



Name _____

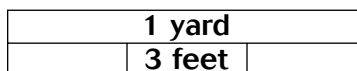
Customary Units of Length

R 11-1

To change from a larger unit of length to a smaller unit, **multiply**.

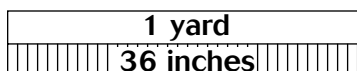
yards to feet

Number of yards \times 3



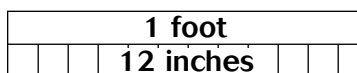
yards to inches

Number of yards \times 36



feet to inches

Number of feet \times 12



miles to feet

Number of miles \times 5,280



To change from a smaller unit of length to a larger unit, **divide**.

feet to yards

Number of feet \div 3

inches to yards

Number of inches \div 36

inches to feet

Number of inches \div 12

feet to miles

Number of feet \div 5,280

15 ft = ? yd

A foot is a smaller unit than a yard.



3 ft = 1 yd

So, divide 15 by 3.

15 \div 3 = 5
15 ft = 5 yd

Divide.

2 ft = ? in.

A foot is a greater unit than an inch.



1 ft = **12** in.

So, multiply 2 by 12.

2 \times 12 = 24
2 ft = 24 in.

Multiply.

You can change units of length to larger or smaller units to add and subtract measurements.

$$\begin{array}{r} 7 \text{ ft } 6 \text{ in.} \\ + 4 \text{ ft } 10 \text{ in.} \\ \hline 11 \text{ ft } 16 \text{ in.} \end{array}$$

Rename 16 in.
as 1 ft 4 in.

→ 12 ft 4 in.

$$\begin{array}{r} 4 \text{ ft } 20 \text{ in.} \\ \cancel{5} \text{ ft } \cancel{8} \text{ in.} \\ - 2 \text{ ft } 11 \text{ in.} \\ \hline 2 \text{ ft } 9 \text{ in.} \end{array}$$

Rename 5 ft 8 in.
as 4 ft 20 in.

1. 6 ft = _____ in.

2. 36 in. = _____ ft

3. 2 mi = _____ ft

4. 72 in. = _____ yd

5. 2 yd = _____ in.

6. 48 in. = _____ ft

Add or subtract. Change to a larger unit when possible.

7. $\begin{array}{r} 14 \text{ yd } 1 \text{ ft} \\ + 8 \text{ yd } 1 \text{ ft} \\ \hline \end{array}$

8. $\begin{array}{r} 8 \text{ ft } 10 \text{ in.} \\ + 9 \text{ ft } 9 \text{ in.} \\ \hline \end{array}$

9. $\begin{array}{r} 21 \text{ ft } 9 \text{ in.} \\ - 5 \text{ ft } 5 \text{ in.} \\ \hline \end{array}$

10. $\begin{array}{r} 6 \text{ yd } 2 \text{ ft} \\ - 2 \text{ yd } 3 \text{ ft} \\ \hline \end{array}$

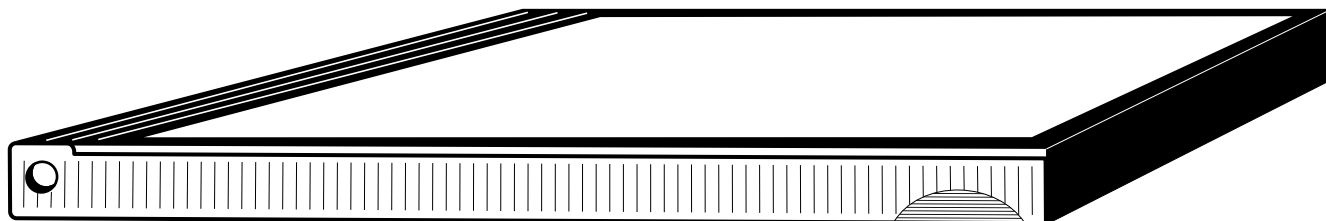


Name _____

Customary Units of Length

H 11-1

Look at the CD case pictured below. Use a ruler to measure its length to each unit given.



1. nearest in. _____

2. nearest $\frac{1}{2}$ in. _____

3. nearest $\frac{1}{4}$ in. _____

4. nearest $\frac{1}{8}$ in. _____

5. 96 ft = _____ yd

6. 5 mi = _____ ft

7. 72 in. = _____ yd

8. 216 in. = _____ yd

9. 39 in. = _____ ft _____ in.

10. 65 in. = _____ ft _____ in.

Add or subtract. Change to a larger unit when possible.

11.
$$\begin{array}{r} 12 \text{ yd } 2 \text{ ft} \\ + 11 \text{ yd } 2 \text{ ft} \\ \hline \end{array}$$

12.
$$\begin{array}{r} 4 \text{ mi } 560 \text{ ft} \\ - 2 \text{ mi } 1,200 \text{ ft} \\ \hline \end{array}$$

13.
$$\begin{array}{r} 17 \text{ ft } 8 \text{ in.} \\ + 9 \text{ ft } 6 \text{ in.} \\ \hline \end{array}$$

14.
$$\begin{array}{r} 13 \text{ ft } 5 \text{ in.} \\ - 9 \text{ ft } 10 \text{ in.} \\ \hline \end{array}$$

15.
$$\begin{array}{r} 20 \text{ yd } 1 \text{ ft } 4 \text{ in.} \\ + 16 \text{ ft } 8 \text{ in.} \\ \hline \end{array}$$

16.
$$\begin{array}{r} 31 \text{ ft } 4 \text{ in.} \\ - 15 \text{ ft } 4 \text{ in.} \\ \hline \end{array}$$

Test Prep Circle the correct letter for each answer.

