

APRIL 27TH

Length

Getting the Idea

Length measures how long, wide, or tall an object is. It also measures distances. The table below shows some units of length in the customary system.

| Customary Units of Length | |
|---------------------------|-------------------|
| 1 foot (ft) | = 12 inches (in.) |
| 1 yard (yd) | = 3 feet |
| 1 mile (mi) | = 1,760 yards |

You can use these benchmarks to estimate lengths.

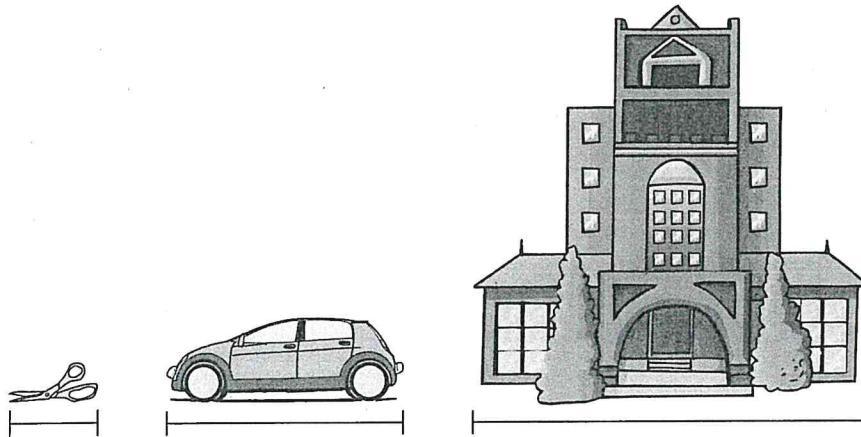
A 12-inch ruler measures 1 foot.

A yardstick measures 1 yard.

An adult can walk 1 mile in about 20 minutes.

Example 1

Which real object is most likely to be 150 feet long?



Strategy Think about the length of 1 foot.

Step 1

Think about how long 150 feet will be.

The length of this book is about 1 foot.

Imagine lining up 150 books to get 150 feet.

Step 2 Review the choices.

A pair of scissors is much shorter than 150 feet.

A 4-door car is shorter than 150 feet.

A building could be 150 feet long.

Solution The building is most likely about 150 feet.

The table below shows some units of length in the metric system.

| Metric Units of Length | |
|------------------------|-----------------------|
| 1 centimeter (cm) | = 10 millimeters (mm) |
| 1 meter (m) | = 100 centimeters |
| 1 kilometer (km) | = 1,000 meters |

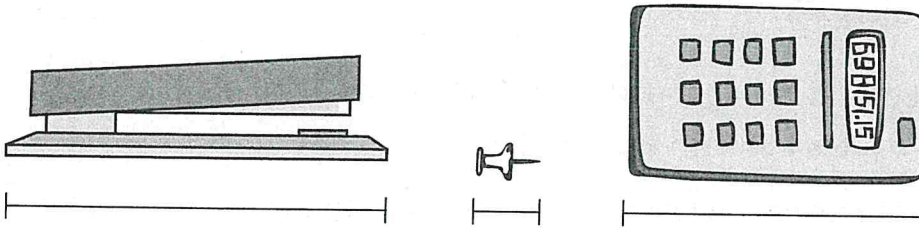
This line measures 1 centimeter. _____

1 meter is a little shorter than 1 yard.

An adult can walk 1 kilometer in about 10 minutes.

Example 2

Which real object is most likely to be 20 milliliters long?



Strategy Think about the length of 1 millimeter.

Step 1 Think about how long 20 millimeters will be.

1 millimeter is about the thickness of a dime.

20 millimeters will be about the height of 20 stacked dimes.

Step 2 Review the choices.

A stapler is longer than 20 millimeters.

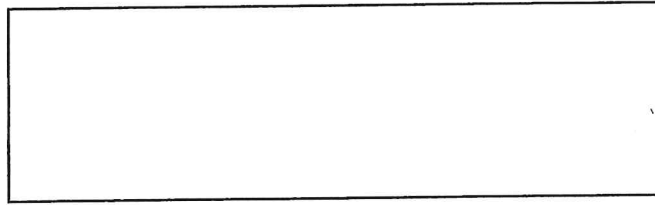
The pushpin could be about 20 millimeters.

A calculator is about the length of a stapler, so it is longer than 20 millimeters.

Solution The pushpin is most likely about 20 millimeters.

EXAMPLE 3

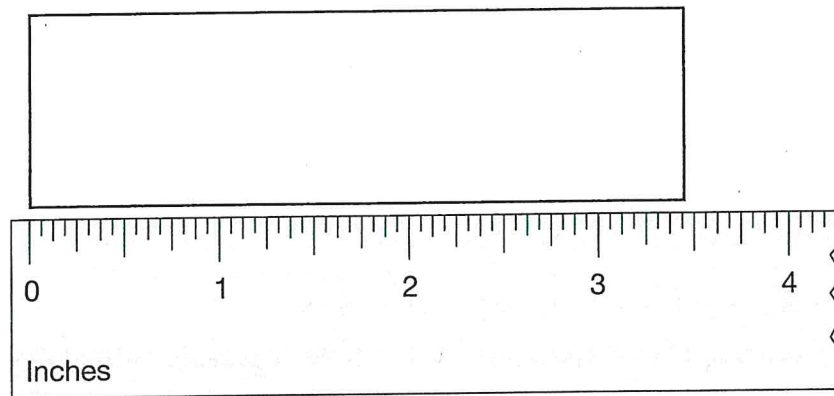
Use an inch ruler. What is the length of this rectangle to the nearest $\frac{1}{16}$ inch?



Strategy Use an inch ruler divided into sixteenths to measure the length of the rectangle.

Step 1

Align the 0-mark of the ruler with the left end of the rectangle.



Step 2

Look at the right end of the rectangle.

It is between the 3-inch and the 4-inch marks.

Step 3

Determine the length of the rectangle to the nearest $\frac{1}{16}$ inch.

The rectangle ends 7 marks past the 3-inch mark.

Each mark represents $\frac{1}{16}$ inch, so the rectangle is $3\frac{7}{16}$ inches long.

Solution The length of the rectangle is $3\frac{7}{16}$ inches.

You can use the relationship between units to change from one unit to another.

When you change a larger unit to a smaller unit, use multiplication.

To change 3 feet to inches, multiply 3×12 .

So 3 feet = 36 inches.

Example 4

Mr. Conroy is 6 feet and 3 inches tall. How tall is Mr. Conroy in inches?

Strategy Multiply to change feet to inches. Then add the extra inches.

Step 1 Find the relationship between feet and inches.

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

Step 2 Multiply 6 feet by 12 inches.

$$6 \times 12 = 72 \text{ inches}$$

Step 3 Add the extra inches.

$$72 + 3 = 75 \text{ inches}$$

Solution Mr. Conroy is 75 inches tall.

Example 5

The table shows the relationship between the number of meters and the number of centimeters. Complete the table.

| Meters | Centimeters |
|--------|-------------|
| 2 | |
| 4 | |
| 6 | |
| 8 | |

Strategy Use the relationship between meters and centimeters.

Step 1 Find the relationship between meters and centimeters.

$$1 \text{ meter} = 100 \text{ centimeters}$$

Step 2 How many centimeters are in 2 meters?

Multiply 2 meters by 100 centimeters.

$$2 \times 100 = 200 \text{ centimeters.}$$

So 2 meters = 200 centimeters.

Step 3 Find the number of centimeters in 4, 6, and 8 meters.

$$4 \times 100 = 400 \text{ centimeters}$$

$$6 \times 100 = 600 \text{ centimeters}$$

$$8 \times 100 = 800 \text{ centimeters}$$

Step 4 Complete the table.

| Meters | Centimeters |
|--------|-------------|
| 2 | 200 |
| 4 | 400 |
| 6 | 600 |
| 8 | 800 |

Solution The table is shown in Step 4.

When you solve a real world problem, write a number sentence to represent the problem.

Example 6

A window curtain is $3\frac{3}{8}$ feet wide. What is the total width of two window curtains side by side?

Strategy Write a number sentence for the problem.

Step 1 Write a number sentence.

Each curtain is $3\frac{3}{8}$ feet wide.

To find the total width, use addition.

Let w represent the total width of two curtains.

$$\text{Find } 3\frac{3}{8} + 3\frac{3}{8} = w.$$

Step 2 Find the sum.

Add the fraction parts.

Then add the whole number parts.

$$\begin{array}{r} 3\frac{3}{8} \\ + 3\frac{3}{8} \\ \hline 6\frac{6}{8} \end{array}$$

Step 3 Simplify.

$$\frac{6}{8} = \frac{6 \div 2}{8 \div 2} = \frac{3}{4}$$

$$\text{So } 6\frac{6}{8} = 6\frac{3}{4}.$$

Solution The total width of two curtains is $6\frac{3}{4}$ feet.

Guided Practice

Nicole lives 3 kilometers from the mall and 1.6 kilometers from her school. How far, in meters, does Nicole live from the mall?

Find how far Nicole lives from the mall.

She lives _____ kilometers from the mall.

To change from kilometers to meters, should you use multiplication or division?

1 kilometer = _____ meters

$3 \times$ _____ meters = _____ meters

So 3 kilometers = _____ meters.

Nicole lives _____ meters from the mall.

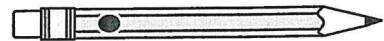
Lesson Practice • Part 1

Choose the correct answer.

