Unit 4 Parent Guide

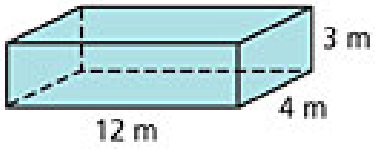
Lesson 1—Nets and Surface Area for Rectangular Prisms--Helpful Hints

*Students were introduced to surface area in today's lesson. Students learned multiple strategies for finding the surface area of a rectangular prism including a formula as well as a hands-on strategy of unfolding a rectangular prism and finding the area of each different side of the shape before adding them together. The formula for finding the surface area of a rectangular prism and the steps to complete are outlined below.

Formula for finding surface area: 2 (length x width) + 2 (height x width) + 2 (length x height)

**Another way to think of the formula is to create 3 different pairs of the numbers, multiply them, then multiply the answer times 2 and then add all of the products together. For example: If the 3 dimensions were 3 inches, 4 inches, and 2 inches then the formula would be 2 (3x4) + 2 (4x2) + 2 (3x2)

Example #1: Find the surface area of the following shape



Step 1: Use the 3 dimensions to follow the formula

2 (12x4) + 2 (4x3) + 2 (12x3)=

Step 2: Solve the multiplication problems inside the parentheses first.

2(48) + 2(12) + 2(36)=

Step 3: Take all products and multiply them each by 2

96 + 24 + 72=

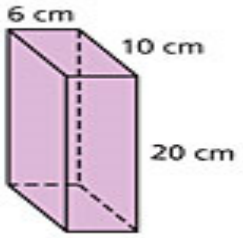
Step 4: Add all products together for the final answer

192

Step 5: Label your answer in squared units

192 meters squared

Example #1: Find the surface area of the following shape



Step 1: Use the 3 dimensions to follow the formula

2 (6x10) + 2 (10x20) + 2 (20x6)=

Step 2: Solve the multiplication problems inside the parentheses first.

2(60) + 2(200) + 2(120)=

Step 3: Take all products and multiply them each by 2

120 + 400 + 240=

Step 4: Add all products together for the final answer

760

Step 5: Label your answer in squared units

760 centimeters squared

*Lesson 2—Nets and Surface Area for Nonrectangular Prisms--Helpful Hints

*Today's lesson built upon the knowledge that student's gained during lesson 1 to understand how to calculate and identify the surface area of shapes that are not rectangular prisms. In order to work with nonrectangular prisms, students also learned strategies for identifying and naming nonrectangular prisms. The strategies and skills that students learned in today's lesson are outlined below.

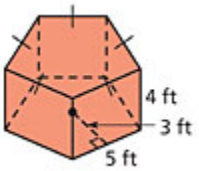
**To name a prism, students learned to identify the shape of the base and use that to then identify the prism.
Example #1: If the base of the prism was a pentagon, then the name of the prism would be a pentagonal prism.
Example #2: If the base of the prism was a triangle, then the name of the prism would be a triangular prism.
Example #3: If the base of the prism was an octagon, then the name of the prism would be an octagonal prism.

Homework Hints:
#7-Students will need to ask themselves, "if this is an octagonal prism, how many flat sides should it have? Does this shape have that many flat sides?" in order to answer the question.
#8-Students will need to ask themselves, "if the square base has an area of 16, what number did I multiply together to get 16?" Once they determine what the number is for the length and width and they already know the height is 6, they must then apply the surface area formula learned yesterday: 2 (length x width) + 2 (height x width) + 2 (length x height) in order to solve the problem.
#9-Students will need to ask themselves "if the perimeter is 8 and the shape is an octagon how much would each side be?"
#10- Students will need to gather all of the information that they already know.
-I already know that the triangular faces on my prism are 6 cm^2 each.
-I know that a triangular prism is made up of both triangular faces and rectangular faces
- I know the height of the rectangular faces
-I know the width of each of the rectangular faces
*Students will need to then use the information they already know in order to complete the formula for finding the surface area of the triangular prism which is: Area of the triangle bases + Area of each rectangular face

*Lesson 3—Surface Area of Prisms--Helpful Hints

*Today students continued to learn about finding the surface area of different types of prisms. To find the surface area of specific prisms, there are specific steps involved. These steps are outlined below.
Step 1: Determine what type of prism the shape is (triangular, octagonal, pentagonal etc.)
Step 2: Determine what 2 different shapes are included in the prism you are working with
Step 3: Find the area of each different kind of shapes using formulas we learned in Unit 1
*Area of a triangle: base x height ÷ 2
*Area of a rectangle: length x width
*Area of a regular polygon (pentagon, octagon, hexagon…): draw a line to the center of the shape to create different triangles. Find the area of one of the triangles and then multiply that area by how many triangles are found in the shape. (hint: the number of triangles will match up with the number of sides the shape has)
Step 4: Once the area of all shapes have been found, add them all together.
Step 5: Label the answer in square units

Example #1: Find the surface area of the following shape



Step 1: Determine what type of prism the shape is (triangular, octagonal, pentagonal etc.)
This is a pentagonal prism

Step 2: Determine what 2 different shapes are included in the prism you are working with

I am working with 2 pentagons and 5 rectangles

Step 3: Find the area of each different kind of shapes using formulas we learned in Unit 1

I will have to find the area of a rectangle: length x width

I will have to find the area of a pentagon: (height x base ÷ 2) x 5

Step 4: Once the area of all shapes have been found, add them all together.