17. Which measurement is the same as 4 yards 1 foot 3 inches?

- A** 4 yards 18 inches **B** 159 inches **C** 51 inches **D** 3 yards 3 feet 3 inches

18. Which measurement is the same as 6 feet 6 inches?

- F** 72 inches **G** 36 inches **H** $2\frac{1}{2}$ yards **J** 2 yards 6 inches

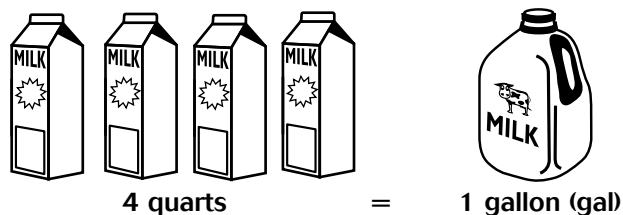
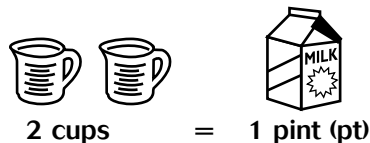
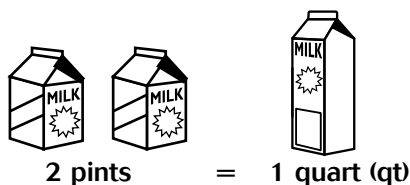
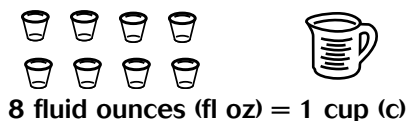


Name _____

Customary Units of Capacity and Weight

R 11-2

Customary Units of Capacity



Customary Units of Weight

16 ounces (oz) = 1 pound (lb)

2,000 pounds = 1 ton (T)

Example 1

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

$$5 \text{ qt} = \square \text{ gal}$$

A quart is a smaller unit than a gallon so you will divide.

$$4 \text{ qt} = 1 \text{ gal}$$

$$5 \div 4 = 1 \text{ R}1$$

$$5 \text{ qt} = 1 \text{ gal } 1 \text{ qt}$$

You can change units of capacity or weight to larger or smaller units to add and subtract measurements.

Example 3

$$\begin{array}{r} 4 \text{ gal } 2 \text{ qt} \\ - 1 \text{ gal } 3 \text{ qt} \\ \hline 2 \text{ gal } 3 \text{ qt} \end{array}$$

Rename 4 gal 2 qt as 3 gal 6 qt.

Example 2

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

$$4.5 \text{ T} = \square \text{ lb}$$

A ton is a larger unit than a pound, so you will multiply.

$$1 \text{ T} = 2,000 \text{ lb}$$

$$4.5 \times 2,000 = 9,000 \text{ lb}$$

Example 4

$$\begin{array}{r} 7 \text{ lb } 5 \text{ oz} \\ + 6 \text{ lb } 12 \text{ oz} \\ \hline 13 \text{ lb } 17 \text{ oz} \end{array}$$

Rename 17 oz as 1 lb 1 oz.

$$13 \text{ lb } 17 \text{ oz} = 13 \text{ lb} + 1 \text{ lb} + 1 \text{ oz} = 14 \text{ lb } 1 \text{ oz}$$

1. $9 \text{ pt} = \underline{\hspace{1cm}} \text{ c}$

2. $2 \text{ gal} = \underline{\hspace{1cm}} \text{ qt}$

3. $8 \text{ c} = \underline{\hspace{1cm}} \text{ pt}$

4. $6 \text{ gal} = \underline{\hspace{1cm}} \text{ qt}$

5. $64 \text{ oz} = \underline{\hspace{1cm}} \text{ lb}$

6. $12,000 \text{ lb} = \underline{\hspace{1cm}} \text{ T}$



Name _____

Customary Units of Capacity and Weight

H 11-2

- | | |
|----------------------|--------------------------------|
| 1. 12 qt = _____ gal | 2. 16 pt = _____ qt |
| 3. 16 pt = _____ gal | 4. 24 fl oz = _____ c |
| 5. 12 lb = _____ oz | 6. 55 oz = _____ lb _____ oz |
| 7. 80 oz = _____ lb | 8. 3,750 lb = _____ T _____ lb |

Give an appropriate unit of customary measure for each.

9. a can of fruit juice _____
10. 1 serving of milk _____
11. a bowl of soup _____
12. a chicken sandwich _____

Add or subtract. Change to a larger unit when possible.

13. 2 qt 1 c + 3 qt 1 c _____
14. 12 lb 7 oz – 8 lb 8 oz _____
15. 9 gal 3 qt – 6 gal 1 qt _____
16. 15,000 lb + 17,000 lb _____
17. How many 3-oz servings are in a 3-lb bag of peeled baby carrots?

Test Prep Circle the correct letter for each answer.

18. Write an expression for the number of fluid ounces in n gallons.

A $64n$ **B** $32n$ **C** $48n$ **D** $128n$

19. Write an expression for the number of ounces in n tons.

F $4,000n$ **G** $32,000n$ **H** $4,8000n$ **J** $64,000n$



Name _____

Problem-Solving Skill

R 11-3

Is an Estimate Enough?

Whether or not an exact answer is needed depends on the situation. Some problems can be solved by finding an estimate. Others require an exact answer.

Example 1 Ming needs 50 in. of ribbon for a craft project. She has 24 in. remaining on one roll and 31 in. on another. Does she have enough ribbon?

24 rounds down \longrightarrow 20 31 rounds down \longrightarrow 30

$$30 + 20 = 50$$

Since both numbers were rounded down, the exact answer will be greater than 50. An estimate is all that is needed.

Example 2 Bill has \$50.00. Can he buy a shirt for \$22.00 and a shirt for \$29.00?

22 rounds down \longrightarrow 20 29 rounds up \longrightarrow 30

$$30 + 20 = 50$$

Since one number was rounded up and the other was rounded down, you can't tell whether the estimate would be greater or less than the exact answer. You should find the exact answer.

Anne earned \$14.00 from her dog walking job. She added this amount to the \$27.63 she had saved. She wants to order the craft box described below.

Item Number	Description	Cost of Item	Shipping and Handling
62276	Craft Box	\$35.75	\$6.47

Use the information above for Exercises 1–5.

1. What is the cost of the craft box without shipping fees? _____
2. What is the cost of shipping? _____
3. How much money does Anne have? _____
4. Estimate how much the craft box will cost, including shipping. _____
5. Do you need to find the exact cost of the craft box, including shipping, in order to tell if Anne has enough money to pay for it? Explain.



