make ice sculptures. One artist started with a block of ice 6 ft tall, 3 ft wide, and 3 ft long. She chipped away $\frac{1}{3}$ of the ice to make a polar bear. How much ice was in the polar bear itself? 36 ft³

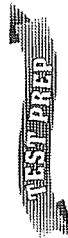
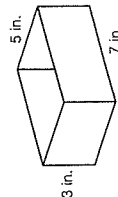
- A pool for water lilies has the shape of a rectangular prism 10 ft long, 4 ft wide, and 4 ft deep. How much water can the pool hold? 160 ft³

- A box of shredded wheat cereal measures 7 in. by 10 in. by 2 in. How much cardboard is used for the box? (Assume no overlap.) 208 in²

- Doreen has a large sandbox that holds twice the amount of sand that her small sandbox will hold. The small sandbox is 3 ft by $2\frac{1}{2}$ ft by 1 ft. How much sand can the large sandbox hold when filled level to the top? 15 ft³

- A stick of butter is shaped like a rectangular prism. The stick of butter is 5 in. long, $1\frac{1}{2}$ in. wide, and $1\frac{1}{2}$ in. thick. How much butter does the stick contain? $11\frac{1}{4}$ in³

- A rectangular box with no top is 7 in. long, 5 in. wide, and 3 in. deep. If Hector paints the outside of the box (sides and bottom) with gold paint, what is the measure of what he will paint? 107 in²



- An aquarium is 3 ft long, $1\frac{1}{2}$ ft wide, and 2 ft deep. How much water can the aquarium hold? Skill 18

A $13\frac{1}{2}$ ft³ C 9 ft³

B 27 ft³ D $4\frac{1}{2}$ ft³

F 44 in³ H 80 in³

G 48 in³ J 88 in³

SKILL 19: Connecting Volume, Mass, and Capacity

Student pages 41–42

Name _____ Date _____ Class _____

SKILL 19: Connecting Volume, Mass, and Capacity



One liter fills 1,000 cm³ of space. In science, you learn that the mass of 1 cm³ of water is 1 g (1 gram).

Example

What is the mass of the water that the aquarium can hold?

Step 1: Find the volume.

$$20 \text{ cm} \times 20 \text{ cm} \times 40 \text{ cm} = 16,000 \text{ cm}^3$$

Step 2: Change cm³ to mL.

$$1 \text{ cm}^3 \text{ holds } 1 \text{ mL}$$

So, 16,000 cm³ holds 16,000 mL.

Step 3: Change mL to g.

$$1 \text{ mL of water has a mass of } 1 \text{ g}$$

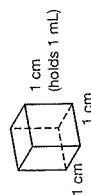
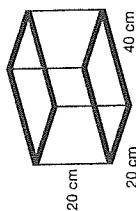
So, 16,000 mL has a mass of 16,000 g.

Step 4: Change g to kg.

$$1 \text{ kg} = 1,000 \text{ g}$$

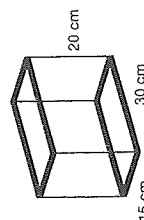
$$\text{So, } 16,000 \text{ g} = 16,000 \div 1,000 = 16 \text{ kg}$$

The mass of the water the aquarium will hold is 16 kg.



Guided Practice

Find the mass, in kilograms, of the water the aquarium can hold.



1. a. Find the volume. 9,000 cm³
b. Change cm³ to mL. 9,000 mL
c. Change mL to g. 9,000 g
d. Change g to kg. 9 kg

Complete each sentence.

2. A 1,000 cm³ container holds 1,000 mL of water, which is 1 L.
3. 1 L of water has a mass of 1,000 g, which is 1 kg.
4. A 3,000 cm³ container holds 3,000 mL of water, which is 3 L.
5. 2,000 mL of water fills a 2,000 cm³ container.
6. 25 L of water has a mass of 25,000 g, which is 25 kg.
7. 2 kg of water has a volume of 2 L.

Section C: Surface Area and Volume

Measurement 41

Name _____ Date _____ Class _____

SKILL 19: Practice

Complete the table.

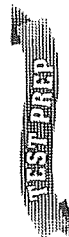
	Volume (cm ³)	Amount of water (L)	Amount of water (mL)	Mass of water (kg)	Mass of water (g)
1. Aquarium A	25,000	25	25,000	25	25,000
2. Aquarium B	1,800	1.8	1,800	1.8	1,800
3. Aquarium C	120,000	120	120,000	120	120,000
4. Aquarium D	44,600	44.6	44,600	44.6	44,600

Complete each sentence.

5. 1,800 mL of water would fill a(n) 1,800 cm³ container.
6. 2.9 kg of water would fill a(n) 2,900 mL container.
7. 1.25 L of water has a mass of 1.25 kg.
8. A 50 cm³ container can hold 0.05 L.