Area of a rectangle: 4 x 5 = 20

There are 5 different rectangles in this shape so I must take 20 x 5=100

Area of a pentagon: (3 x 5 ÷ 2) x 5

3 x 5 = 15

15 ÷ 2 = 7.5

7.5 x 5 = 37.5

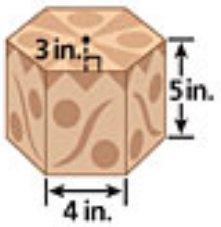
There are 2 different pentagons in this shape so I must take 37.5 x 2=75

100 + 75 = 175

Step 5: Label the answer in square units

175 ft²

Example #2: Find the surface area of the following shape



Step 1: Determine what type of prism the shape is (triangular, octagonal, pentagonal etc.)

This is a hexagonal prism

Step 2: Determine what 2 different shapes are included in the prism you are working with

I am working with 2 hexagons and 6 rectangles

Step 3: Find the area of each different kind of shapes using formulas we learned in Unit 1

I will have to find the area of a rectangle: length x width

I will have to find the area of a hexagon: (height x base ÷ 2) x 6

Step 4: Once the area of all shapes have been found, add them all together.

Area of a rectangle: 4 x 5 = 20

There are 6 different rectangles in this shape so I must take 20 x 6 = 120

Area of a hexagon: (3 x 4 ÷ 2) x 6

3 x 4 = 12

12 ÷ 2 = 6

6 x 6 = 36

There are 2 different hexagons in this shape so I must take 36 x 2 = 72

120 + 72 = 192

Step 5: Label the answer in square units

192 in²

*Lesson 4--Nets for Pyramids--Helpful Hints

*Today students will use their knowledge of prisms and nets from lessons 1-3 and apply it to the skills and strategies that they learned today about nets of pyramids. Pyramids are shapes with a 2-dimensional shape as the base and then triangles that all meet at a point. In order to work with pyramids, students also learned strategies for identifying and naming pyramids. The strategies and skills that students learned in today's lesson are outlined below.

**To name a pyramid, students learned to identify the shape of the base and use that to then identify the pyramid.

Example #1: If the base of the pyramid was a pentagon, then the name of the pyramid would be a pentagonal pyramid.
Example #2: If the base of the pyramid was a triangle, then the name of the pyramid would be a triangular pyramid.
Example #3: If the base of the pyramid was an hexagon, then the name of the pyramid would be an hexagonal pyramid.

Homework Hints:
#7-Students will need to ask themselves, "if this is an triangular pyramid, how many triangles should it have to make a point at the top? Does this shape have that many triangles?" in order to answer the question.

#8- Students will need to ask themselves "if the perimeter is 48 and the shape is a hexagon on the bottom how much would each side be worth?"

#9- Students will need to think about the formula for finding the area of a triangle in order to answer this question.

#10- Students will need to think about what they know about the base of a pyramid in order to answer this question.

*Lesson 5—Surface Area of Pyramids--Helpful Hints

**Today students continued to learn about finding the surface area of different types of pyramids. To find the surface area of specific pyramids, there are specific steps involved. These steps are outlined below.
Step 1: Determine what type of pyramid the shape is (triangular, octagonal, pentagonal etc.)
Step 2: Determine what 2 different shapes are included in the pyramid you are working with
Step 3: Find the area of each different kind of shapes using formulas we learned in Unit 1
*Area of a triangle: base x height ÷ 2
*Area of a rectangle: length x width
*Area of a regular polygon (pentagon, octagon, hexagon…): draw a line to the center of the shape to create different triangles. Find the area of one of the triangles and then multiply that area by how many triangles are found in the shape. (hint: the number of triangles will match up with the number of sides the shape has)
Step 4: Once the area of all shapes have been found, add them all together.
Step 5: Label the answer in square units

Example #1: Find the surface area of the following shape

Step 1: Determine what type of pyramid the shape is (triangular, octagonal, pentagonal etc.)
This is a pentagonal pyramid
Step 2: Determine what 2 different shapes are included in the pyramid you are working with
I am working with 1 pentagon and 5 triangles

Step 3: Find the area of each different kind of shapes using formulas we learned in Unit 1

I will have to find the area of triangles: (height x base ÷ 2) x 5

I will have to find the area of a pentagon: (height x base ÷ 2) x 5

Step 4: Once the area of all shapes have been found, add them all together.

Area of a pentagon: (8 x 6 ÷ 2) x 5

8 x 6 = 48

48 ÷ 2 = 24

24 x 5 =120

Area of a triangle: (8 x 12 ÷ 2) x 5 (because there are 5 triangles to make the pyramid)

8 x 12 = 96

96 ÷ 2 = 48

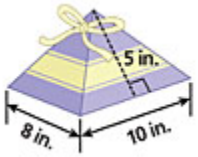
There are 5 different triangles in this shape so I must take 48 x 5 = 240

120 + 240 = 360

Step 5: Label the answer in square units

360 in²

Example #2: Find the surface area of the following shape



Step 1: Determine what type of pyramid the shape is (triangular, octagonal, pentagonal etc.)

This is a rectangular pyramid

Step 2: Determine what 2 different shapes are included in the pyramid you are working with

I am working with 1 rectangle and 4 triangles

Step 3: Find the area of each different kind of shapes using formulas we learned in Unit 1

I will have to find the area of a rectangle: length x width

I will have to find the area of a triangle: (height x base ÷ 2)

Step 4: Once the area of all shapes have been found, add them all together.

Area of a rectangle: 8 x 10 = 80

Area of a triangle: (5 x 10 ÷ 2) x 4 (because there are 4 triangles to make the pyramid)

5 x 10 = 50

50 ÷ 2 = 25

There are 4 different triangles in this shape so I must take 25 x 4 = 100

100 + 80 = 180

Step 5: Label the answer in square units

180 in²