Name _____

Problem-Solving Skill

Is an Estimate Enough?

H 11-3

Answer each question.

Nicole wants to order a crystal radio kit.
Use the information from the catalog page
to answer the questions.

Crystal Radio Kit *Special Discount!*

Item #24-016 Radio Kit
Regular base price, \$14.95

Sale price—now only \$12.89

Build your own working radio in
less than 2 hours!

Size when assembled:
about 8 in. by 6 in.

Shipping Costs \$1.75

1. Which is true of the price of the crystal radio kit?
 - a. Its price is now more than \$13.00.
 - b. Its price was once more than \$13.00.
 - c. Its price is exactly \$13.00.
2. Which is true of the new price?
 - a. Including shipping costs, it is less than the old base price.
 - b. Including shipping costs, it is more than the old base price.
 - c. Including shipping costs, it is exactly the same as the old base price.
3. Which expression shows how much less the sale price is, without shipping costs, than the regular price?
 - a. $\$14.95 - \$12.89 = \$2.06$
 - b. $\$14.95 - \$1.25 = \$13.70$
 - c. $\$12.89 - \$1.25 = \$11.64$
4. Marilyn has \$6.48 from her piggy bank and \$8.55 saved from her birthday money. Can you estimate to find whether she can afford the radio kit plus shipping costs? Explain your answer.

5. How long does it take to build the radio? How do you know this is an estimate?

6. Suppose Nico wants to build 3 radios. He has \$50.

- a. Does he have enough money to buy 3 radio kits plus shipping cost? _____
- b. Do you have to find the exact amount of 3 radio kits plus shipping to figure out if he has enough money? Explain.

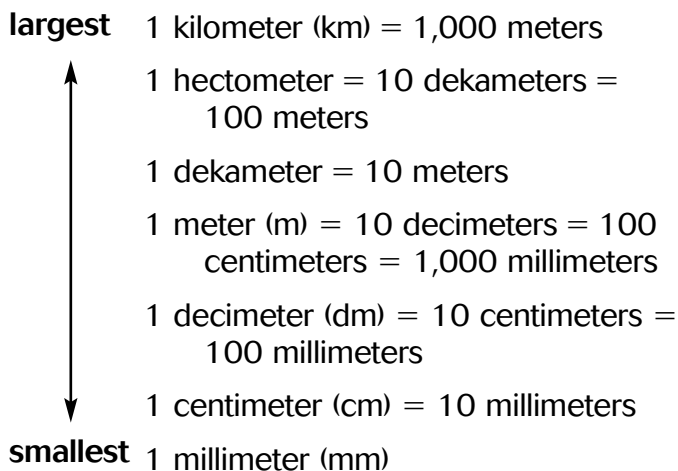


Name _____

Metric Units of Length

R 11-4

You can change a measurement from one metric unit to another. To change from a larger unit to a smaller unit, multiply. To change from a smaller unit to a larger unit, divide.



Example 1

600 cm = ? m A centimeter is a smaller unit than a meter. Divide. \longrightarrow 100 cm = 1 m \longrightarrow 600 \div 100 = 6
 So, divide 600 by 100. 600 cm = 6 m

Example 2

3 m = ? cm A meter is a greater unit than a centimeter. Multiply. \longrightarrow 1 m = 100 cm \longrightarrow 3 \times 100 = 300
 So, multiply 3 by 100. 3 m = 300 cm

1. 70 cm = ? dm

70 \div _____ = _____

70 cm = _____ dm

2. 35 m = ? cm

35 \times _____ = _____

35 m = _____ cm

3. 2,000 m = _____ km

4. 40 mm = _____ cm

5. 4.2 dm = _____ cm

6. 660 cm = _____ mm

7. 5.1 km = _____ m

8. 500 cm = _____ dm



Name _____

Metric Units of Length

H 11-4

1. 270 mm = _____ cm 2. 6 cm = _____ mm 3. 3,600 cm = _____ m
4. 710 cm = _____ dm 5. 300 cm = _____ m 6. 700 cm = _____ m
7. 53.5 dm = _____ mm 8. 520 cm = _____ dm 9. 28 dm = _____ cm
10. 6 mm = _____ cm 11. 4,900 m = _____ km 12. 3 km = _____ m
13. 853 cm = _____ dm 14. 4.5 m = _____ cm 15. 900 m = _____ km
16. 125 mm = _____ cm 17. 300 mm = _____ m 18. 7,300 m = _____ km
19. 68 m = _____ mm 20. 2.5 cm = _____ dm 21. 51 mm = _____ cm

Complete each sentence with an appropriate metric unit of length.

22. A pen is about 16 long.

23. A CD is only 1 thick.

24. Brian biked 30 to the next town.

25. Karen's new car is 5 long.

26. Natalie plants 5 flowers in a row 15.4 cm apart.
How many centimeters long is the row?

Test Prep Circle the correct letter for each answer.

27. Which would be the best unit to measure the length of a table?

A mm **B** cm **C** dk **D** km

28. The width of a note pad is 7 cm. How many millimeters is this?

A 0.07 **B** 0.7 **C** 70 **D** 700



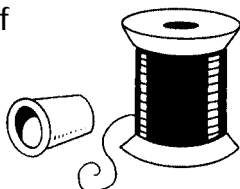
Name _____

Metric Units of Capacity and Mass

R 11-5

The milliliter (mL) and the liter (L) are units of capacity in the metric system.

The capacity of a thimble is about 1 mL.



$$1 \text{ mL} = 0.001 \text{ L}$$

The capacity of a quart carton is about 1 liter.



$$1 \text{ L} = 1,000 \text{ mL}$$

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

lettuce seed, 10 mg



paper clip, 1 g



kitten, 1 kg



$$1 \text{ kilogram (kg)} = 1,000 \text{ grams (g)}$$

$$1 \text{ gram} = 1,000 \text{ milligrams (mg)}$$

$$1 \text{ gram} = 0.001 \text{ kilogram}$$

$$1 \text{ milligram} = 0.001 \text{ gram}$$

Example 1

To change from a larger unit to a smaller unit, **multiply**.

$$2 \text{ kg} = \text{ } \text{g}$$

A kilogram is a larger unit than a gram, so you will multiply.

