Lesson 14.1 Skills Practice

NAME ____________________________________________ DATE ____________________

Cut, Fold, and Voila!
Nets

Vocabulary
Define each term in your own words.

1. geometric solids

2. net

3. prototype

4. edge

5. face

6. vertex

Problem Set
Sketch and label the location of each face of the given geometric solid.

1. Front right  Front left  Back  Top  Bottom
2. [Diagram of a rectangular prism]

3. [Diagram of a hexagonal prism]

4. [Diagram of a pyramid]

5. [Diagram of a tetrahedron]
6. Sketch a net of each geometric solid.

7. Sketch a net of each geometric solid.

Sample answer.
8.

9.
10. [Diagram of a pyramid]

11. [Diagram of a triangular pyramid]
12.
13.
14.
More Cans in a Cube

The Cube

Vocabulary

Match each definition to its corresponding term.

1. The amount of space occupied by an object
   a. polygon

2. A regular polyhedron whose six faces are congruent squares
   b. polyhedron

3. The total area of the 2-dimensional surfaces that make up a 3-dimensional object
   c. regular polyhedron

4. A 3-dimensional figure that has polygons as faces
   d. cube

5. A closed figure formed by three or more line segments
   e. unit cube

6. A 3-dimensional solid that has congruent regular polygons as faces and has congruent angles between all faces
   f. surface area

7. A cube that is one unit in length, one unit in width, and one unit in height
   g. volume

8. A portion of a line that includes two points and all the points in between those two points
   h. point

9. Having the same size, shape, and measure
   i. line segment

10. A location in space
    j. congruent
Problem Set

Calculate the surface area of the cube.

1. 4 cm

The surface area of the cube is $6 \cdot 4 \cdot 4 = 96 \text{ cm}^2$.

2. 1.5 cm

3. 7 cm

4. 1.8 cm

5. 3.5 cm

6. 0.9 cm
Lesson 14.2   Skills Practice

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7.  

8.  

9.  

10.  

9.2 cm  

0.6 cm  

6 cm  

5.25 cm
Calculate the volume of each cube. Then, calculate the cube’s volume if its dimensions were doubled.

11. 4 cm

The volume of the cube is $4 \times 4 \times 4 = 64$ cm$^3$.
If the cube’s dimensions were doubled, the volume would be $8 \times 64 = 512$ cm$^3$.

12. 7 cm

13. 1.6 cm

14. 3.5 cm
15. 0.5 cm

16. 8.4 cm

17. 5.7 cm

18. 2.2 cm
19. \(4.6\) cm

20. \(7.54\) cm
Prisms Can Improve Your Vision!

Prisms

Vocabulary

Write the term that best completes each statement.

1. A ________________ is a prism that has rectangles as its bases.
2. A ________________ is a polyhedron with two parallel and congruent faces called ________________. The other faces of the polyhedron are parallelograms and are called ________________.
3. A prism which has bases aligned one directly above the other and has lateral faces that are rectangles is a ________________.
4. The ________________ is the length of a line segment that is drawn from one base to the other base and is perpendicular to both.

Problem Set

1. Analyze the prism shown.
   a. Describe the number of faces and lateral faces of the prism.

   The prism has 5 faces and 3 lateral faces.

   b. Describe the number of vertices of the prism.

   The prism has 6 vertices.

   c. Describe the number of edges of the prism.

   The prism has 9 edges.

   d. Describe the shape of the base of the prism and name the prism.

   The shape of the base of the prism is a triangle. The prism shown is a triangular prism.
2. Analyze the prism shown.
   a. Describe the number of faces and lateral faces of the prism.

   b. Describe the number of vertices of the prism.

   c. Describe the number of edges of the prism.

   d. Describe the shape of the base of the prism and name the prism.

3. Analyze the prism shown.
   a. Describe the number of faces and lateral faces of the prism.

   b. Describe the number of vertices of the prism.

   c. Describe the number of edges of the prism.

   d. Describe the shape of the base of the prism and name the prism.
4. Analyze the prism shown.
   a. Describe the number of faces and lateral faces of the prism.

   b. Describe the number of vertices of the prism.

   c. Describe the number of edges of the prism.

   d. Describe the shape of the base of the prism and name the prism.
Outside and Inside a Prism
Surface Area and Volume of a Prism

Problem Set

Calculate the surface area and volume of each right rectangular prism.

1. 2 cm
   3 cm
   8 cm

   The surface area is $2(8 \cdot 3) + 2(3 \cdot 2) + 2(8 \cdot 2) = 48 + 12 + 32 = 92 \text{ cm}^2$.
   The volume is $8 \cdot 3 \cdot 2 = 48 \text{ cm}^3$.

2. 3 ft
   6 ft
   4 ft

3. 1 in.
   2 in.
   15 in.
4. A right rectangular prism has dimensions of 5 cm, 6 cm, and 10 cm.

5. A right rectangular prism has dimensions of 5 yd, 6 yd, and 20 yd.

6. A right rectangular prism has a length of 7 inches, a width of 4 inches, and a height of 2 inches.
7. A right rectangular prism has a length of 5 centimeters, a width of 5 centimeters, and a height of 12 centimeters.

