Englewood Public School District

GEOMETRY

SUMMER PACKET

2018

Name _____

Note to Student:

- **Show all work in the packet.**
- **You may <u>not</u> use a calculator.**
- **Use the QR codes to watch a video tutorial on the topics that do not have examples.**
- **This assignment will be graded.**

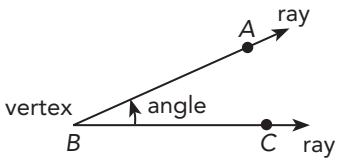
G
SKILL 32

Name _____ Date _____

Classify Angles

Example

An angle is formed by two rays that share a common endpoint called the vertex. In the angle at right, $\overrightarrow{BA}$ and $\overrightarrow{BC}$ meet at vertex B to form $\angle ABC$.



Angles are measured in degrees. The symbol used to show degrees is °. The measure of angle ABC is 25°. This can be written as $m\angle ABC = 25°$.

Classify $\angle ABC$ as an acute, obtuse, or right angle. Use the chart at right for reference.

Angle Type	Description
Acute	Measure is less than 90°.
Right	Measure is 90°.
Obtuse	Measure is greater than 90° but less than 180°.
Straight	Measure is 180°.

STEP 1 From vertex B, draw a dotted line perpendicular to $\overrightarrow{BC}$ to form a right angle.

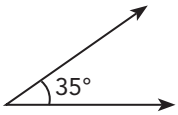
STEP 2 Compare the measure of $\angle ABC$ to the measure of the right angle you drew.

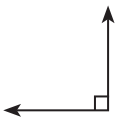
$$25° < 90°$$

So, $\angle ABC$ is an acute angle.

Quick Check

Tell whether each angle is an acute, obtuse or right angle.

1. 

2. 

3. $m\angle Z = 75°$ _____

4. $m\angle 5 = 121°$ _____

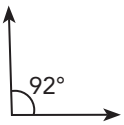
Practice on Your Own

Tell whether each angle is an acute, obtuse or right angle.

5.

6.

7.

8. 

9. $m\angle R = 179°$ _____

10. $m\angle G = 89°$ _____

© Marshall Cavendish International (Singapore) Private Limited.

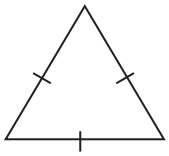
G
SKILL 34

Name _____ Date _____

Classify Triangles by Side Lengths

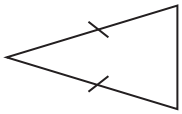
Example 1 **Equilateral Triangle**

- All three sides have equal length.
- All three angles have equal measure.



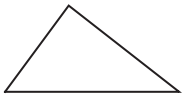
Example 2 **Isosceles Triangle**

- At least two sides have equal length.
- The angles opposite the equal sides have equal measure.



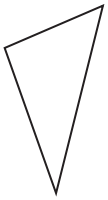
Example 3 **Scalene Triangle**

- No sides have equal length.
- No angles have equal measure.

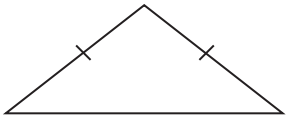


Quick Check

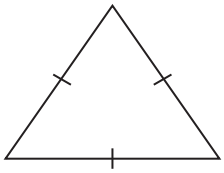
Classify each triangle by its side lengths.

1. 

_____

2. 

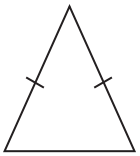
_____

3. 

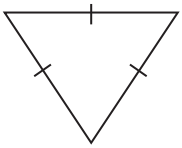
_____

Practice on Your Own

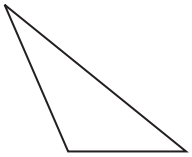
Classify each triangle by its side lengths.

4. 

_____

5. 

_____

6. 

_____

Classify the triangle described below.

7. One angle measures 40° and a second angle measures 60°.

_____

© Marshall Cavendish International (Singapore) Private Limited.

G

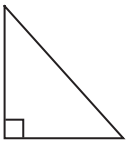
SKILL 35

Name _____ Date _____

Classify Triangles by Angle Measures

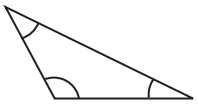
Example 1 **Right Triangle**

An angle that measures 90° is called a right angle.
Any triangle that includes a right angle is called a right triangle.