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

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

$$2 \text{ kg} = 2,000 \text{ g}$$

Example 2

To change from a smaller unit to a larger unit, **divide**.

$$3,500 \text{ mL} = \text{ } \text{L}$$

A milliliter is a smaller unit than a liter, so you will divide.

$$1,000 \text{ mL} = 1 \text{ L}$$

$$3,500 \div 1,000 = 3.5$$

$$3,500 \text{ mL} = 3.5 \text{ L}$$

1. $7,000 \text{ mL} = \text{ } \text{L}$

2. $2,600 \text{ mg} = \text{ } \text{g}$

3. $0.5 \text{ L} = \text{ } \text{mL}$

4. $0.7 \text{ kg} = \text{ } \text{g}$

5. $6,000 \text{ g} = \text{ } \text{kg}$

6. $10,500 \text{ ml} = \text{ } \text{L}$

Give an appropriate metric unit for each.

7. a math book _____

8. a water bottle _____

9. a spoon of vanilla _____

10. an egg _____



Name _____

Metric Units of Capacity and Mass

H 11-5

Mental Math

- | | |
|-----------------------|------------------------|
| 1. 1.7 g = _____ mg | 2. 4 L = _____ mL |
| 3. 8,200 mL = _____ L | 4. 12,100 mL = _____ L |
| 5. 30 kg = _____ g | 6. 0.5 g = _____ mg |
| 7. 530 g = _____ kg | 8. 48 L = _____ mL |
| 9. 4 kg = _____ g | 10. 5.9 L = _____ mL |

Give an appropriate metric unit of capacity for each.

- 11. lunch-size juice box _____
- 12. a bathtub _____
- 13. a barrel _____
- 14. teaspoon _____

Give an appropriate metric unit of mass for each.

- 15. a large watermelon _____
- 16. a peanut _____
- 17. a cow _____
- 18. a bar of soap _____

Test Prep Circle the correct letter for each answer.

19. Roger poured 4 full glasses of lemonade from a 1-liter pitcher. He used up all the lemonade in the pitcher. How many milliliters of lemonade does each glass hold?

A 25 **B** 250 **C** 4000 **D** 40

20. Alice paints model cars with paints that come in tiny jars. Each jar holds 15 mL of paint. Alice has 24 different colors of paint. If all the jars are full, how many liters of paint does Alice have?

F 36 **G** 360 **H** 0.36 **J** 0.036




Name _____


Problem-Solving Strategy


R 11-6

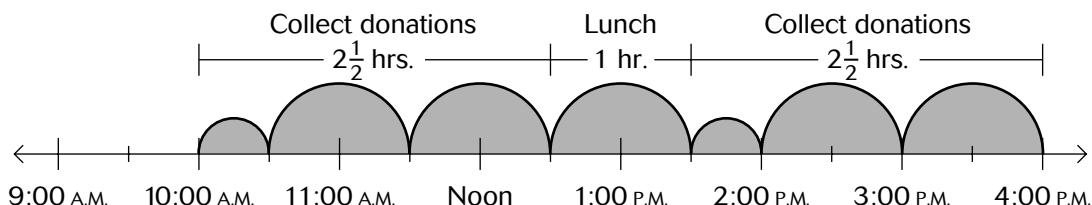
Work Backward


A local group collects donations for park improvements at a mall for $2\frac{1}{2}$ hours. Group members then take a 1-hour lunch break. After lunch, they collect donations for another $2\frac{1}{2}$ hours. They leave the mall at 4:00 P.M. At what time did they get to the mall in the morning?

 **Understand** You know what time the group finished and how much time they spent on each activity. You need to know what time they started.

 **Plan** You can **work backward** from the ending time to find the beginning time. “Turn back the clock” to see when each block of time begins. This will take you back to the time the group arrived at the mall.

 **Solve** Start at 4:00 P.M.. Count back $2\frac{1}{2}$ hours to find when they finished lunch.
Count back another hour to find when they started their lunch break.
Count back another $2\frac{1}{2}$ hours to find when they arrived at the mall.



 **Look Back** Add up the total amount of time they spent at the mall. Then add that total to the hour they arrived. Does that bring you to 4:00 P.M.?

Work backward to solve Exercises 1–2.

1. The group spends all the money they collect at the mall. They spend \$1,200 for park repairs and twice that amount for new playground equipment. How much money did they start with?

How much money did they spend on playground equipment? _____

How much money did they start with? _____

2. The group has an opening day event at the newly improved park. The day begins with 30 minutes of speeches. Then there is a concert that lasts $1\frac{1}{2}$ hours. After that there are 4 hours of races, games, and raffle drawings. The event ends at 3:30 P.M.

At what time did it begin? _____



Name _____

Problem-Solving Strategy

H 11-6

Work Backward

Work backward to solve Exercises 1–6.

1. Science Club members sponsored an event to raise money.
They used \$600 to build a planetarium. This was $\frac{1}{2}$ of the money raised. They used \$200 for lab equipment. The rest went into the Science Club account.
 - a. How much did the Science Club raise in all? _____
 - b. How much was deposited into the Science Club account? _____
2. A corporation donated money to the Science Club, asking that the club spend \$250 of it sponsoring a Science Fair and \$375 on classroom materials. After the club spent the money, they had \$175 of the donation left. How much money was donated? _____
3. A speaker from NASA spoke to the entire school for 1 hour, then to the science club for 45 minutes. She finished with a 30-minute video about Mars. The speaker left at 4:30P.M.. What time did she begin her talk to the entire school? _____
4. Three friends went to the Museum of Natural Science. They spent \$18 on tickets and \$11 on lunch. If they spent a total of \$37 at the museum, how much did they spend on things other than tickets and lunch? _____
5. Suppose the Science Club held two fund-raising dinners. They raised \$400 at one dinner, and \$500 at another. They then had \$3,200 in all. How much money did they have before the two fund raisers? _____
6. For one club contest, the club president thought of several secret numbers. Tell what each secret number is.
 - a. First she doubled the number. Then she added 3. Then she multiplied the sum by 3. She ended up with the number 81. Find the original secret number. _____
 - b. First she divided the number by 4. Then she added 6. Then she divided the sum by 2. She ended up with 6. Find the original secret number. _____
 - c. First she doubled the number. Then she doubled it again. Then she tripled it. She ended up with 96. Find the original secret number. _____