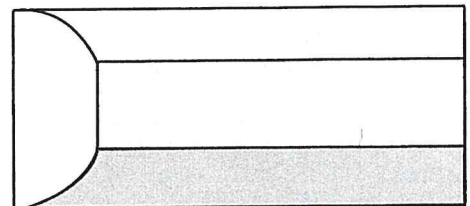
- Which measure is most likely the height of a ceiling?
 - 10 miles
 - 10 yards
 - 10 feet
 - 10 inches
- Which measure is most likely the length of a digital camera?
 - 12 millimeters
 - 12 centimeters
 - 12 meters
 - 12 kilometers
- Which measure is equal to 1,000 centimeters?
 - 10 meters
 - 10 millimeters
 - 100 meters
 - 100 millimeters

- A lamp is 4 feet 8 inches tall. What is the height of the lamp in inches?
 - 40 inches
 - 48 inches
 - 52 inches
 - 56 inches

- Use a centimeter ruler. What is the measure of this pencil to the nearest centimeter?



- 3 cm
 - 4 cm
 - 5 cm
 - 6 cm
- What is the length, to the nearest $\frac{1}{16}$ in., of the eraser shown below?



- $2\frac{1}{4}$ in.
- $2\frac{7}{16}$ in.
- $2\frac{9}{16}$ in.
- $2\frac{13}{16}$ in.

7. A painting is 4 feet long. A photo frame is 10 inches long. How many inches longer is the painting than the photo frame?

- A. 6 inches
- B. 24 inches
- C. 30 inches
- D. 38 inches

8. LeAnne placed a box that is $1\frac{3}{4}$ feet high on top of another box that is $1\frac{1}{4}$ feet high. How many feet high are the boxes when stacked?

- A. $2\frac{3}{4}$ feet
- B. 3 feet
- C. $3\frac{1}{2}$ feet
- D. 4 feet

9. Daron has a cord that is 12 inches long and another one that is $2\frac{1}{2}$ feet. He connects the two cords.

A. What is the total length, in inches, of the two cords? Show your work.

B. What is the total length, in feet, of the two cords? Explain how you found the total length in feet.

Lesson Practice • Part 2

Choose the correct answer.

1. Which is the missing number in the table?

| Feet | Inches |
|------|--------|
| 2 | 24 |
| 4 | 48 |
| 7 | ? |
| 9 | 108 |

- A. 96
B. 84
C. 72
D. 60
2. Each lap around a track is $\frac{1}{4}$ mile. Ross jogs 11 times around the track. How far did Ross jog?
- A. $2\frac{1}{4}$ miles
B. $2\frac{3}{4}$ miles
C. $3\frac{1}{4}$ miles
D. $3\frac{3}{4}$ miles
3. Which is the best metric unit to use to measure the distance between Philadelphia and New York City?
- A. millimeters
B. centimeters
C. meters
D. kilometers

4. Which is the missing number in the table?

| Centimeters | Millimeters |
|-------------|-------------|
| 1 | ? |
| 3 | 30 |
| 5 | 50 |
| 7 | 70 |

- A. 10
B. 20
C. 28
D. 32
5. A meter is slightly longer than a yard. Which sentence is true?
- A. A meter is slightly greater than 3 inches.
B. A meter is slightly less than 3 inches.
C. A meter is slightly less than 3 feet.
D. A meter is slightly greater than 3 feet.
6. The length of the classroom floor is 8 meters. What is the length of the classroom floor in centimeters?
- A. 8 centimeters
B. 80 centimeters
C. 800 centimeters
D. 8,000 centimeters

7. How many inches greater is a yard than a foot?
- A. 2 inches
 - B. 12 inches
 - C. 24 inches
 - D. 35 inches
8. A football team must advance 10 yards in 4 plays to earn a first down. On first down, the Warriors advanced exactly 4 yards. How many more feet must the Warriors advance to earn a first down?
- A. 6 feet
 - B. 18 feet
 - C. 30 feet
 - D. 72 feet
9. How many millimeters greater is a meter than a centimeter?
- A. 999 millimeters
 - B. 990 millimeters
 - C. 900 millimeters
 - D. 99 millimeters
10. Main Street is 3 kilometers long. It runs parallel with 1st Avenue, which is 750 meters long. How many meters longer is Main Street than 1st Avenue?
- A. 2,250 meters
 - B. 2,350 meters
 - C. 3,000 meters
 - D. 3,750 meters

11. The bases on a softball field are 20 yards apart. Including home plate, there are 4 bases.

A. How many feet apart are the bases?

B. How many inches apart are the bases?

C. Liz hit a home run that she earned by running. What is the least distance, in feet, that she had to run?

Lesson 16 Answers

Lesson 16

She lives 3 kilometers from the mall.

To change from kilometers to meters, should you use multiplication or division?

multiplication

1 kilometer = 1,000 meters

$3 \times 1,000$ meters = 3,000 meters

So 3 kilometers = 3,000 meters.

Nicole lives 3,000 meters from the mall.

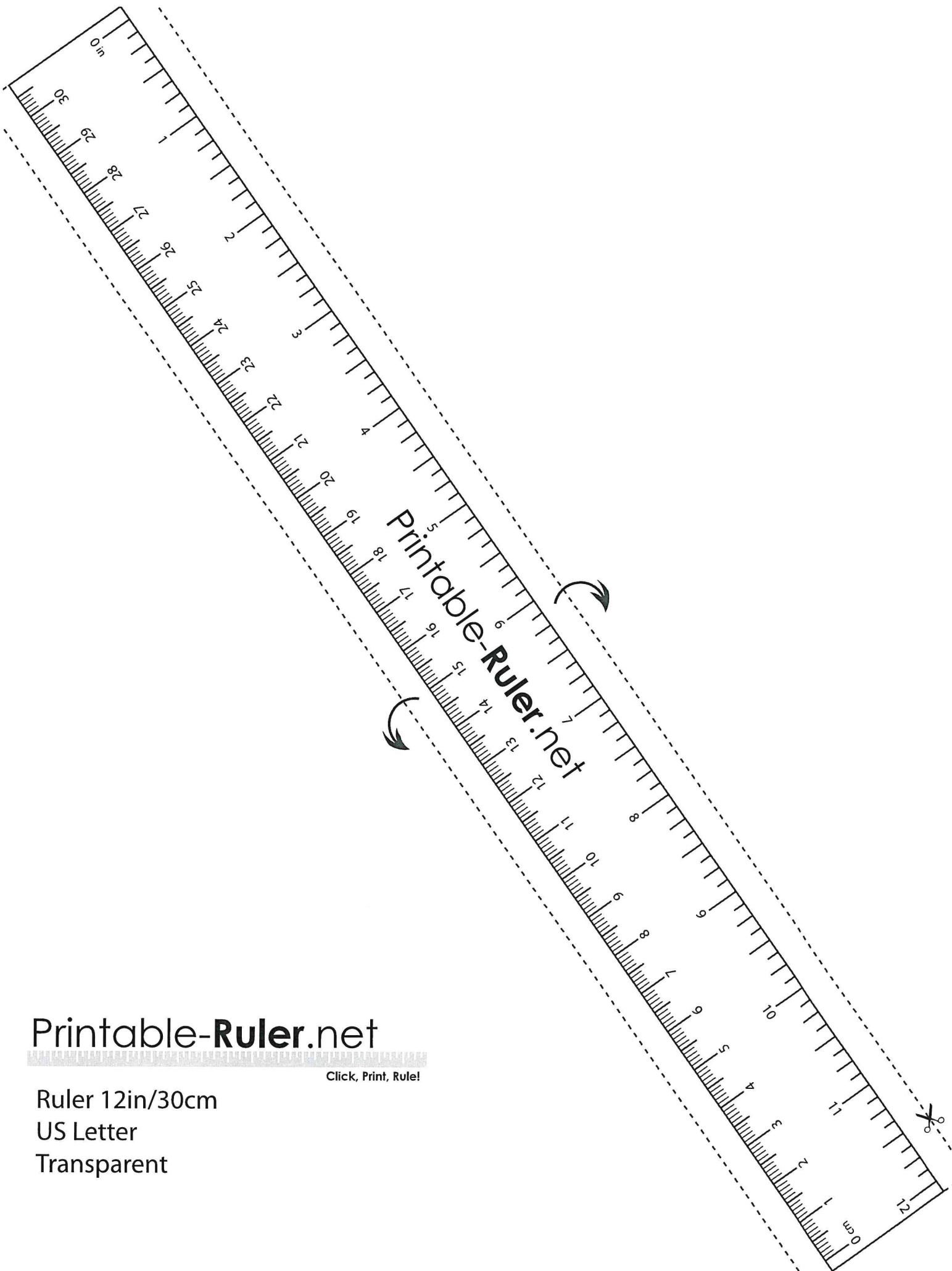
Lesson Practice Part 1

- C
- B
- A
- D
- C
- B
- D
- B
- A. 42 inches; Possible
explanation: I first changed $2\frac{1}{2}$ feet to inches.
I found 2 feet by multiplying $2 \times 12 = 24$ inches. Since 1 foot = 12 inches, I know that $\frac{1}{2}$ foot = 6 inches.
 $24 + 6 = 30$ inches.
So $2\frac{1}{2}$ feet = 30 inches.
Then I added $30 + 12 = 42$ inches to find the total length.
- B. $3\frac{1}{2}$ feet; Possible
explanation: I know that 12 inches = 1 foot, so I added $1 + 2\frac{1}{2}$ feet = $3\frac{1}{2}$ feet.

Lesson Practice Part 2

- B
- B
- D

- A
- D
- C
- C
- B
- B
- A
- A. 60
B. 720
C. 240



Printable-Ruler.net



Click, Print, Rule!