8. A right rectangular prism has a length of 11 centimeters, a width of 3 centimeters, and a height of 10 centimeters.

9. A right rectangular prism has a length of 4.5 meters, a width of 9 meters, and a height of 6 meters.

10. A right rectangular prism has a length of 2.2 feet, a width of 5.5 feet, and a height of 15 feet.

Calculate the surface area and volume for each right prism with the given base. The base of the prism is a regular polygon.

11. The area of each base is \( \frac{1}{2} \cdot 6 \cdot 5.2 = 15.6 \text{ cm}^2 \). The area of each lateral face is \( 6 \cdot 10 = 60 \text{ cm}^2 \).

The surface area of the prism is \( 2 \cdot 15.6 + 3 \cdot 60 = 31.2 + 180 = 211.2 \text{ cm}^2 \).

The volume of the prism is \( 15.6 \cdot 10 = 156 \text{ cm}^3 \).
12. 6 cm

13. 12 cm
14.

- Base: 3 cm
- Height: 2.6 cm
- Side: 2 cm

15.

- Base: 14.5 cm
- Side: 20 cm
- Height: 14.5 cm
- Radius: 12 cm
Sketch a net for each right rectangular prism. Label the bases and lateral faces.

16.

17. Answers may vary.

18.
Lesson 14.4  Skills Practice

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19.

20.
21.

22.
The Egyptians Were on to Something—Or Was It the Mayans?
Pyramids

**Vocabulary**

Draw and label a figure to illustrate the key terms.

1. pyramid
2. vertex of a pyramid
3. height of a pyramid
4. slant height of a pyramid
Problem Set

Calculate the surface area of each pyramid with the given base and lateral face. The base of each pyramid is a regular polygon.

1. The height of the pyramid is 11.6 feet.

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10 ft
[Diagram of a pyramid with base 10 ft, height 8.7 ft, and lateral face 12 ft]
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The area of the base is \( \frac{1}{2} (10 \cdot 8.7) = 43.5 \text{ ft}^2 \). The area of each lateral face is \( \frac{1}{2} (10 \cdot 12) = 60 \text{ ft}^2 \).

The surface area of the pyramid is \( 43.5 + 3 \cdot 60 = 43.5 + 180 = 223.5 \text{ ft}^2 \).

2. The height of the pyramid is 8 centimeters.

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6 cm
[Diagram of a pyramid with base 5.2 cm, height 8.2 cm, and lateral face 8.2 cm]
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The area of the base is \( \frac{1}{2} (5.2 \cdot 8.2) = 21.02 \text{ cm}^2 \). The area of each lateral face is \( \frac{1}{2} (5.2 \cdot 8.2) = 21.02 \text{ cm}^2 \).

The surface area of the pyramid is \( 21.02 + 3 \cdot 21.02 = 21.02 + 63.06 = 84.08 \text{ cm}^2 \).
3. The height of the pyramid is 12 centimeters.

4. The height of the pyramid is 4 inches.

5. The height of the pyramid is 6 meters.
6. The height of the pyramid is 7 feet.

7. The height of the pyramid is 10 centimeters.
8. The height of the pyramid is 5 inches.

9. The height of the pyramid is 20 centimeters.
10. The height of the pyramid is 8 millimeters.
And the Winning Prototype Is...?
Identifying Geometric Solids in Everyday Occurrences

Problem Set
Identify the geometric solid.

1. pyramid

2.
Lesson 14.6 Skills Practice

3.

4.

5.

6.
Use the given information to answer the question. Round to the nearest hundredth, if necessary. Use 3.14 for π.

7. Bin Awhile Manufacturing builds cube-shaped steel containment bins. The cost of the steel used is $1.50 per square foot. How much does the steel cost for each containment bin?

Determine the surface area of the bin. The area of each face is $4 \times 4 = 16 \text{ ft}^2$.
The total surface area is $6 \times 16 = 96 \text{ ft}^2$.
So, the cost of the steel for each bin is $96 \times 1.50 = 144.00$.

8. Tariq is building a hollow glass replica of an Egyptian pyramid with a square base for an art exhibit. The glass costs $0.01 per square inch. How much does Tariq spend on the glass for his pyramid?

Determine the surface area of the pyramid. The area of each face is $24 \times 20 = 480 \text{ in.}^2$.
The total surface area is $4 \times 480 = 1920 \text{ in.}^2$.
So, the cost of the glass for each pyramid is $1920 \times 0.01 = 19.20$. 
9. Jamie is considering buying an aluminum swimming pool in the shape of a rectangular prism. How many cubic feet of water will the pool hold when full?

![Diagram of a rectangular prism with dimensions 25 ft x 12.56 ft x 4 ft]

10. Laila is manufacturing boxes for frozen popsicles. The cost of the cardboard used to make the box is $0.03 per square foot. How much does the cardboard cost for each box?

![Diagram of a box with dimensions 0.6 ft x 0.75 ft x 0.15 ft]