Name _____

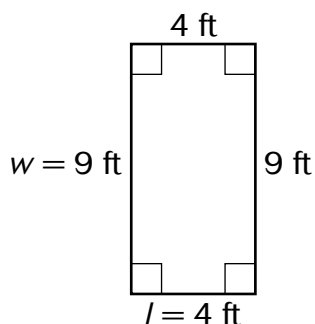
Perimeter and Circumference

R 11-7

The distance around a polygon is its **perimeter**. When polygons have two or more sides the same length, you can use a **formula** to find the perimeter.

Example 1

Find the perimeter of the rectangle.



l = length

w = width

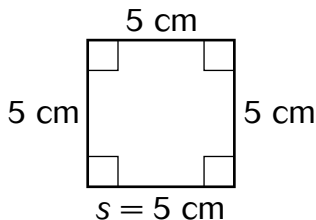
$$P = (2 \times l) + (2 \times w) = 2l + 2w$$

$$P = (2 \times 4) + (2 \times 9)$$

$$P = 8 + 18 = 26 \text{ ft}$$

Example 2

Find the perimeter of the square.



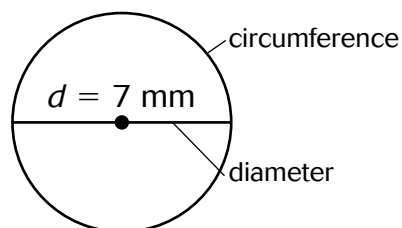
s = side

$$P = 4 \times s = 4s$$

$$P = 4 \times 5 = 20 \text{ cm}$$

Example 3

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



$$C = \pi \times d$$

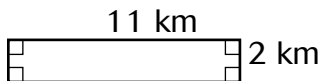
$$C = 3.14 \times 7$$

$$= 21.98 \text{ mm}$$

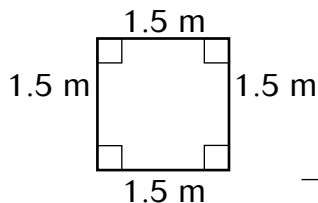
The distance across a circle, through its center, is the diameter of the circle. The distance around a circle is its circumference.

Find the perimeter or the circumference of each figure. Use 3.14 for π .

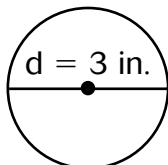
1.



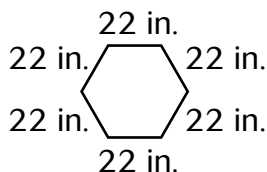
2.



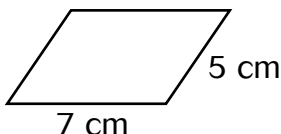
3.



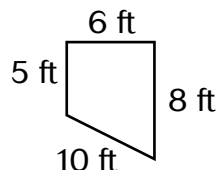
4.



5.



6.





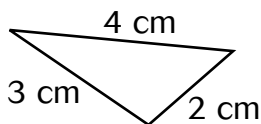
Name _____

Perimeter and Circumference

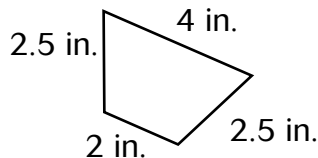
H 11-7

Find the perimeter or the circumference of each figure. Use 3.14 for π .

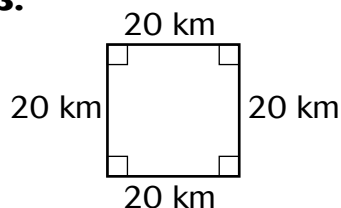
1.



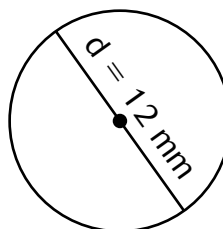
2.



3.

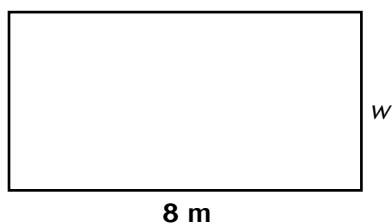


4.



Math Reasoning Find each missing measurement.

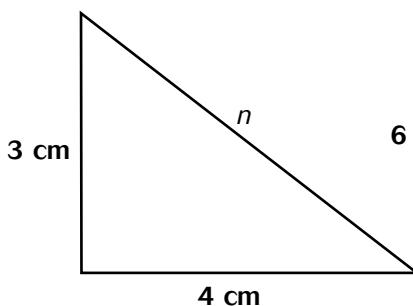
5.



$$P = 25 \text{ m}$$

$$w = \underline{\hspace{2cm}}$$

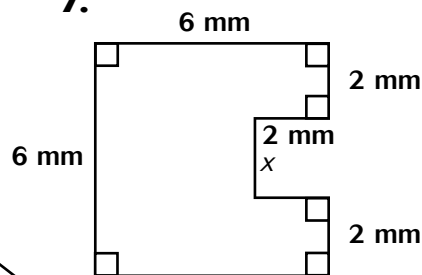
6.



$$P = 12 \text{ cm}$$

$$n = \underline{\hspace{2cm}}$$

7.



$$x = \underline{\hspace{2cm}}$$

$$P = \underline{\hspace{2cm}}$$

Test Prep Circle the correct letter for each answer.

8. Mica is gluing glass beads around the edge of a picture frame. The frame is 12 in. \times 14 in. She will place two beads on every inch of frame. About how many beads will she use?