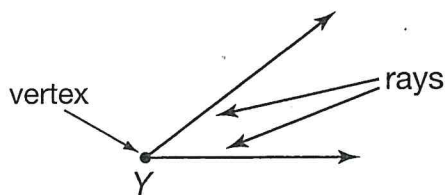
Ruler 12in/30cm
US Letter
Transparent

APRIL 28TH

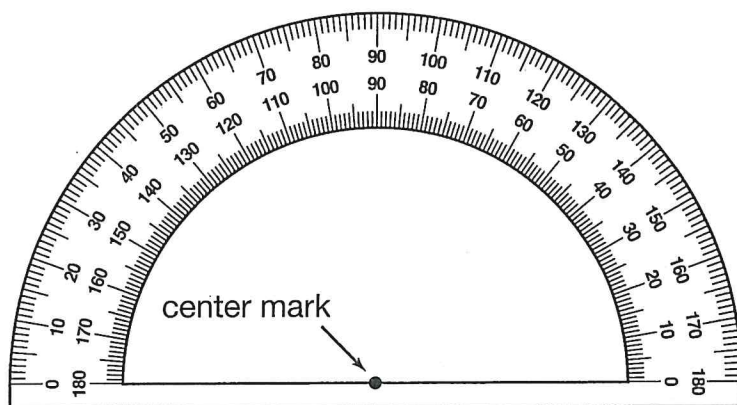
Angles

Getting the Idea

An **angle** (\angle) is formed by two **rays** that meet at the same **endpoint**. That endpoint is the **vertex** of the angle. An angle can be named by its vertex. The angle below can be named as angle Y or $\angle Y$. A **degree** is the unit used for measuring angles.

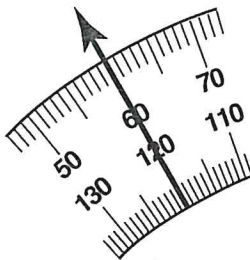


You can use a **protractor** to measure angles. A protractor often has two scales. The scales increase from 0° to 180° , but in opposite directions.



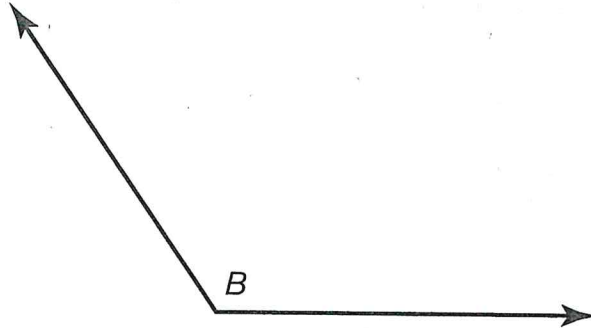
To help you decide which scale to read when measuring an angle, compare the angle to 90° .

For example, if the scales read 120° and 60° , and the angle is less than 90° , then the measure of the angle is 60° . If the angle is greater than 90° , then the measure of the angle is 120° .



Example 1

What is the measure of angle B ?

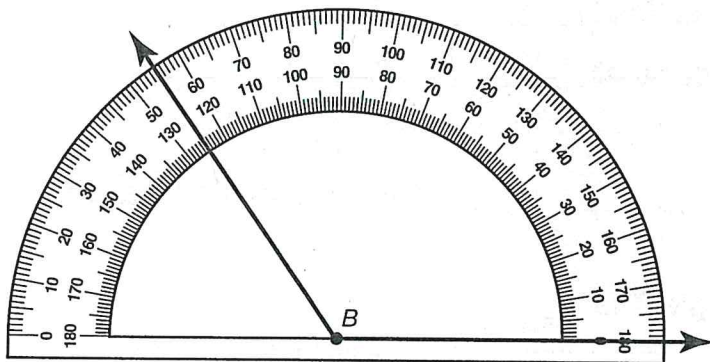


Strategy Use a protractor.

Step 1

Place the center mark of the protractor on the vertex of the angle.

Line up one ray of the angle with the 0° mark on one of the scales.

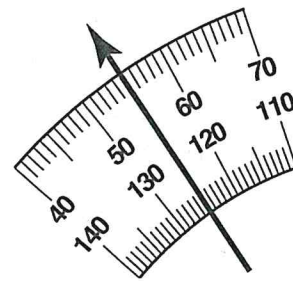
**Step 2**

Look at the scale at the point where the other ray of the angle crosses it.

Read the degree mark on the same scale used in Step 1.

The ray crosses the scale at 125° .

It crosses the other scale at 55° .

**Step 3**

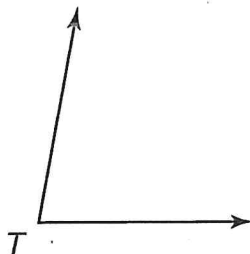
Decide which scale to use.

Angle B appears greater than 90° , so it makes sense that the measure would be 125° , not 55° .

Solution The measure of angle B is 125° .

Guided Practice

What is the measure of angle T ?



Put the center mark of the protractor on the _____ of the angle.

Line up one ray of the angle with the _____ $^{\circ}$ mark on one of the scales.

Look at the scale where the other ray of the angle crosses it.

The ray crosses the scale at _____ $^{\circ}$.

It crosses the other scale at _____ $^{\circ}$.

Check your answer.

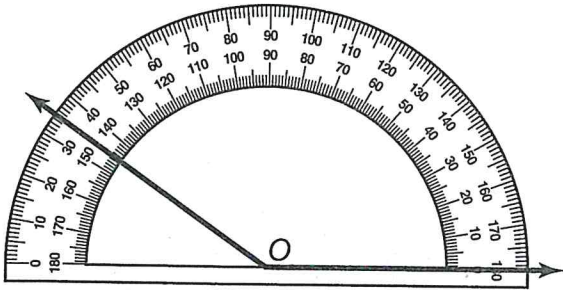
Angle T appears _____ than 90° , so the measure is _____ $^{\circ}$,
not _____ $^{\circ}$.

The measure of angle T is _____ $^{\circ}$.

Lesson Practice • Part 1

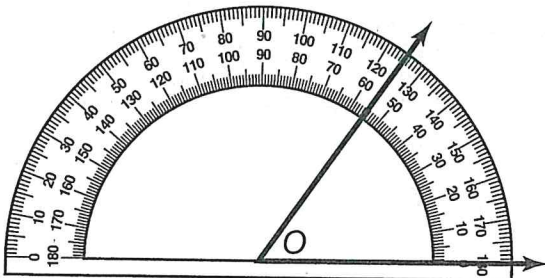
Choose the correct answer.

1. What is the measure of this angle?



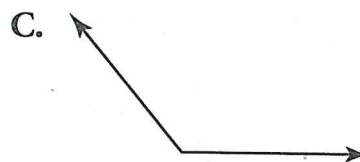
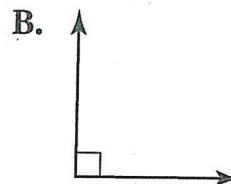
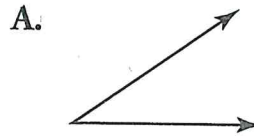
- A. 45°
- B. 55°
- C. 135°
- D. 145°

2. What is the measure of this angle?

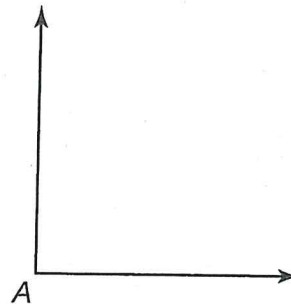


- A. 55°
- B. 60°
- C. 120°
- D. 125°

3. Which angle has the least measure?

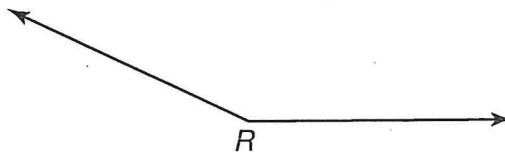


4. Which could be the measure of angle A?

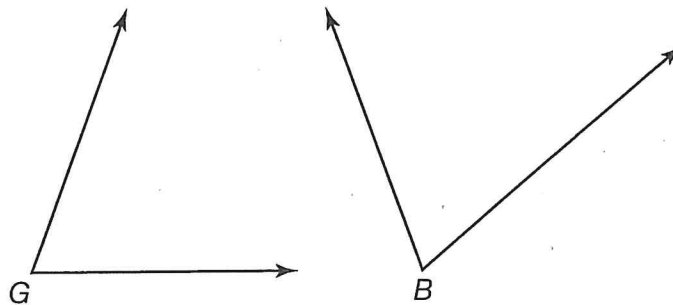


- A. 180°
- B. 140°
- C. 90°
- D. 35°

5. Use a protractor. What is the measure of angle R ?



6. Gabriel drew these angles on the board.



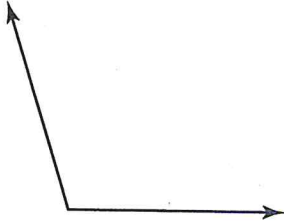
- A. Use a protractor to find the measure of Gabriel's angles.
-

- B. Compare the measures of Gabriel's angles. Which angle has a greater measure? Explain your answer.
-

Lesson Practice • Part 2

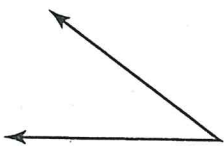
Choose the correct answer.