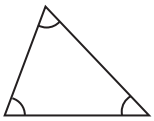
Example 2 **Obtuse Triangle**

An angle with a measure greater than 90° is called an obtuse angle.
Any triangle that includes an obtuse angle is called an obtuse triangle.



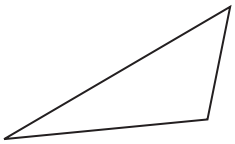
Example 3 **Acute Triangle**

An angle that measures less than 90° is called an acute angle.
Any triangle that includes three acute angles is called an acute triangle.

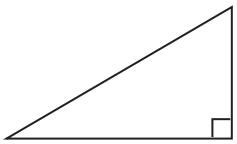


Quick Check

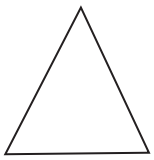
Classify each triangle by its angle measures.

1. 

_____

2. 

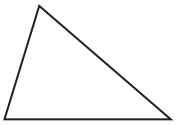
_____

3. 

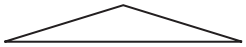
_____

Practice on Your Own

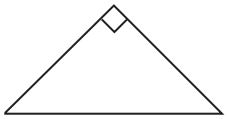
Classify each triangle by its angle measures.

4. 

_____

5. 

_____

6. 

_____

Classify the triangle described below.

7. None of the angles measure greater than 80°.

_____

© Marshall Cavendish International (Singapore) Private Limited.

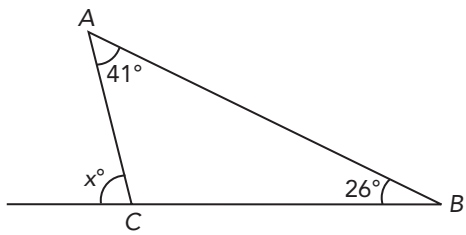
G
SKILL 30

Name _____ Date _____

Find Measures of Exterior Angles of a Triangle

Example

Find the unknown angle measure.



STEP 1 The unknown angle is an exterior angle of triangle at *C*. So, its measure must be equal to the sum of the measures of the interior angles at *A* and *B*.

$x = m\angle A + m\angle B$

STEP 2 Substitute the known angle measures into the equation. Solve for *x*.

$x = 41 + 26$

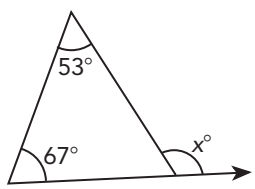
$x = 67$

The unknown angle measure is 67°.

Quick Check

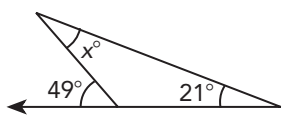
Find the unknown angle measure.

1



_____

2

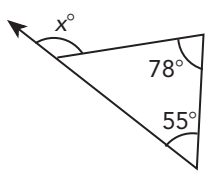


_____

Practice on Your Own

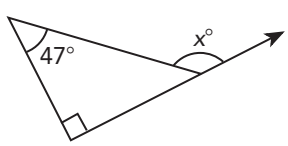
Find the unknown angle measure.

3



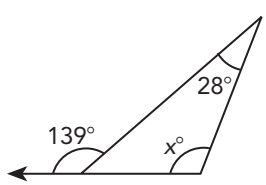
_____

4



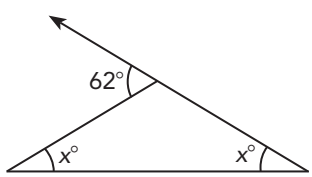
_____

5



_____

6



_____

© Marshall Cavendish International (Singapore) Private Limited.

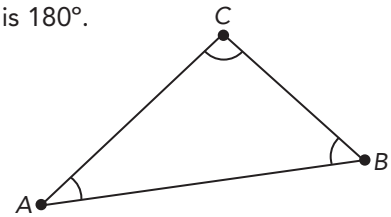
G
SKILL 29

Name _____ Date _____

Find Measures of Interior Angles of a Triangle

The sum of the measures of the interior angles of a triangle is 180°.

$m\angle A + m\angle B + m\angle C = 180°$



Example

The measures of two of the interior angles of a triangle are 58° and 86°.

Find the measure of the third interior angle.

STEP 1 Substitute the known angle measures into the equation.

$m\angle A + m\angle B + m\angle C = 180°$

$58 + 86 + m\angle C = 180$

STEP 2 Solve for $m\angle C$.