Solve.

9. A bucket and the water in it have a combined mass of 5 kg. If you put enough additional water in the bucket to increase the combined mass to 5.3 kg, how many liters of water have you added? 0.3 L
10. A drinking glass contains 210 grams of water. How many cubic centimeters of water are in the glass? 210 cm³



11. Mark is going to carry a bottle of water on a camping trip. If he fills the bottle with 0.75 L of water, how much mass does the water itself add to the mass of his backpack? Skill 19
12. How much wood do you paint if you paint the outside of a closed, rectangular wooden box that is 40 cm by 30 cm by 25 cm? Skill 18

- F 95 cm³ H 5,900 cm²
G 2,950 cm² J 30,000 cm³

- A 75 g C 75 kg
B 750 g D 750 kg

42 Measurement

Section C: Surface Area and Volume

SKILL 20: Converting Between Measurement Systems

Student pages 43-44

Name _____

Date _____

Class _____



SKILL 20: Converting Between Measurement Systems

You have learned to convert units within the metric system or the U.S. Customary system. For some tasks, however, it is necessary to convert from one system to the other. The table at the right shows some of the common conversion factors for converting units from one system to the other.

Conversion Factors	
Length	
1 in. = 2.54 cm	
1 km = 0.62 mi	
Area	
1 in ² = 6.45 cm ²	
Volume	
1 in ³ = 16.39 cm ³	
Capacity	
1 L = 1.06 qt	
Weight	
1 oz = 28 g	
1 kg = 2.2 lb	

Example 1

Convert 30 in. to the nearest centimeter.

Use $\frac{2.54 \text{ cm}}{1 \text{ in.}}$ as the conversion factor, since you are converting to centimeters.

$$30 \text{ in.} = \frac{30 \cancel{\text{in.}}}{1} \times \frac{2.54 \text{ cm}}{1 \cancel{\text{in.}}} \\ = (30 \times 2.54) \text{ cm} \\ = 76.2 \text{ cm} \approx 76 \text{ cm}$$

So, 30 in. is about 76 cm.

Cancel matching units.

Simplify.

Multiply. Round to a whole number.

Example 2

Convert 25 qt to the nearest liter.

Multiply by the conversion factor $\frac{1 \text{ L}}{1.06 \text{ qt}}$, since you are converting to liters.

$$25 \text{ qt} \approx \frac{25 \cancel{\text{qt}}}{1} \times \frac{1 \text{ L}}{1.06 \cancel{\text{qt}}} \\ \approx \frac{25}{1.06} \text{ L} \\ \approx 23.58 \text{ L} \approx 24 \text{ L}$$

So, 25 qt is about 24 L.

Cancel matching units.

Simplify.

Divide. Round to a whole number.

Guided Practice

- Convert 15 kg to the nearest pound.
 - What conversion factor will you use?

$$\frac{2.2 \text{ lb}}{1 \text{ kg}} \times \frac{15 \text{ kg}}{1} = \frac{33 \text{ lb}}{1}$$
 - Complete the calculations for the conversion.

$$15 \text{ kg} \approx \frac{15 \cancel{\text{kg}}}{1} \times \frac{2.2 \text{ lb}}{1 \cancel{\text{kg}}} \\ \approx (15 \times 2.2) \text{ lb} \\ \approx 33 \text{ lb}$$
- How many miles long is a 5 km race? Give your answer to the nearest mile.
 - $5 \text{ km} \approx \frac{5 \cancel{\text{km}}}{1} \times \frac{0.62 \text{ mi}}{1 \cancel{\text{km}}} = 3.1 \text{ mi} \approx 3 \text{ mi}$
 - $5 \text{ km} \approx 3 \text{ mi}$

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Name _____

Date _____

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SKILL 20: Practice

Convert each measure. Round to the nearest unit.

- 12 in. $\approx$ 30 cm
- 500 g $\approx$ 18 oz
- 26 oz $\approx$ 728 g
- 50 cm $\approx$ 20 in.
- 15 lb $\approx$ 7 kg
- 25 kg $\approx$ 55 lb
- 100 km $\approx$ 62 mi
- 55 mi $\approx$ 89 km
- 18 L $\approx$ 19 qt
- 10 in³ $\approx$ 164 cm³
- 100 in³ $\approx$ 1,639 cm³
- 65 cm³ $\approx$ 4 in³

Which of the two measurements is greater?

- 200 km or 150 mi 150 mi
- 45 in. or 100 cm 45 in.
- 24 L or 24 qt 24 L
- 750 g or 16 oz 750 g

Solve. Round to the nearest unit.