1. Use a protractor. What is the measure of this angle?



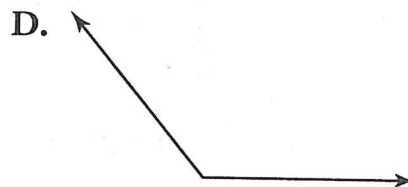
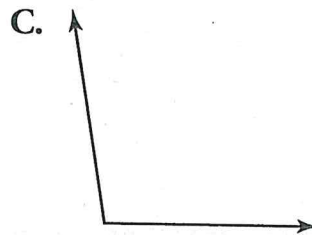
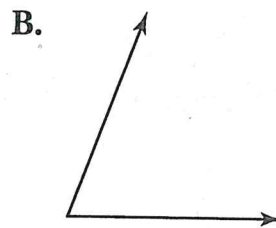
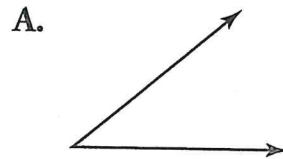
- A. 68°
- B. 72°
- C. 108°
- D. 112°

2. Use a protractor. What is the measure of this angle?

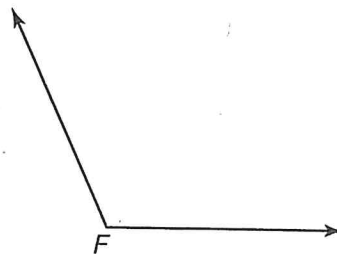


- A. 36°
- B. 44°
- C. 136°
- D. 144°

3. Which angle has the greatest measure?

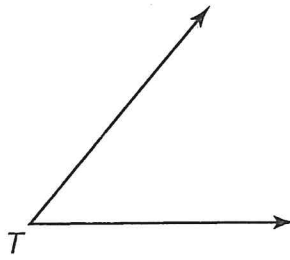


4. Which could be the measure of angle F ?



- A. 65°
- B. 70°
- C. 115°
- D. 130°

5. Use a protractor. What is the measure of angle T ?



6. Adalynn drew this angle on the board.



- A. Use a protractor to find the measure of Adalynn's angle.

- B. What could be the measure of an angle less than the measure of Adalynn's angle?

Lesson 17 Answers

Lesson 17

Guided Practice

Put the center mark of the protractor on the **vertex** of the angle.

Line up one ray of the angle with the 0° mark on one of the scales.

The ray crosses the scale at 80° .

It crosses the other scale at 100° .

Check your answer.

Angle T appears **less** than 90° , so the measure is 80° , not 100° .

The measure of $\angle T$ is 80° .

Lesson Practice Part 1

1. D
2. A
3. A
4. C
5. 155°
6. A. 70°
B. Neither. Both angles have a measure of 70 degrees.

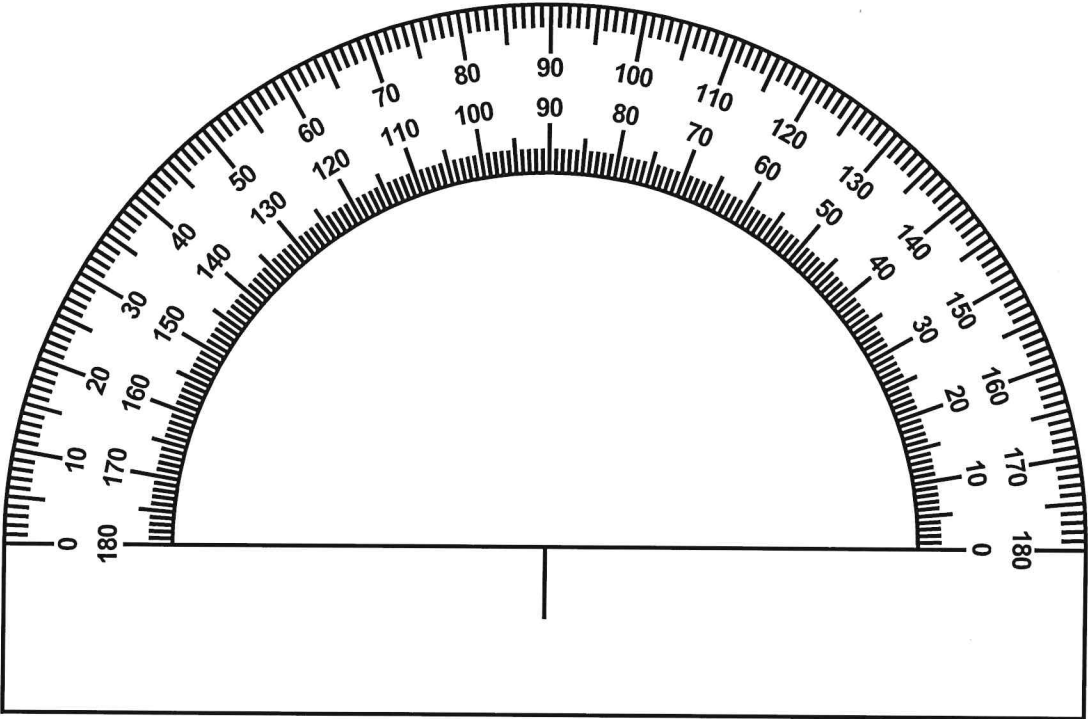
Lesson Practice Part 2

1. C
2. A
3. D
4. C
5. 50°
6. A. 150°
B. Accept any angle measure less than 150 degrees.

Lesson 18

Protractor

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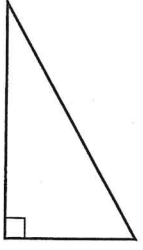
APRIL 29TH

Triangles and Solid Figures

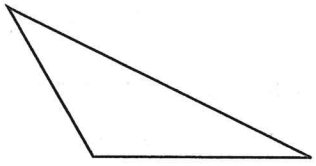
Getting the Idea

A **triangle** is a polygon with three sides and three angles.

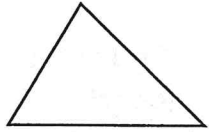
You can classify triangles by their angles.



right triangle
has one right angle
(equal to 90°)

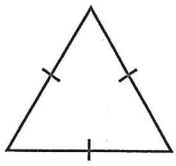


obtuse triangle
has one obtuse angle
(more than 90°)

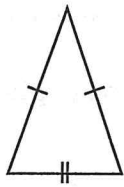


acute triangle
has three acute angles
(less than 90°)

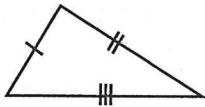
You can also classify triangles by their sides.



equilateral triangle
all sides are equal
in length



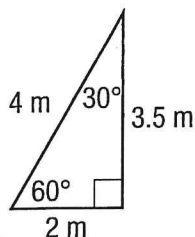
isosceles triangle
two sides are equal
in length



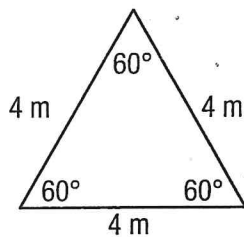
scalene triangle
all sides are of
different lengths

Example 1

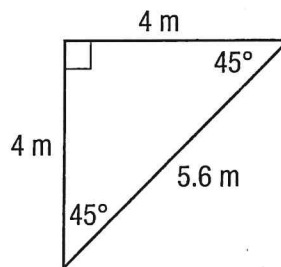
Which triangle below is a right isosceles triangle?



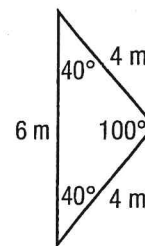
Triangle D



Triangle E



Triangle F



Triangle G

Strategy Find the triangle with a right angle and two sides that are the same length.

Step 1

Look at the angle measures.

Which triangles have a right angle?

Triangle D and Triangle F have right angles.

Step 2

Look at the side lengths.

Which triangle has two sides that are the same length?

Triangle F has two sides that measure 4 meters.

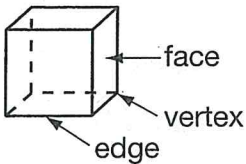
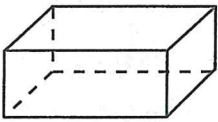
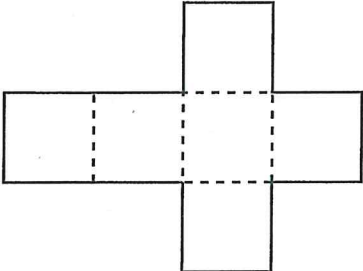
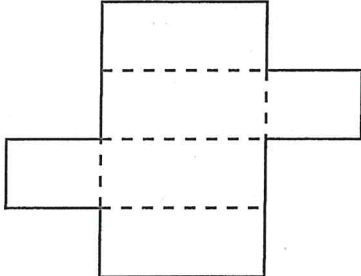
Solution Triangle F is a right isosceles triangle.

Solid figures, also called **three-dimensional figures**, are figures that have length, width, and height.

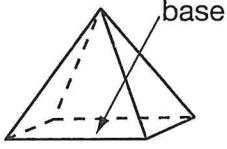
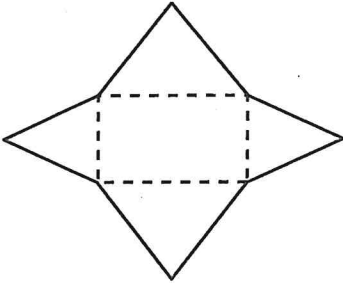
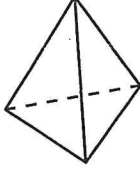
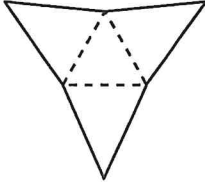
Solid figures can be classified by the number of faces, edges, and vertices they have. A **face** is a flat surface of a solid figure. An **edge** is a line segment where two faces of a solid figure meet. A **vertex** is the point where three or more edges of a solid figure meet. The plural of vertex is vertices.