$58 + 86 + m\angle C = 180$	
$144 + m\angle C = 180$	Add.
$144 - 144 + m\angle C = 180 - 144$	Subtract 144 from both sides.
$m\angle C = 36$	Simplify.

The measure of the third interior angle is 36°.

Quick Check

The measures of two interior angles are given for each triangle. Find the measure of the third interior angle.

1. $\triangle ABC$: 50°, 60° _____
2. $\triangle DEF$: 23°, 106° _____
3. $\triangle GHI$: 48°, 66° _____

Practice on Your Own

The measures of two interior angles are given for each triangle. Find the measure of the third interior angle.

4. $\triangle JKL$: 70°, 65° _____
5. $\triangle MNO$: 108°, 34° _____
6. $\triangle PQR$: 27°, 34° _____
7. $\triangle STU$: 91°, 18° _____
8. $\triangle VWX$: 54°, 89° _____
9. $\triangle XYZ$: 61°, 73° _____

© Marshall Cavendish International (Singapore) Private Limited.

G
SKILL 33

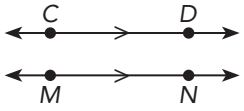
Name _____ Date _____

Identify Parallel and Perpendicular Lines

Two lines in the same plane that do not intersect are parallel lines. Parallel lines are always the same distance apart. They have no points in common.
Two lines that intersect and form a 90° angle are perpendicular lines.

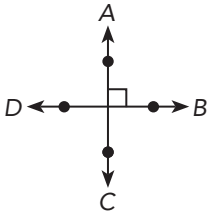
Example 1 **Parallel Lines**

Lines $\overleftrightarrow{CD}$ and $\overleftrightarrow{MN}$ are parallel. They do not intersect. They are the same distance apart. They share no common points. The > symbols on the lines indicate that $\overleftrightarrow{CD}$ and $\overleftrightarrow{MN}$ are parallel.



Example 2 **Perpendicular Lines**

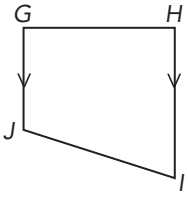
Lines $\overleftrightarrow{AC}$ and $\overleftrightarrow{DB}$ are perpendicular. They intersect to form 90° angles, as indicated by the right angle symbol.



Quick Check

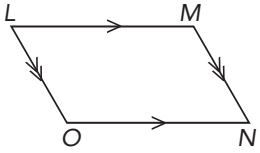
Identify each pair of parallel line segments.

1



_____

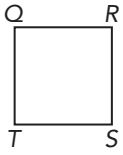
2



_____

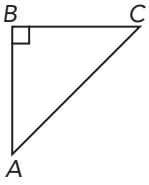
Identify each pair of perpendicular line segments.

3 *QRST* is a square.



_____

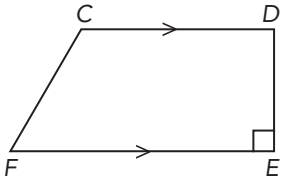
4



_____

Practice on Your Own
Identify each pair of parallel or perpendicular line segments.

5



Parallel: _____

Perpendicular: _____

© Marshall Cavendish International (Singapore) Private Limited.

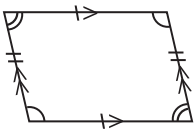
G
SKILL 36

Name _____ Date _____

Name Quadrilaterals

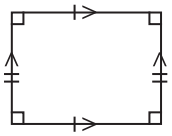
Example 1 Parallelogram

- Opposite sides are parallel and equal in length.
- Opposite angles have equal measures.



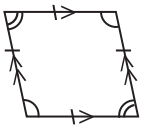
Example 2 Rectangle

- A rectangle is a type of parallelogram.
- All interior angles are right angles.
- Diagonals have equal measure.



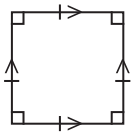
Example 3 Rhombus

- A rhombus is a type of parallelogram.
- All sides are equal in length.
- Opposite angles have equal measure.
- Diagonals intersect at right angles.



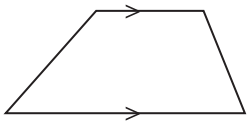
Example 4 Square

- A square is a type of parallelogram.
- All sides are equal in length.
- All interior angles are right angles.
- Diagonals have equal lengths and intersect at right angles.