A 26

B 168

C 104

D 52

9. Jordan is training for a relay race. He runs around a track that is 140 m by 300 m. Each time he trains, he runs around the track 6 times. How far does he run during each training session?

F 42,000 m

G 440 m

H 880 m

J 5,280 m

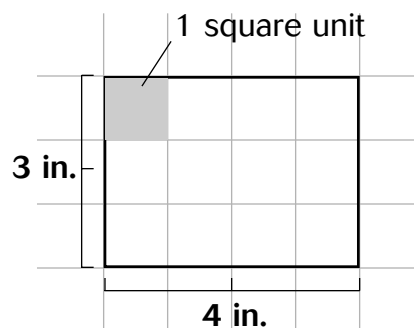


Name _____

Area

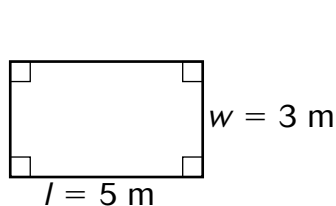
R 11-8

Area is the number of square units (units²) a figure covers. The area of this figure is 4×3 , or 12, square units. Each unit is a square inch, so there are 12 square inches (in²) in the figure.



Example 1

Find the area of the rectangle.



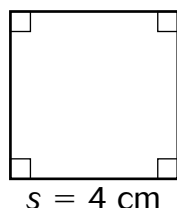
$$A = l \times w = lw$$

$$A = 5 \times 3$$

$$A = 15 \text{ square meters (m}^2\text{)}$$

Example 2

Find the area of the square.



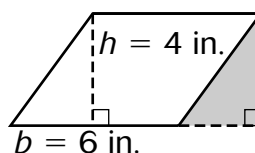
$$A = s \times s = s^2$$

$$A = 4 \times 4$$

$$A = 16 \text{ square centimeters (cm}^2\text{)}$$

Example 3

Find the area of the parallelogram.



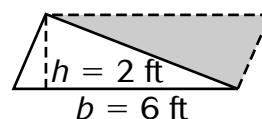
$$A = b \times h = bh$$

$$A = 6 \times 4$$

$$A = 24 \text{ square inches (in}^2\text{)}$$

Example 4

Find the area of the triangle.



$$A = \frac{1}{2} \times b \times h = \frac{1}{2}bh$$

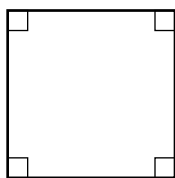
$$A = \frac{1}{2} \times 6 \times 2$$

$$A = \frac{1}{2} \times 12$$

$$A = 6 \text{ square feet (ft}^2\text{)}$$

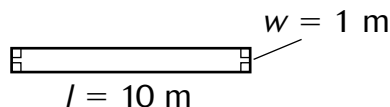
Find the area of each figure. Show which formula you used.

1.

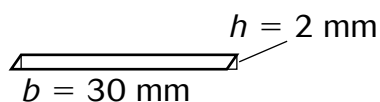


$$s = 6 \text{ mm}$$

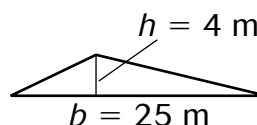
2.



3.



4.





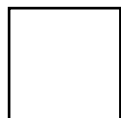
Name _____

Area

H 11-8

Find the area of each figure.

1.



$$s = 12 \text{ m}$$

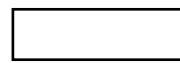
2.



$$w = 6 \text{ ft.}$$

$$l = 20 \text{ ft.}$$

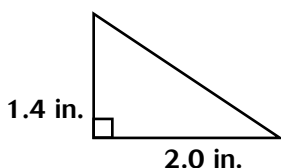
3.



$$w = 1.2 \text{ m}$$

$$l = 4.1 \text{ m}$$

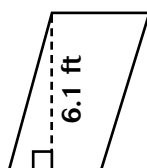
4.



1.4 in.

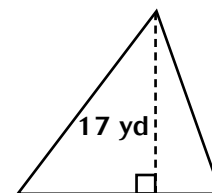
2.0 in.

5.



3.2 ft

6.



18.4 yd

Math Reasoning Find each missing measurement.

Test Prep Circle the correct letter for each answer.

7. $A = 540 \text{ in.}^2$

8. $A = 42 \text{ m}^2$

9. $A = 169 \text{ cm}^2$

10. $A = 64 \text{ m}^2$

$$l = 30 \text{ in.}$$

$$w = 5 \text{ m}$$

$$s = \underline{\hspace{2cm}}$$

$$s = \underline{\hspace{2cm}}$$

$$w = \underline{\hspace{2cm}}$$

$$l = \underline{\hspace{2cm}}$$

11. triangle

12. parallelogram

13. parallelogram

14. triangle

$$b = 14 \text{ m}$$

$$A = 72 \text{ in.}^2$$

$$A = 30 \text{ yd}^2$$

$$A = 72 \text{ cm}^2$$

$$h = 19 \text{ m}$$

$$h = 12 \text{ in.}$$

$$b = 5 \text{ yd}$$

$$h = 12 \text{ cm}$$

$$A = \underline{\hspace{2cm}}$$

$$b = \underline{\hspace{2cm}}$$

$$h = \underline{\hspace{2cm}}$$

$$b = \underline{\hspace{2cm}}$$

The Jai Alai Club is making a model playing field. The model field is 27 inches long and 15 inches wide. They can buy 1-inch squares of artificial grass. They can buy pieces of model fencing in 1-inch strips.

15. How many squares of grass will they need?

A 42

B 84

C 270

D 405

16. How many strips of fencing will they need?

F 42

G 84

H 270

J 405



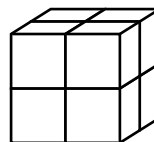
Name _____

Volume

R 11-9

You can use a formula to find the amount of space contained in a rectangular prism.

Volume is the measure in cubic units (units³) of a solid figure. The figure at the right has a volume of 8 cubic units.



Example 1

Find the volume of the rectangular solid. There are 10 cubes in the bottom layer and there are three layers.