A **net** is a flat pattern that can be folded into a three-dimensional figure. A net shows each surface of the solid figure it forms.

A **prism** is a three-dimensional figure with a pair of parallel faces called **bases** that are congruent polygons. Its other faces are rectangles or parallelograms. The table below shows some common prisms and their nets.

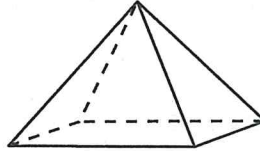
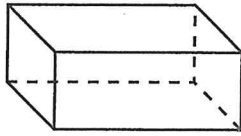
| Cube | Rectangular Prism |
|---|--|
|  |  |
|  |  |
| <p>6 faces 12 edges 8 vertices</p> | <p>6 faces 12 edges 8 vertices</p> |

A **pyramid** has a base that is a polygon. All its other faces are triangles. The table below shows some common pyramids and their nets.

| Rectangular Pyramid | Triangular Pyramid |
|--|--|
|   |   |
| 5 faces 8 edges 5 vertices | 4 faces 6 edges 4 vertices |

Example 2

How are a rectangular prism and a rectangular pyramid alike? How are they different?



Strategy Describe the properties of a rectangular prism and a rectangular pyramid.

Step 1 Describe the number of faces in each figure.

A rectangular prism has 6 faces.

A rectangular pyramid has 5 faces.

Step 2 Describe the bases of each figure.

A rectangular prism has two parallel bases that are congruent rectangles.

A rectangular pyramid has one base that is a rectangle.

Step 3 Describe the faces of each figure.

The faces of a rectangular prism are rectangles.

The faces of a rectangular pyramid are triangles.

Step 4 List the similarities of the figures.

The rectangular prism and the rectangular pyramid each have a rectangular base.

Step 5 List the differences in the figures.

The rectangular prism and the rectangular pyramid have different numbers of faces.

All faces of the rectangular prism are rectangles. Only one face of the rectangular pyramid is a rectangle. All its other faces are triangles.

Solution The similarities and differences in a rectangular prism and a rectangular pyramid are listed in Steps 4 and 5.

Guided Practice

Name this triangle in as many ways as possible.

THINKING IT THROUGH

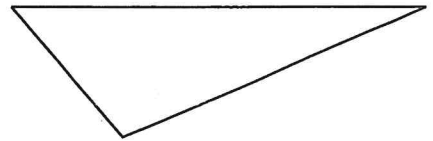
All sides of this triangle have _____ lengths.

So, the triangle is a(n) _____ triangle.

This triangle has one _____ angle.

So, the triangle is a(n) _____ triangle.

The two names for this triangle are _____ and _____.

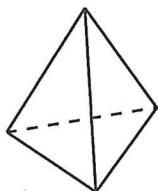


Lesson Practice • Part 1

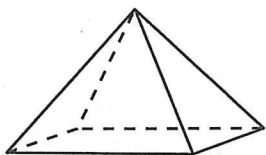
Choose the correct answer.

1. Which solid figure has 6 faces?

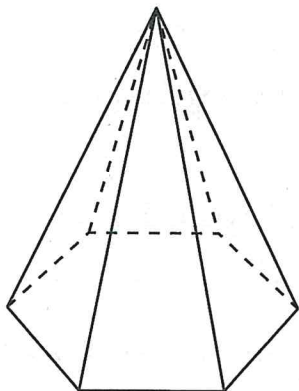
A.



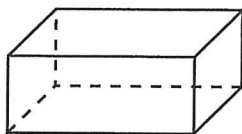
B.



C.



D.



2. Which solid figure has only one base?

- A. rectangular pyramid
- B. cube
- C. rectangular prism
- D. triangular prism

3. Which type of triangle must have sides that are all different in length?

- A. Scalene
- B. Equilateral
- C. Isosceles
- D. Right

4. What is the name for a triangle that has exactly two sides that are equal in length?

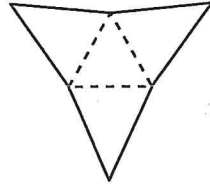
- A. Scalene
- B. Equilateral
- C. Isosceles
- D. Right

5. Which of the following is true about a cube?

- I It has 8 vertices.
- II It has 6 faces.
- III It has 8 edges.

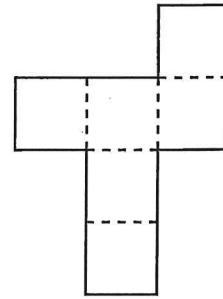
- A. I and II
- B. II and III
- C. I and III
- D. I, II, and III

6. Which solid figure can be made from this net?



- A. rectangular prism
- B. rectangular pyramid
- C. triangular pyramid
- D. pentagonal pyramid

7. Which three-dimensional figure can be made from this net?



- A. rectangular pyramid
- B. cube
- C. pentagonal pyramid
- D. triangular pyramid

8. A triangular pyramid has 4 faces, 6 edges, and 4 vertices. A rectangular pyramid has 5 faces, 8 edges, and 5 vertices.

- A. How many faces, edges, and vertices would a pentagonal pyramid have?

- B. What kind or kinds of polygons would you need to construct a pentagonal pyramid? How many of each kind or kinds of polygons would you need?

Lesson Practice • Part 2

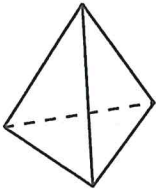
Choose the correct answer.

1. Which solid figure can have faces that are squares and nonsquare rectangles?

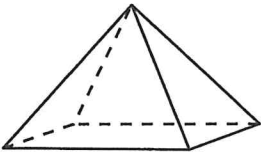
- A. rectangular prism
- B. rectangular pyramid
- C. cube
- D. triangular pyramid

2. Which solid figure has 8 vertices?

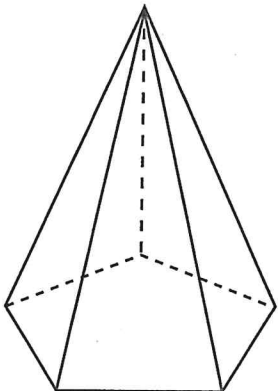
A.



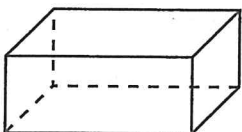
B.



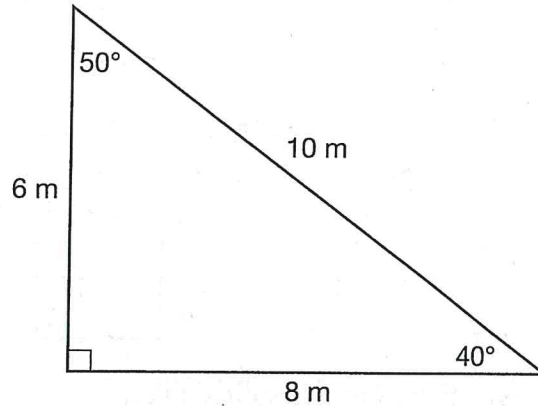
C.



D.

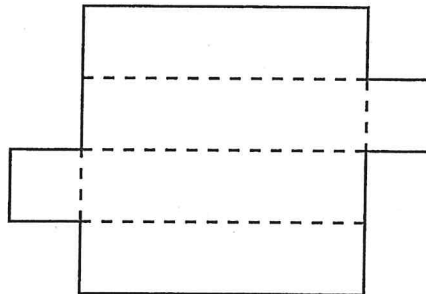


3. Which name describes the triangle below?



- A. Acute scalene
- B. Obtuse scalene
- C. Right isosceles
- D. Right scalene

4. Which solid figure can be made from this net?



- A. square pyramid
- B. cube
- C. rectangular prism
- D. rectangular pyramid

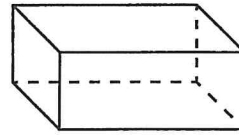
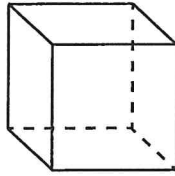
5. Which solid figure always has congruent faces?

- A. triangular prism
- B. rectangular pyramid
- C. rectangular prism
- D. cube

6. How many more combined faces and vertices does a prism have than edges?

- A. 1
- B. 2
- C. 3
- D. 4

7. A cube and a rectangular prism are shown.



A. How are the solids alike?

B. How do the solids differ?

Lesson 18 Answers

Lesson 18

Guided Practice

All sides of this triangle have **different** lengths.

So, the triangle is a(n) **scalene** triangle.

This triangle has one **obtuse** angle.

So, the triangle is a(n) **obtuse** triangle.

The two names for this triangle are **scalene** and **obtuse**.

Lesson Practice Part 1

1. D
2. A
3. A
4. C
5. A
6. C
7. B
8. A. 6 faces, 10 edges, 6 vertices
B. 1 pentagon and 5 triangles

Lesson Practice Part 2

1. A
2. D
3. D
4. C
5. D
6. B
7. A. Possible answer: Both have 6 faces, 12 edges, and 8 vertices. Both are made from rectangles.
B. Possible answer: A cube must have all square faces. A rectangular prism does not have to have any square faces.

APRIL 30TH

Perimeter

Getting the Idea

The distance around the outside of a plane figure is called the **perimeter**. To find the perimeter of a polygon, add the lengths of all the sides of the polygon.

Example 1

What is the perimeter of the rectangle?

Strategy Count the units on each side and add.

Step 1 Find the length of each side by counting the units.

There are 8 units across the top.

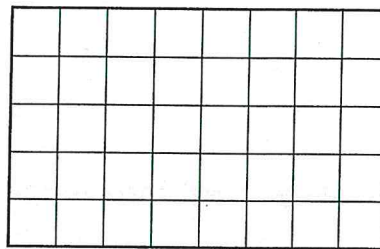
There are 5 units along the right side.