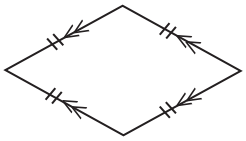
Example 5 Trapezoid

- A trapezoid is not a parallelogram.
- Only one pair of opposite sides is parallel.

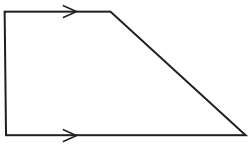


✔ Quick Check

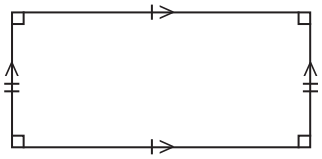
Name each quadrilateral.

1. 

_____

2. 

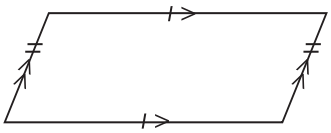
_____

3. 

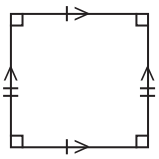
_____

Practice on Your Own

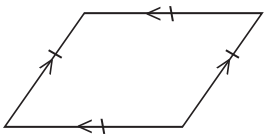
Name each quadrilateral.

4. 

_____

5. 

_____

6. 

_____

© Marshall Cavendish International (Singapore) Private Limited.

G
SKILL 38

Name _____ Date _____

Find the Perimeter of a Polygon

Example

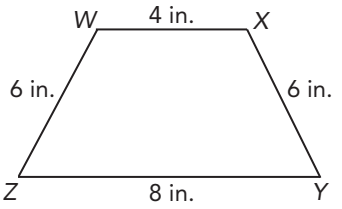
The perimeter of a polygon is the distance around the polygon. Figure *WXYZ* is a trapezoid. Find its perimeter.

STEP 1 Identify the sides of the polygon. Trapezoid *WXYZ* has 4 sides: $\overline{WX}$, $\overline{XY}$, $\overline{YZ}$, and $\overline{ZW}$.

STEP 2 Write an equation for the perimeter.
$P = WX + XY + YZ + ZW$

STEP 3 Substitute the value for the length of each side into the equation and find the sum.
$P = 4 + 6 + 8 + 6 = 24$

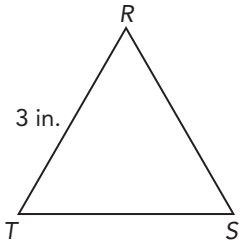
The perimeter of trapezoid *WXYZ* is 24 inches, or 24 in.



Quick Check

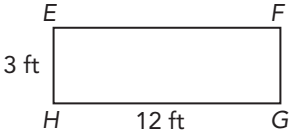
Find the perimeter of each polygon.

1 Figure *RST* is an equilateral triangle.



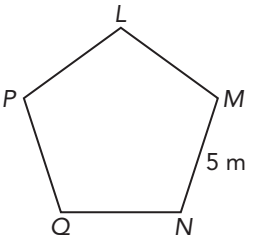
P = _____

2 Figure *EFGH* is a rectangle.



P = _____

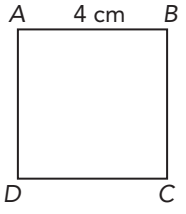
3 Figure *LMNOP* is a regular pentagon.



P = _____

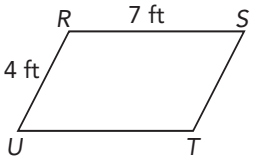
Practice on Your Own
Find the perimeter of each polygon.

4 Figure *ABCD* is a square.



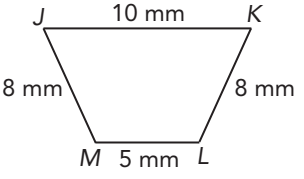
P = _____

5 Figure *RSTU* is a parallelogram.



P = _____

6 Figure *JKLM* is a trapezoid.



P = _____

© Marshall Cavendish International (Singapore) Private Limited.

G
SKILL 39

Name _____ Date _____

Find the Area of a Rectangle Using a Formula

Example

Find the area of the rectangle at right.

STEP 1 Write the formula for the area of a rectangle.

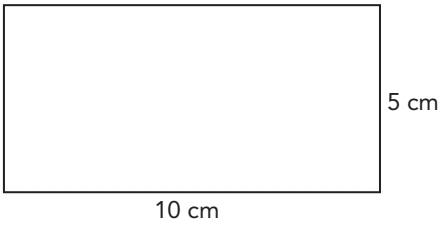
Area = *length* · *width* or $A = \ell w$

STEP 2 Substitute the length of the longer side, 10, for ℓ in the formula. Substitute the length of the shorter side, 5, for *w*.