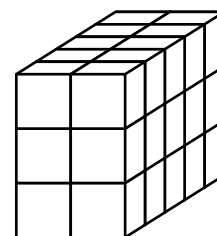
$$V = 10 \times 3 = 30 \text{ cubic units (units}^3\text{)}$$

You can use a formula to find the volume.

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

$$V = 5 \times 2 \times 3$$

$$V = 30 \text{ units}^3$$



Example 2

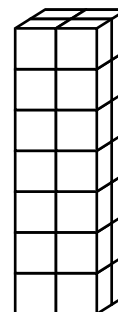
There are 4 cubes in the bottom layer and there are 7 layers.

You can use a formula to find the volume.

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

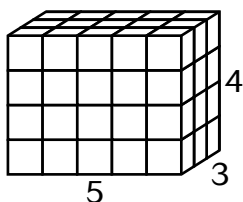
$$V = 2 \times 2 \times 7$$

$$V = 28 \text{ units}^3$$



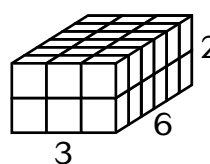
Find the volume of each rectangular prism.

1.



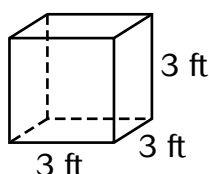
$$V = \underline{\quad} \times \underline{\quad} \times \underline{\quad} = \underline{\quad} \text{ units}^3$$

2.

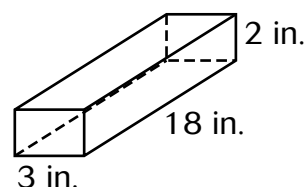


$$V = \underline{\quad} \times \underline{\quad} \times \underline{\quad} = \underline{\quad} \text{ units}^3$$

3.



4.





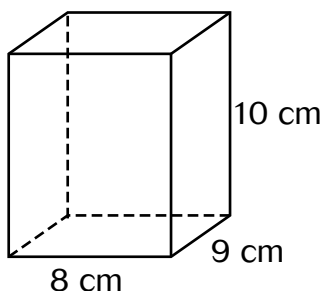
Name _____

Volume

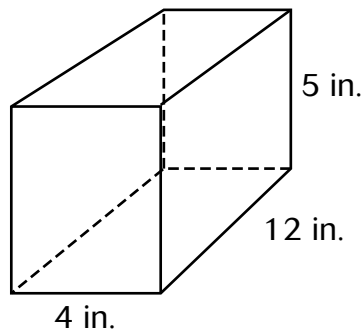
H 11-9

Find the volume of each rectangular prism.

1.



2.



3. a box with length 3 ft, width 7 ft, height 9 ft

4. a box with length 2 m, width 9 m, height 5 m

5. a box with length 4 mm, width 4 mm, height 1 mm

6. a box with length 2 cm, width 3 cm, height 7 cm

7. Derrick made a wooden box that is 20 cm long, 20 cm wide, and 15 cm high. What is the volume of the box?

8. An aquarium is $1\frac{1}{2}$ ft tall, 2 ft long and 1 ft wide. What is the volume of the aquarium?

9. **Math Reasoning** What is the volume, in inches, of the aquarium in Exercise 8?

Find the missing measurement.

10. Jenny made a cardboard box that is 4 ft wide and 5 ft long. The box has a volume of 100 ft^3 . What is the height of the box?

11. The volume of a plastic shoe box is 900 in.^3 . Its length is 15 in. and its height is 6 in. what is the width?

Test Prep Circle the correct letter for each answer.

Find the volume.

12. $l = 4, w = 8, h = 3$

A 32 units^3

B 24 units^3

C 48 units^3

D 96 units^3

13. $l = 12, w = 4, h = 10$

F 48 units^3

G 240 units^3

H 480 units^3

J 120 units^3



Name _____

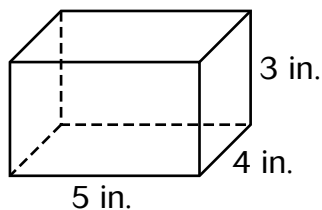
Surface Area

R 11-10

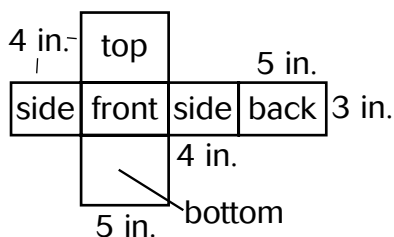
Surface area is the sum of the areas of all the faces of a solid figure.

Example 1

Find the surface area of the figure.



You could cut the figure apart and unfold it.



Add the areas of all the faces to find the surface area.

front area + back area + side area + side area + top area + bottom area

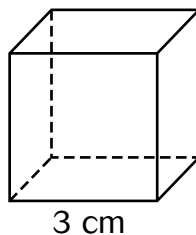
$$(5 \times 3) + (5 \times 3) + (4 \times 3) + (4 \times 3) + (5 \times 4) + (5 \times 4)$$

$$15 + 15 + 12 + 12 + 20 + 20$$

$$\text{Surface area} = 94 \text{ in.}^2$$

Example 2

Find the surface area of the cube. Each side of the cube is a square and each has an area of $3 \times 3 = 9 \text{ cm}^2$.

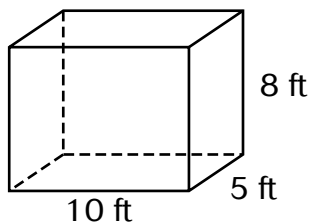


$$\text{Surface area} = 9 \text{ cm}^2 + 9 \text{ cm}^2 + 9 \text{ cm}^2 + 9 \text{ cm}^2 + 9 \text{ cm}^2 + 9 \text{ cm}^2$$

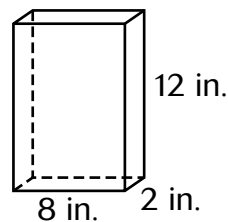
$$\text{Surface area} = 6 (9 \text{ cm}^2) = 54 \text{ cm}^2.$$

Find the surface area of each figure.