There are 8 units across the bottom.

There are 5 units along the left side.

Step 2 Add the lengths of the sides.

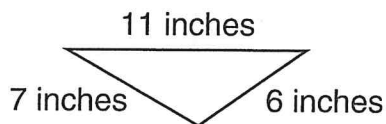
$$8 + 5 + 8 + 5 = 26$$



Solution The perimeter of the rectangle is 26 units.

Example 2

What is the perimeter of the triangle?



Strategy Add the lengths of the sides.

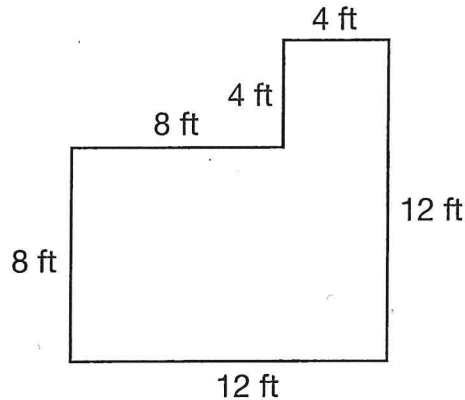
$$11 + 7 + 6 = 24$$

Remember to include the units in the answer.

Solution The perimeter of the triangle is 24 inches.

Example 3

Danny's deck is shown below. What is the perimeter of Danny's deck?



Strategy Add the lengths of all of the sides.

$$4 + 12 + 12 + 8 + 8 + 4 = 48$$

Remember to include the units in the answer.

Solution The perimeter of Danny's deck is 48 feet.

When all of the sides of a polygon have the same length, it is a **regular polygon**. To find the perimeter of a regular polygon, you can either add the sides or multiply the number of sides by the length of each side.

Example 4

What is the perimeter of the square?



Strategy Use the properties of a square.

Step 1

Determine the length of each side.

The drawing only shows the length of one side. Since the polygon is a square, all of the sides are the same length.

Step 2 Find the perimeter.

There are four sides of length 3 yards, so add 3 four times.

$$3 + 3 + 3 + 3 = 12$$

Since you add the same number 4 times to find the perimeter of a square, you can also multiply the side length by 4 to find the perimeter.

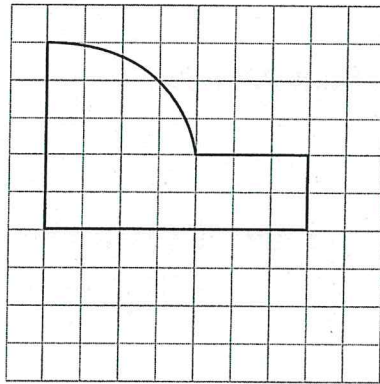
$$4 \times 3 = 12$$

Solution The perimeter of the square is 12 yards.

When a figure has curves, you can estimate the perimeter by counting squares on a grid or by finding the perimeter of a polygon that is similar in size and shape to the figure given.

Example 5

Estimate the perimeter of the figure, and then determine if your answer is reasonable.

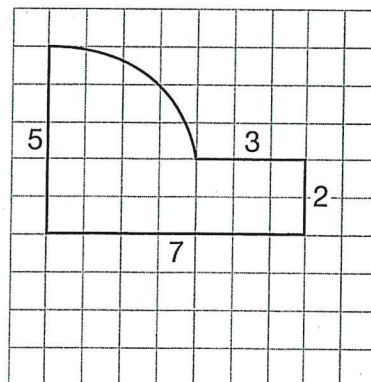


Strategy Find the lengths of the straight sides and estimate the length of the curve.

Step 1 Add the lengths of the straight sides.

$$5 + 7 + 2 + 3 = 17$$

The straight sides have a combined length of 17 units.



Step 2

Estimate the length of the curve.

The curve travels diagonally across 4 squares. Since the diagonal of a square is longer than its side length, use 5 units as the estimate.

Step 3

Find an estimate for the total perimeter.

Add the lengths of the straight sides to the estimated length of the curve.

$$17 \text{ units} + 5 \text{ units} = 22 \text{ units}$$

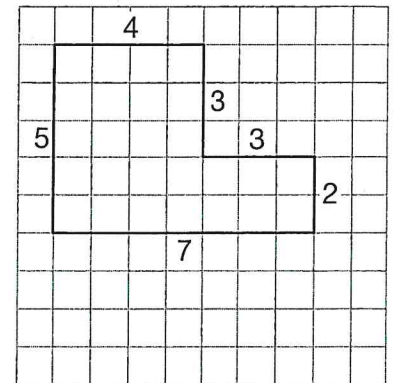
Step 4

Determine whether the estimate is reasonable.

Find the perimeter of a similar figure with only straight sides that are vertical or horizontal.

$$5 + 7 + 2 + 3 + 3 + 4 = 24$$

The estimate is close to the perimeter of this figure, but slightly less. This makes sense, because the given figure would have a smaller perimeter than this one.

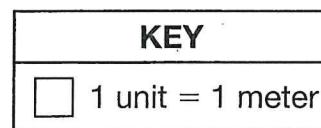
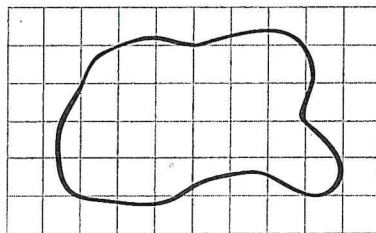


Solution The perimeter is about 22 units.

Example 6

The map shows a pond on Mr. Yu's farm. Each unit on the grid represents 1 meter. Estimate the perimeter of the pond. Then, determine whether your estimate is reasonable.

Mr. Yu's Pond



Strategy Use the grid to estimate the lengths.

Step 1

Estimate the lengths across the top, bottom, left, and right sides.

The top stretches across 6 units.

The right side is about 4 units tall.

The bottom goes through 7 squares on the grid.

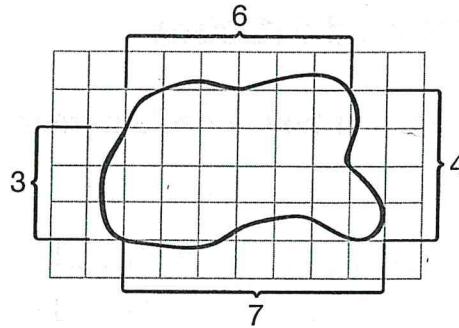
The left side is about 3 units tall.

Add to get the estimate.

$$6 + 4 + 7 + 3 = 20$$

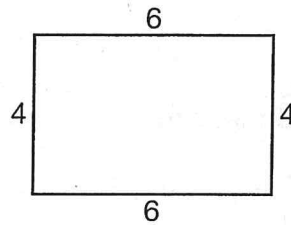
Recall that a unit represents 1 meter.

The estimated perimeter is 20 meters.

**Step 2**

Find the perimeter of a polygon that is a similar size and shape.

The pond can be roughly estimated as a 6 by 4 rectangle.



Find the perimeter of a rectangle with sides that are 6 and 4 units long.

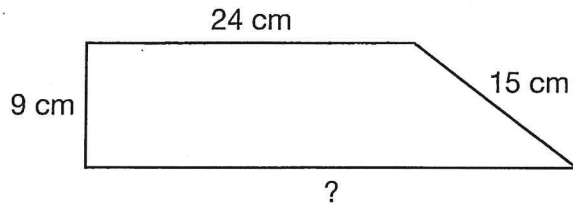
$$6 + 4 + 6 + 4 = 20$$

This is the same as our estimate, so our estimate is reasonable.

Solution A reasonable estimate for the perimeter of the pond is 20 meters.

Guided Practice

The figure below has a perimeter of 84 centimeters.



What is the unknown side length?

Add to find the measure of the known side lengths.

$$\underline{\quad\quad} + \underline{\quad\quad} + \underline{\quad\quad} = \underline{\quad\quad}$$

Subtract the measure of the known side lengths from the known perimeter of the figure.

$$84 - \underline{\quad\quad} = \underline{\quad\quad}$$

Check your answer. Add all the side lengths.

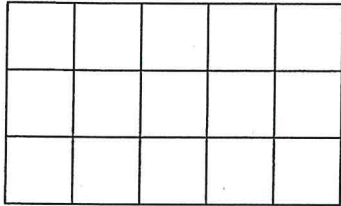
$$\underline{\quad\quad} + \underline{\quad\quad} + \underline{\quad\quad} + \underline{\quad\quad} = \underline{\quad\quad}$$

The unknown side length of the figure is $\underline{\quad\quad}$ centimeters.

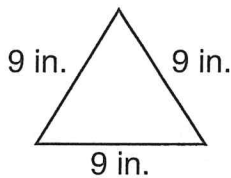
Lesson Practice • Part 1

Choose the correct answer.

1. What is the perimeter of the rectangle?

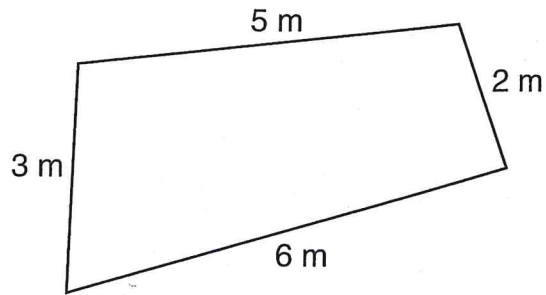


- A. 5 units
 B. 8 units
 C. 13 units
 D. 16 units
2. Which number sentence gives the perimeter of the triangle in inches?