$A = 10 \cdot 5$

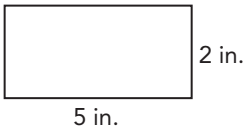
STEP 3 Multiply.

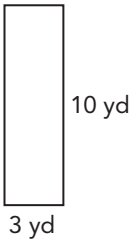
$A = 10 \cdot 5 = 50$ The area of the rectangle is 50 square centimeters, or 50 cm^2.

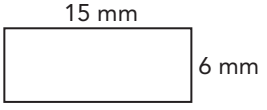


Quick Check

Find the area of each rectangle.

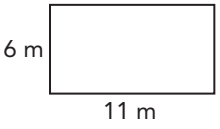


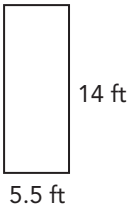




1 _____ 2 _____ 3 _____

Practice on Your Own
Find the area of each rectangle.





4 _____ 5 _____

Solve.

6 The length of a rectangle is 18.3 yards and its width is 9 yards.

Find the area of the rectangle. _____

© Marshall Cavendish International (Singapore) Private Limited.

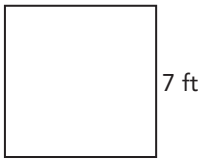
G
SKILL 40

Name _____ Date _____

Find the Area of a Square Using a Formula

Example

Find the area of a square: Area = length × length, or $A = \ell^2$.



STEP 1 Write the formula for the area of a square.

Area = length · width or $A = \ell^2$

STEP 2 Substitute the value for the length into the formula.

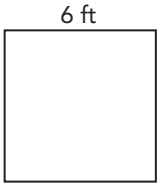
$A = 7^2$ Remember, when you "square" a number, you multiply it by itself.

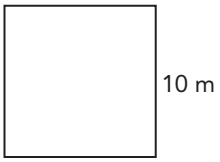
STEP 3 Multiply.

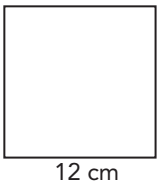
$A = 7 \times 7 = 49$ The area of the square is 49 square feet, or 49 ft^2.

✔ Quick Check

Find the area of each square.

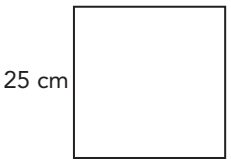


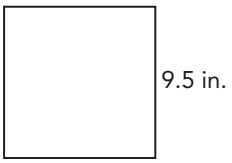




1 A = _____ 2 A = _____ 3 A = _____

Practice on Your Own
Find the area of each square.





4 A = _____ 5 A = _____

Solve.

6 A side length of a square is 21 millimeters. Find the area of the square.

_____

7 A side length of a square is 14.6 feet. Find the area of the square.

_____

© Marshall Cavendish International (Singapore) Private Limited.

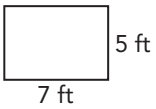
G
SKILL 49

Name _____ Date _____

Find Areas of Rectangles, Triangles and Trapezoids

Example 1 Rectangle

Find the area of the rectangle.



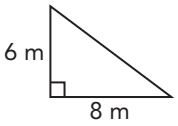
STEP 1 Use the formula for an area of a rectangle. $A = \ell w$

STEP 2 Substitute the values for the length and width. $A = 7 \cdot 5$

STEP 3 Multiply. The units are $\text{ft} \cdot \text{ft} = \text{ft}^2$. $A = 35\ \text{ft}^2$

Example 2 Triangle

Find the area of the triangle.



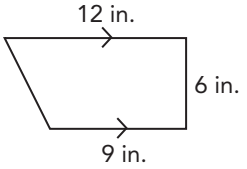
STEP 1 Use the formula for the area of a triangle. $A = \frac{1}{2}bh$

STEP 2 Substitute the values for the base and height. $A = \frac{1}{2}(8)(6)$

STEP 3 Multiply. The units are $m \cdot m = m^2$. $A = 24\ \text{ft}^2$

Example 3 Trapezoid

Find the area of the trapezoid.