- How many quarts are there in five 2-liter bottles? 11 quarts
- If you drive 90 kilometers in an hour, how many miles have you driven? 56 miles
- A recipe calls for 450 grams of flour.
 - How many ounces of flour is this? 16 ounces
 - How many pounds of flour is this? 1 pound
- A 52-inch square tablecloth is big enough to cover Mary's table. She found a tablecloth on sale that is a 140-centimeter square. Is the tablecloth big enough to cover Mary's table? Why? yes; 140 cm > 52 in.



- Convert 20 in. to the nearest centimeter. Use 1 in. = 2.54 cm.

Skill 20

 - 508 cm
 - 51 cm
 - 8 cm
 - 7 cm

- The water in a glass has a mass of 90 g. How many liters of water does the glass contain?

Skill 19

 - 90 L
 - 0.9 L
 - 9 L
 - 0.09 L

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SKILL 21: Volume of Triangular Prisms and Cylinders

Name _____ Date _____ Class _____



SKILL 21: Volume of Triangular Prisms and Cylinders

The volume of prisms and cylinders is the product of the area of the base (B) and the height (h).

Example 1

Find the volume of the triangular prism.

Step 1: Find the area of the base.
Use the formula for area of a triangle.

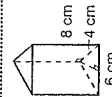
$$B = \frac{1}{2} \times (b \times h)$$

$$= \frac{1}{2} \times (6 \times 4) = \frac{1}{2} \times 24 = 12 \text{ cm}^2$$

$$V = B \times h = 12 \times 8 = 96 \text{ cm}^3$$

Step 2: Find the volume.

The volume of the triangular prism is 96 cm^3 .



Example 2

Find the volume of the cylinder.

Step 1: Find the area of the base.
Use the formula for area of a circle. Use 3.14 for π .

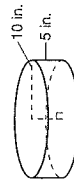
$$B = \pi \times r^2$$

$$= 3.14 \times 10^2 = 3.14 \times 100 = 314 \text{ in}^2$$

$$V = B \times h = 314 \times 5 = 1,570 \text{ in}^3$$

Step 2: Find the volume.

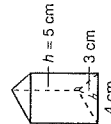
The volume of the cylinder is $1,570 \text{ in}^3$.



Guided Practice

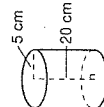
Find the volume of the triangular prism.

- What figure is the base? triangle
- What is the area of the base? 6 cm^2
- What is the prism's height? 5 cm
- What is its volume? 30 cm^3



Find the volume of the cylinder. Use 3.14 for π .

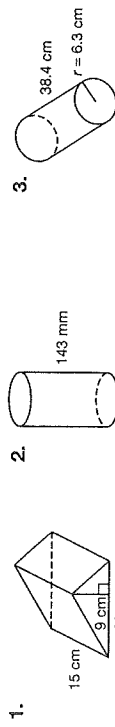
- What figure is the base? circle
- What is the area of the base? 78.5 cm^2
- What is the height? 20 cm
- What is the volume? $1,570 \text{ cm}^3$



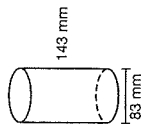
Name _____ Date _____ Class _____

SKILL 21: Practice

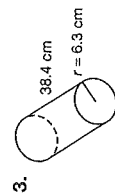
Find the volume of each solid. Use 3.14 for π . Round each answer to a whole number.



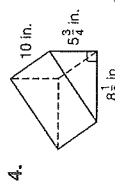
$1,553 \text{ cm}^3$



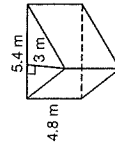
$773,325 \text{ mm}^3$



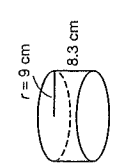
$4,786 \text{ cm}^3$



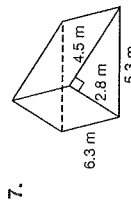
244 in^3



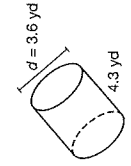
39 m^3



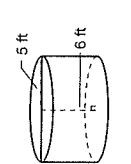
$2,111 \text{ cm}^3$



40 m^3



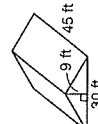
44 yd^3



471 ft^3

Solve.

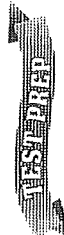
10. The attic of Karen's house has the shape of the triangular prism shown at the right. Find the volume of the attic.



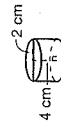
$6,075 \text{ ft}^3$

11. A cylindrical cookie tin has a diameter of 10 in. and a height of $3\frac{1}{2}$ in. How many cubic inches of cookies can it hold? Round your answer to the nearest cubic inch.

275 in^3



12. Find the volume of the cylinder.
Use 3.14 for π .



100.48 cm^3

13. Convert 30 km to the nearest mile. Use 1 km = 0.62 mi.

- F 48 mi H 19 mi
G 18 mi J 186 mi

50.24 cm^3

75.36 cm^3

Skill 20

Skill 21