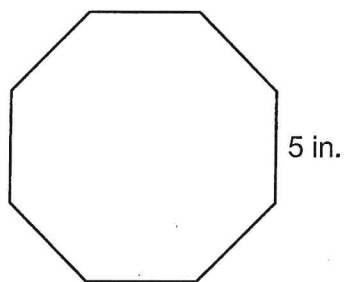
- A. $9 + 9$
 B. $9 + 3$
 C. 9×3
 D. $3 + 3 + 3$

3. What is the perimeter of the figure?



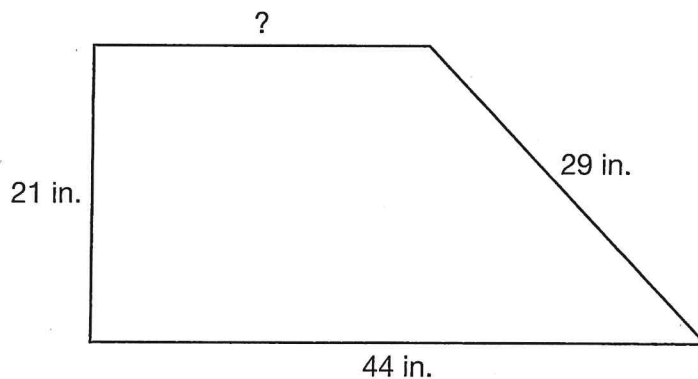
- A. 20 meters
 B. 16 meters
 C. 14 meters
 D. 12 meters
4. What is the perimeter of a square with a side length of 7 centimeters?
- A. 14 centimeters
 B. 28 centimeters
 C. 49 centimeters
 D. 70 centimeters
5. A swimming pool is in the shape of a rectangle. It is 1 meter wide and 8 meters long. What is its perimeter?
- A. 18 meters
 B. 22 meters
 C. 36 meters
 D. 64 meters

6. A teacher cut an octagon-shape from poster board. Each side of the octagon is 5 inches long.



Show two different ways to find the perimeter of the octagon. What is the perimeter?

7. The perimeter of the figure shown is 118 inches.

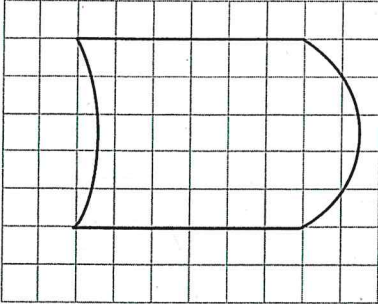


What is the missing side length? Explain how you found your answer.

Lesson Practice • Part 2

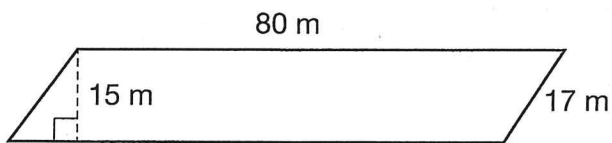
Choose the correct answer.

1. Which is the best estimate of the perimeter of the figure?



- A. 15 units
- B. 20 units
- C. 23 units
- D. 33 units

2. What is the perimeter of the figure, in meters (m)?



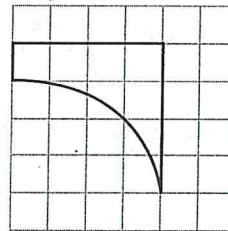
- A. 112 m
- B. 190 m
- C. 192 m
- D. 194 m

3. What is the perimeter of a square with a side length of 32 millimeters, (mm)?

- A. 64 mm
- B. 96 mm
- C. 128 mm
- D. 160 mm

4. Mr. Longoria's property is bordered on 3 sides by roads and on one side by a river. The map shows the borders of his land.

Mr. Longoria's Land



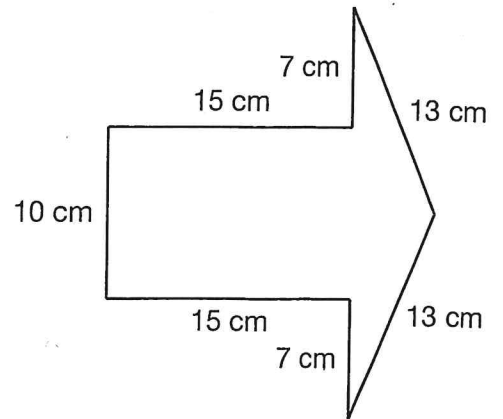
1 unit = 1 mile

Which is the best estimate of the perimeter of Mr. Longoria's land?

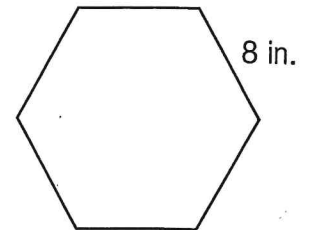
- A. 19 miles
- B. 14 miles
- C. 10 miles
- D. 7 miles

5. What is the perimeter of the figure?

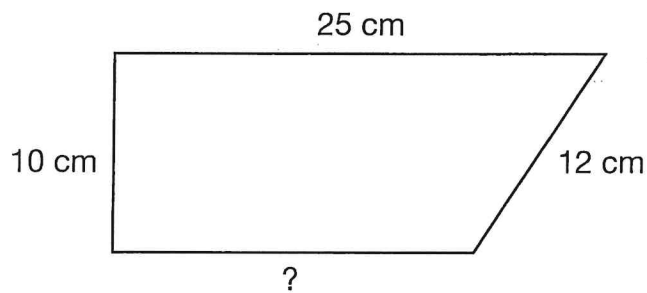
- A. 45 centimeters
- B. 70 centimeters
- C. 80 centimeters
- D. 90 centimeters



6. Bettina made a hexagon-shaped sign out of cardboard. Each side of the hexagon is 8 inches long. Show two different ways to find the perimeter of Bettina's sign. What is the perimeter?



7. The perimeter of the figure shown is 67 centimeters.



What is the missing side length? Explain how you found your answer.

Lesson 19 Answers

Lesson 19

Guided Practice

The figure below has a perimeter of 84 centimeters.

What is the unknown side length?

Add to find the measure of the known side lengths.

$$9 + 24 + 15 = 48$$

Subtract the measure of the known side lengths from the known perimeter of the figure.

$$84 - 48 = 36$$

Check your answer. Add all the side lengths.

$$9 + 24 + 15 + 36 = 84$$

The unknown side length of the figure is **36** centimeters.

Lesson Practice Part 1

1. D
2. C
3. B
4. B
5. A

6. $5 + 5 + 5 + 5 + 5 + 5 + 5 + 5 = 40$ inches
 $5 \times 8 = 40$ inches
The perimeter is 40 inches.
7. The missing side length is 24 inches.
I added up the 3 sides that are labeled and got a total of 94 inches. Since $118 - 94 = 24$, the missing side length is 24 inches long.

Lesson Practice Part 2

1. C
2. D
3. C
4. B
5. C

6. $8 + 8 + 8 + 8 + 8 + 8 = 48$ inches
 $8 \times 6 = 48$ inches
The perimeter is 48 inches.
7. The missing side length is 20 cm.
I added up the 3 sides that are labeled and got a total of 47 cm. Since $47 + 20 = 67$, the missing side is 20 cm long.

MAY 1ST

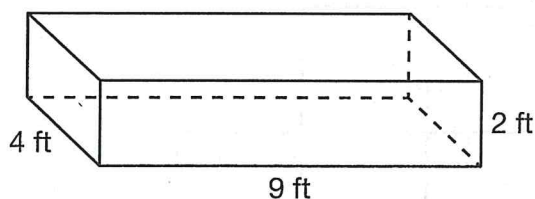
Surface Area

Getting the Idea

Surface area is the total area of the surfaces of a solid figure. Surface area is measured in **square units**. You can use a net to help you find the surface area of a solid figure.

Example 1

What is the surface area of this rectangular prism?



Strategy Use a net.

Step 1

Draw the net showing the dimensions.

Find the area of each face.

$$A = 9 \times 4 = 36$$

$$A = 2 \times 4 = 8$$

$$A = 9 \times 2 = 18$$

$$A = 2 \times 4 = 8$$

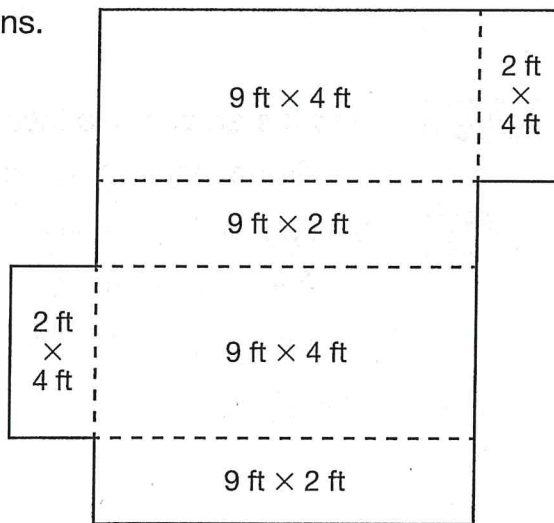
$$A = 9 \times 4 = 36$$

$$A = 9 \times 2 = 18$$

Step 2

Add the areas to find the total surface area.

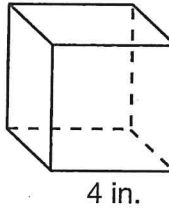
$$36 + 8 + 18 + 8 + 36 + 18 = 124$$



Solution The surface area of the rectangular prism is 124 square feet.