STEP 1 Use the formula for the area of a trapezoid. $A = \frac{1}{2}(b_1 + b_2)h$

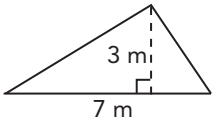
STEP 2 Substitute values for the bases and height. $A = \frac{1}{2}(12 + 9)6$

STEP 3 Simplify. The units are $\text{in.} \cdot \text{in.} = \text{in.}^2$ $A = 63\ \text{in.}^2$

Quick Check

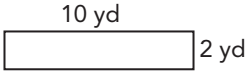
Find the area of each figure.

1



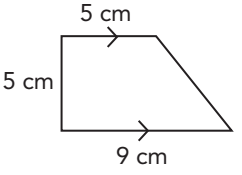
_____

2



_____

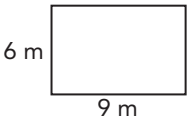
3



_____

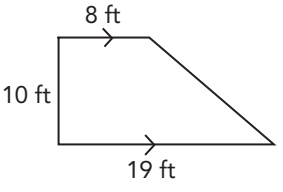
Practice on Your Own
Find the area of each figure.

4



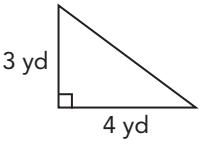
_____

5



_____

6



_____

© Marshall Cavendish International (Singapore) Private Limited.

G
SKILL 42

Name _____ Date _____

Find the Area and Circumference of a Circle

Example

The tires on Kim's bicycle have a diameter of 24 inches.

a) What is the area of the circle formed by a tire? Use 3.14 as an approximation for π.

STEP 1 Use the formula for the area of a circle: $A = \pi r^2$ with r = radius.

Calculate the radius of the circle: $r = 24 \div 2 = 12$ in.

STEP 2 Find the area of the wheel.

$$\begin{aligned} A &= \pi r^2 \\ &= \pi(12)^2 \\ &= \pi(144) \\ &\approx 3.14 \cdot 144 \\ &= 452.16 \end{aligned}$$

The area of the tire is about 452.16 square inches.

b) What is the circumference of one tire? Use 3.14 as an approximation for π.

Use the formula for the circumference of a circle:
$C = \pi d$ with d = diameter, or
$C = 2\pi r$ with r = radius.

$$\begin{aligned} C &= \pi(24) \\ &\approx 3.14 \cdot 24 \\ &= 75.36 \end{aligned}$$

The circumference of the tire is about 75.36 inches.

Quick Check
Solve. Use 3.14 as an approximation for π.

1 A circle has a radius of 30 centimeters.

a) What is its area? _____

b) What is its circumference? _____

2 A circle has a diameter of 4 feet.

a) What is its area? _____

b) What is its circumference? _____

Practice on Your Own
Solve. Use 3.14 as an approximation for π.

3 A circle has a diameter of 22 inches.

a) What is its area?

_____

b) What is its circumference?

_____

4 A circle has a radius of 8 meters.

a) What is its area?

_____

b) What is its circumference?

_____

5 A circle has a diameter of 14 centimeters.

a) What is its area? _____

b) What is its circumference?

_____

6 A circle has a radius of 6 inches.

a) What is its area? _____

b) What is its circumference?

_____

© Marshall Cavendish International (Singapore) Private Limited.

G

SKILL 43

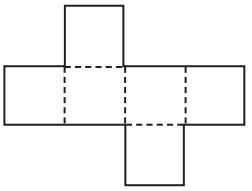
Name _____ Date _____

Identify Nets of Prisms and Pyramids

Example 1 Cube

This net shows six congruent squares. It can be folded to form a square prism, also called a cube.

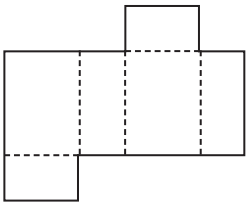
This is a net of a cube.



Example 2 Rectangular Prism

This net shows three pairs of congruent rectangles. Any pair can be considered the bases of the prism.

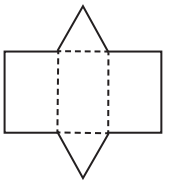
This is a net of a rectangular prism.



Example 3 Triangular Prism

This net shows two congruent triangles (parallel bases) and three rectangular faces.

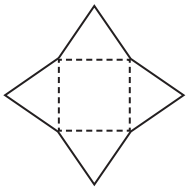
This is a net of a triangular prism.