1.



2.





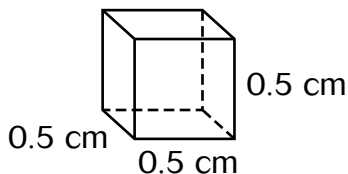
Name _____

Surface Area

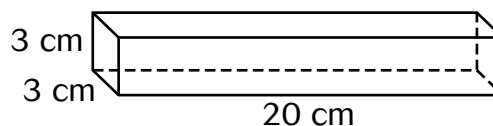
H 11-10

Find the surface area of each figure.

1.

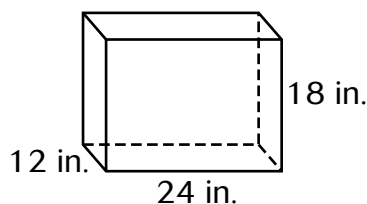


2.



3. What is the surface area of the glass used to make this aquarium?

4. This topless box has a surface area of 125 cm^2 . What is the area of one of the sides? What is the length of one side?

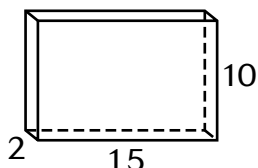


5. Miguel plans to paint the walls and the ceiling of a room white. The room is 10 ft wide and 12 ft long. The ceilings are 8 ft above the floor. Miguel has one can of paint that covers 450 ft^2 of surface. Will he have enough paint? Explain.

6. **Algebra** Write an expression for the surface area of a rectangular prism with sides l , w , and h .

Test Prep Circle the correct letter for each answer.

Find the surface area of each figure.



7. **A** 300 square units
B 340 square units
C 400 square units
D 500 square units



8. **F** $\frac{3}{4} \text{ in.}^2$
G $1 \frac{1}{2} \text{ in.}^2$
H 1 in.^2
J $1 \frac{3}{4} \text{ in.}^2$




Name _____


Problem-Solving Application


Using Appropriate Units of Measure


R 11-11

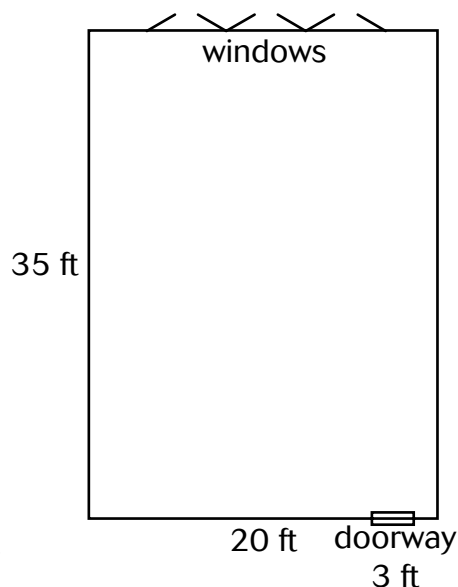
Caleb's Design House is planning to restore a historic home. One of the projects includes refinishing the floor in the Great Room sketched at the right. How much varnish will Caleb need to purchase?

 **Understand** You need to find the area that will be varnished.

 **Plan** You can find the area of the floor.

 **Solve** Use the formula $A = lw$
 $A = 35 \times 20 = 700 \text{ ft}^2$
Caleb should order enough varnish to cover 700 ft^2 .

 **Look Back** Using ft^2 as a unit is correct because the varnish needs to cover an area and area is measured in square units.



For Exercises 1–3, tell if you need to find perimeter, area, or volume. Then solve the problem and give your answer using appropriate units.

1. Once the floor has been refinished, Caleb plans to place a rug in the center of the room. The rug measures 30 ft by 20 ft. How much of the varnished floor will show once the rug is in place? _____
2. Historical pictures indicate that the room originally had a geometric border along each wall where the wall meets the ceiling. The border was 6 inches wide. How much border will Caleb need to replace the original? _____
3. In the Great Room, the ceiling is 15 feet above the floor. Caleb will need to order an air conditioner to cool the room based on the amount of air in the room. What number will he use when he shops for an air conditioner? _____

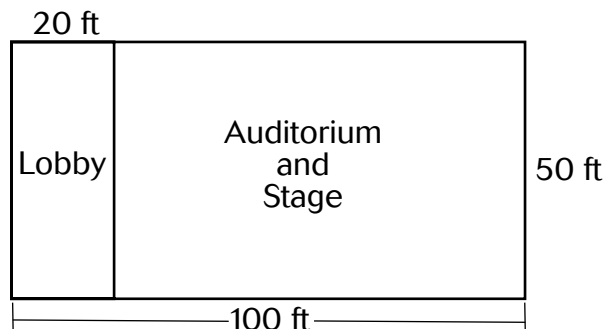


Name _____

Problem-Solving Application

Using Appropriate Units of Measure

H 11-11



1. The drama club at Hawthorn School decided to work together to redecorate parts of their theater. They decided to tile the floor in the theater's lobby. How much tile will they need? Explain how you found your answer.

Students should indicate that they added the areas of each part of the lobby.

2. The lobby walls are 12 ft high. The students can get enough donated paint to cover 2,000 square feet. Will that be enough to paint all the walls in the lobby? Explain.

3. The curtains for the stage are in panels. Each panel is 2 yards wide and 5 yards long. The entire curtain is 8 panels wide. Students want to use a fringe border to cover up the worn spots along the curtain's bottom edge. The fringe is 8 inches deep. How much fringe will they need to trim the entire width of the curtain?

4. Outside the theater is a 75 ft x 30 ft lawn. Students want to seed the lawn. One bag of grass seed covers 2,500 ft. Will one bag be enough to seed the entire lawn?

5. Students plan to put a 1-ft layer of new top soil in a flower bed outside the theater that is 20 ft long and 10 ft wide. How much top soil will they need?

6. The students have decided to plant a circular rose bed in one section of the lawn. The bed will have a diameter of 15 ft. and will have a low white fence around the bed. How much fencing will they need?