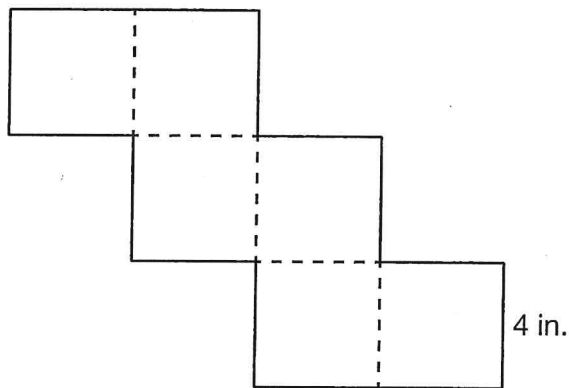
Example 2

What is the surface area of this cube?



Strategy Use a net.

Step 1 Draw the net showing the dimensions of the cube.



Step 2 Find the area of one face.

$$A = 4 \text{ inches} \times 4 \text{ inches} = 16 \text{ square inches}$$

Step 3 Multiply by 6 because there are 6 equal faces.

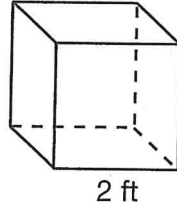
$$SA = 16 \text{ square inches} \times 6$$

$$SA = 96 \text{ square inches}$$

Solution The surface area of the cube is 96 square inches.

Guided Practice

Imani wraps a box that is shaped like a cube. The box has an edge length of 2 feet. What is the surface area of the box?



Draw the net showing the dimensions of the cube.

Find the surface area of the box.

Find the area of one face.

Each edge is _____ feet long.

_____ feet \times _____ feet = _____ square feet

Find the area of 6 faces.

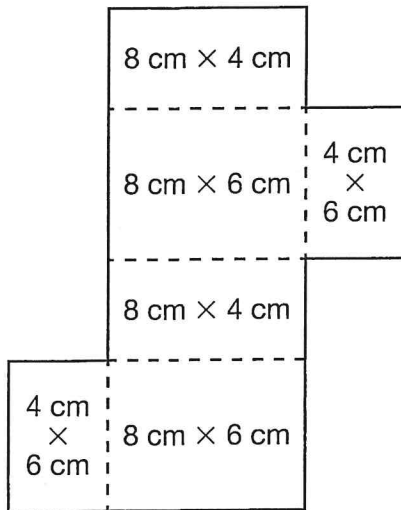
_____ square feet \times 6 = _____ square feet

The surface area of the box is _____.

Lesson Practice • Part 1

Choose the correct answer.

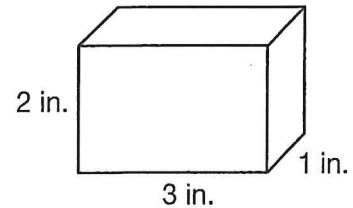
1. The net for a rectangular prism is shown below.



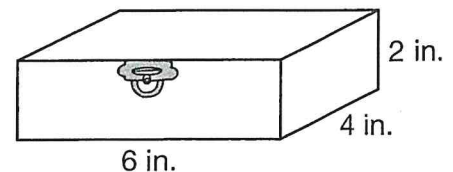
What is the surface area of the rectangular prism, in square centimeters?

- A. 416
B. 208
C. 204
D. 104
2. What is the surface area of a cube with edge lengths of 5 inches?
- A. 30 square inches
B. 75 square inches
C. 150 square inches
D. 300 square inches

3. What is the surface area of this rectangular prism, in square inches?



- A. 11
B. 22
C. 36
D. 72
4. Erin's jewelry box is in the shape of a rectangular prism.



What is the surface area of Erin's jewelry box?

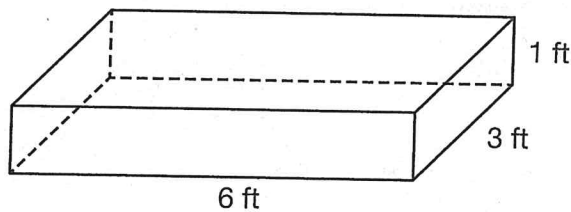
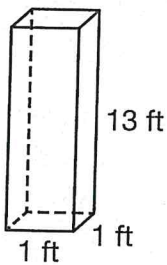
- A. 24 square inches
B. 44 square inches
C. 48 square inches
D. 88 square inches

5. A rectangular storage container is 10 feet long, 5 feet wide, and 8 feet high.

A. What is the length and width of each of the rectangular faces?

B. What is the surface area? Show your work.

6. Two rectangular prisms are shown below.

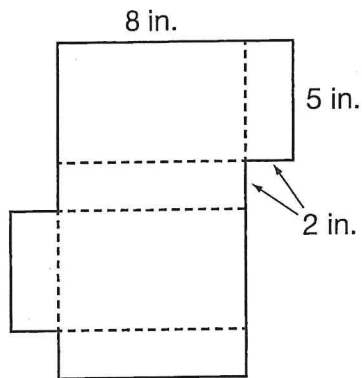


Ned says they have the same surface area. Do you agree or disagree? Explain.

Lesson Practice • Part 2

Choose the correct answer.

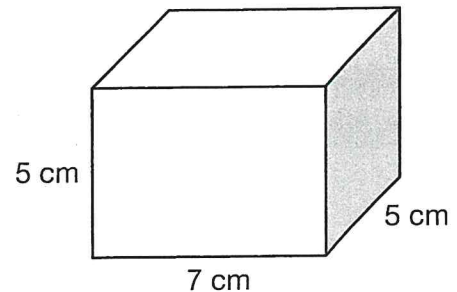
1. Shari made a net of a box.



What is the surface area of the box?

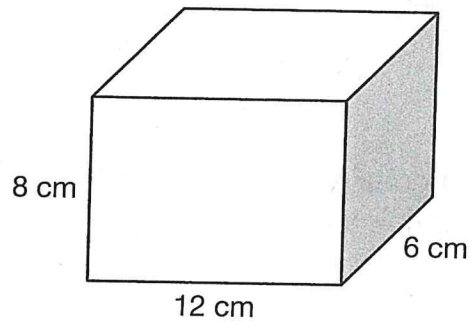
- A. 17 square inches
 - B. 66 square inches
 - C. 78 square inches
 - D. 132 square inches
2. Which is the surface area of a cube with an edge length of 9 cm?
- A. 54 square centimeters
 - B. 108 square centimeters
 - C. 243 square centimeters
 - D. 486 square centimeters

3. What is the surface area of this rectangular prism?



- A. 24 square centimeters
 - B. 190 square centimeters
 - C. 350 square centimeters
 - D. 380 square centimeters
4. Helena wants to paint a box in the shape of a cube with edges that are 7 inches long. What is the surface area that Helena will paint?
- A. 42 square inches
 - B. 147 square inches
 - C. 294 square inches
 - D. 588 square inches

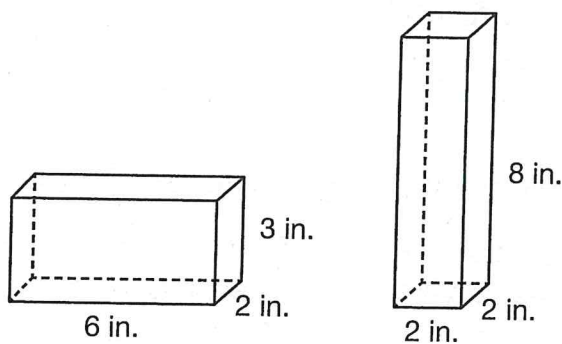
5. A container is shaped like a rectangular prism.



- A. What is the length and width of each of the rectangular faces?

- B. What is the surface area? Show your work.

6. Two rectangular prisms are shown below.



Dominic says they have the same surface area. Do you agree or disagree? Explain.

Lesson 20 Answers

Lesson 20

Guided Practice

Draw the net showing the dimensions of the cube.

Check students' nets.

Each edge is **2** feet long.

$$2 \text{ feet} \times 2 \text{ feet} = 4 \text{ square feet}$$

$$4 \text{ square feet} \times 6 = \mathbf{24} \text{ square feet}$$

The surface area of the box is **24 square feet**.

Lesson Practice Part 1

1. B
2. C
3. B
4. D
5. A. There are two faces that are 10 ft by 5 ft, two faces that are 10 ft by 8 ft, and two faces that are 8 ft by 5 ft.
B. 340 square feet; Possible work:
There are two faces that are 10 ft by 5 ft:
 $2 \times 10 \times 5 = 100$;
There are two faces that are 10 ft by 8 ft:
 $2 \times 10 \times 8 = 160$
There are two faces that are 5 ft by 8 ft:
 $2 \times 5 \times 8 = 80$
The total surface area is $100 + 160 + 80 = 340$ square feet.

6. Agree; Possible explanation: I drew the net for each prism and then found the surface area for each prism. They both have a surface area of 54 square feet.

Lesson Practice Part 2

1. D
2. D
3. B
4. C
5. A. There are two faces that are 12 cm by 6 cm, two faces that are 12 cm by 8 cm, and two faces that are 8 cm by 6 cm.
B. 432 square centimeters; Possible work:
There are two faces that are 12 cm by 6 cm:
 $2 \times 12 \times 6 = 144$
There are two faces that are 12 cm by 8 cm:
 $2 \times 12 \times 8 = 192$;
There are two faces that are 8 cm by 6 cm:
 $2 \times 6 \times 8 = 96$
The total surface area is $144 + 192 + 96 = 432$ square centimeters.
6. Agree; Possible explanation: I drew the net for each prism and then found the surface area for each prism. They both have a surface area of 72 square inches.