Example 4 Square Pyramid

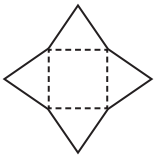
This net shows a square base and four faces that are congruent triangles.

This is a net of a square pyramid.

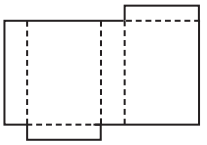


Quick Check

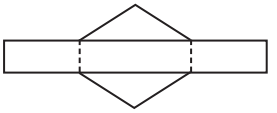
Classify each net of a pyramid or prism by the shape of its base(s).

1. 

_____

2. 

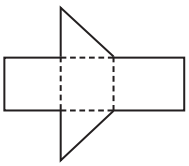
_____

3. 

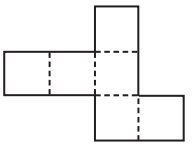
_____

Practice on Your Own

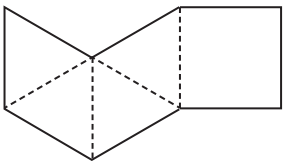
Classify each net of a pyramid or prism by the shape of its base(s).

4. 

_____

5. 

_____

6. 

_____

Classify the solid formed by the net described.

7. The net for a solid has 6 faces. None of the faces are squares or triangles.

What solid does this net form? _____

© Marshall Cavendish International (Singapore) Private Limited.

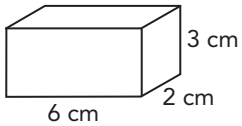
G
SKILL 40

Name _____ Date _____

Apply Surface Area and Volume Formulas for Prisms

Example 1 Surface Area

Find the surface area of the prism.



STEP 1 Use the formula for the surface area of a rectangular prism.
$S.A. = 2lw + 2lh + 2wh$

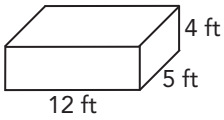
STEP 2 Substitute values for the length l, width w, and height h.
$S.A. = 2(6)(2) + 2(6)(3) + 2(2)(3)$

STEP 3 Multiply, then add. Write the answer using square units.
$S.A. = 24 + 36 + 12$
$S.A. = 72\ cm^2$

The surface area of the prism is 72 cm^2.

Example 2 Volume

Find the volume of the prism.



STEP 1 Use the formula for the volume of a rectangular prism.
$V = lwh$, or $V = Bh$ (B = area of base)]

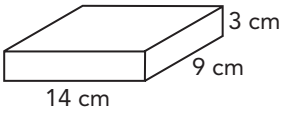
STEP 2 Substitute values for the length l, width w, and height h.
$V = 12 \cdot 5 \cdot 4$, or $V = (12 \cdot 5) \cdot 4$

STEP 3 Multiply. Write the answer using cubic units.
$V = 240\ ft^3$

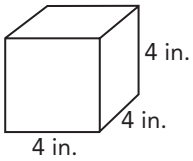
The volume of the prism is 240 ft^3.

Quick Check

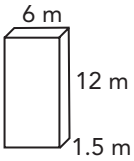
Find the surface area and volume of each prism.

1


$S.A.$ = _____
V = _____

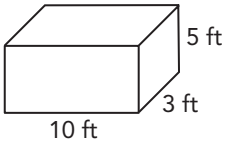
2


$S.A.$ = _____
V = _____

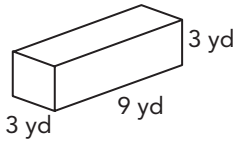
3


$S.A.$ = _____
V = _____

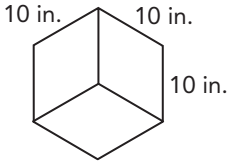
Practice on Your Own
Find the surface area and volume of each prism.

4


$S.A.$ = _____
V = _____

5


$S.A.$ = _____
V = _____

6


$S.A.$ = _____
V = _____

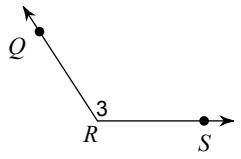
Solve.

7 The volume of a prism is 324 m^3. The prism has a square base and a height of 9 m. What is the length of each side of the base? _____

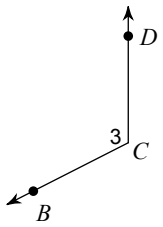
© Marshall Cavendish International (Singapore) Private Limited.

Name each angle in four ways.

1)

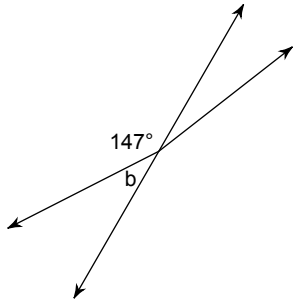


2)

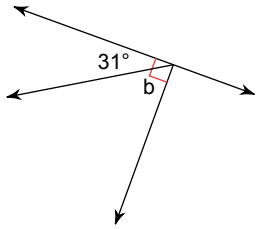


Find the measure of angle b.

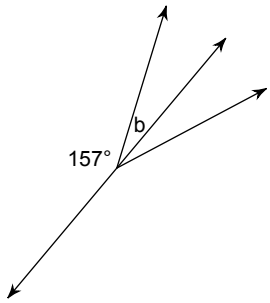
3)



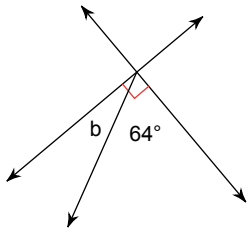
4)



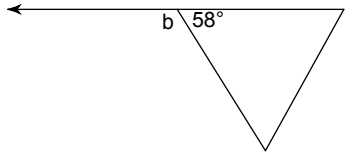
5)



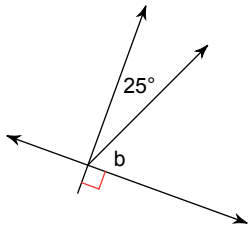
6)



7)



8)



Simplify. Show all work.

9) $\sqrt{288}$

10) $\sqrt{900}$

11) $\sqrt{175}$

12) $\sqrt{36}$

13) $\sqrt{27}$

14) $\sqrt{112}$

15) $\sqrt{800}$

16) $\sqrt{324}$

17) $\sqrt{108}$

18) $\sqrt{500}$

Evaluate each expression. Show all work.

1) $\frac{12}{7} - \frac{4}{5}$

2) $\frac{1}{4} - \left(-3\frac{1}{2}\right)$

3) $\left(-\frac{1}{2}\right) + 2\frac{3}{4}$

4) $7 - 1\frac{2}{3}$

5) $\left(-\frac{7}{4}\right) + 2\frac{1}{8}$

6) $3\frac{5}{6} + \frac{1}{2}$

7) $(-1) - \left(-\frac{3}{4}\right)$

8) $\frac{3}{7} + \left(-\frac{3}{5}\right)$

9) $1\frac{1}{2} \cdot -\frac{1}{6}$

10) $-\frac{4}{3} \cdot \frac{7}{5}$

11) $-2\frac{1}{5} \cdot 3$

12) $-\frac{1}{6} \cdot -\frac{3}{7}$

13) $\frac{5}{8} \div \frac{5}{3}$

14) $-3\frac{1}{4} \div \frac{-3}{2}$

15) $\frac{-4}{5} \div \frac{3}{2}$

16) $-2 \div \frac{7}{6}$

Evaluate each expression. Show all work.

17) $(-4) - 5$

18) $1 + (-8)$

19) $(-5) + (-6)$

20) $7 + (-2)$

21) $7 - (-4)$

22) $(-6) + 7$

23) $5 \cdot -6$

24) $-4 \cdot 2$

25) $4 \cdot -5$

26) $6 \cdot -6$

27) $5 \cdot -2$

28) $-4 \cdot -1$

29) $-9 \div -3$

30) $-30 \div 3$

31) $12 \div -2$

32) $-6 \div 3$

33) $-35 \div 5$

34) $-15 \div -5$

Solve each equation. Show all work.

35) $\frac{3}{5} = \frac{b}{5}$

36) $-15 = \frac{k}{15}$

37) $-31 = -16 - n$

38) $7n = -14$

39) $n - 3 = 1$

40) $x + (-4) = -1$

41) $-18 = -11 + x$

42) $-3 = 8 + x$

43) $n - (-6) = -14$

44) $\frac{x}{4} - 3 = -1$

45) $5 + 2n = 31$

46) $\frac{6 + x}{3} = 3$

47) $\frac{r - 10}{-2} = -5$

48) $-57 = 8x - 1$

49) $\frac{x - 9}{1} = 0$

50) $-6(6x - 5) = 30 + 6x$

51) $-17 + 4p = 3(1 + 4p) - 4p$

52) $-16 + 4x = -4(-3x - 4)$