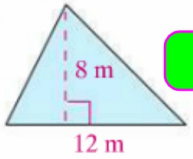
7-2 Surface Areas of Prisms and Cylinders

CONTENT STANDARDS
7.G.6

Check Skills You'll Need

Find the area of each triangle.

2.



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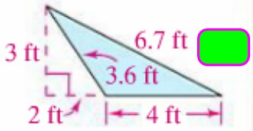


What You'll Learn

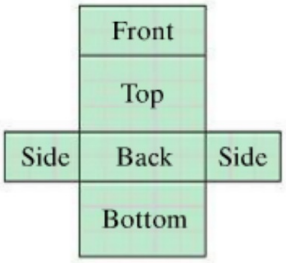
To find the surface areas of prisms and cylinders using nets

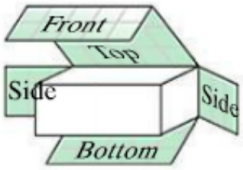
New Vocabulary net, surface area

Why Learn This?

When you wrap a birthday gift or cover a textbook, you are working with surface area. Surface area tells you how much material you need to cover something. You can use a net to solve surface area problems.

A **net** is a two-dimensional pattern that you can fold to form a three-dimensional figure. You can use nets to design boxes.

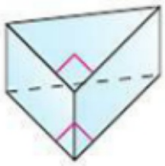


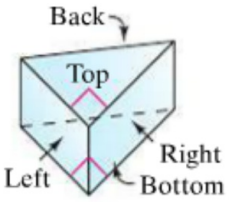


You can draw many different nets for a three-dimensional figure.

EXAMPLE 1 Drawing a Net

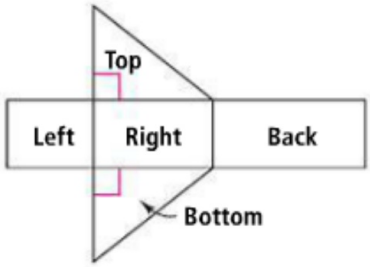
Draw a net for the triangular prism at the right.





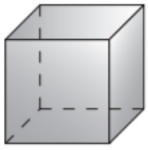
← Begin by labeling the bases and faces.

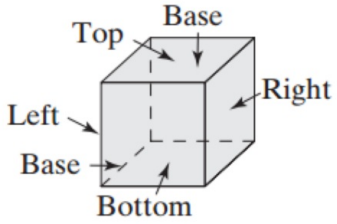
First draw one base. Then draw one face that connects both bases. Next, draw the other base. Draw the remaining faces. →



Example

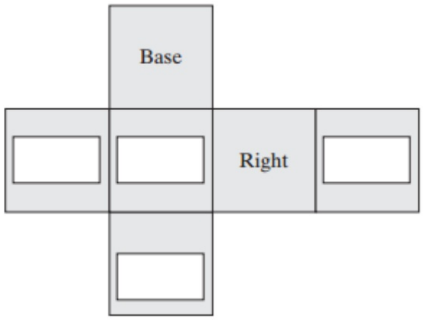
1 Drawing a Net Draw a net for the cube.





← Begin by labeling the bases and faces.

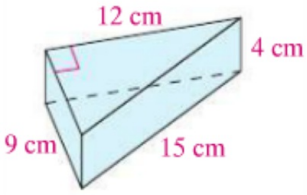
First, draw one base. Then, draw one face that connects both bases. Next, draw the other base. Draw and label the remaining faces.



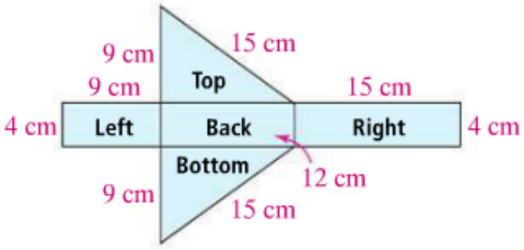
The **surface area** of a prism is the sum of the areas of its faces. You measure surface area of a prism in square units. You can find the surface area by finding the area of its net.

EXAMPLE 2 Finding the Surface Area of a Prism

Find the surface area of the triangular prism.



First draw a net for the prism.



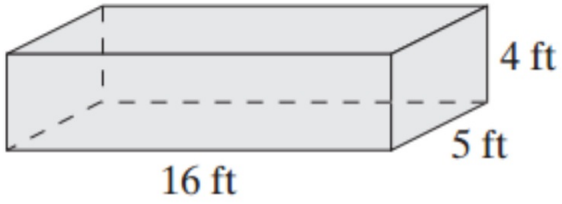
Then find the total area of the five faces.

left side		back		right side		top		bottom		
$4(9)$	$+$	$4(12)$	$+$	$4(15)$	$+$	$\frac{1}{2}(12)(9)$	$+$	$\frac{1}{2}(12)(9)$	$=$	252

The surface area of the triangular prism is 252 cm^2.

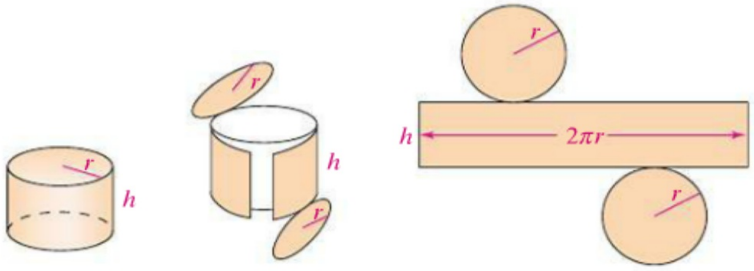
Quick Check

2. Find the surface area of the rectangular prism.



If you cut a label from a can, you will see that the label is a rectangle. The height of the rectangle is about the height of the can. The base length of the rectangle is the circumference of the can.

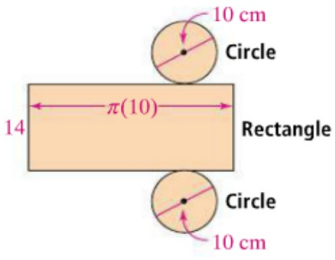
Similarly, if you cut up a cylinder, you get a rectangle and two circles.



You can use a net of a cylinder to find its surface area.

EXAMPLE 3 Finding the Surface Area of a Cylinder

Crafts You plan to make a birthday present for your friend. The first step is to cover a coffee can with construction paper. How much construction paper do you need?



Step 1 Draw a net.

Step 2 Find the area of one circle.

$$\begin{aligned} A &= \pi r^2 \\ &= \pi(5)^2 \\ &= \pi(25) \\ &\approx 78.54 \end{aligned}$$

Step 3 Find the area of the rectangle.

$$\begin{aligned} (\pi d)h &= \pi(10)(14) \\ &= 140\pi \\ &\approx 439.82 \end{aligned}$$

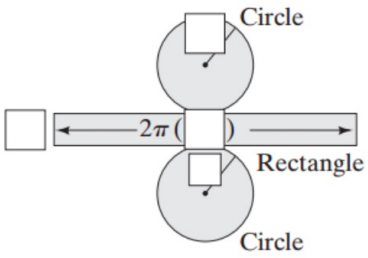
Step 4 Add the areas of the two circles and the rectangle.

Surface area $= 78.54 + 78.54 + 439.82 = 596.9$

The amount of construction paper needed is about 597 cm^2.

3 Finding the Surface Area of a Cylinder Find the surface area of the cylinder. Round to the nearest tenth.

Step 1 Draw a net.



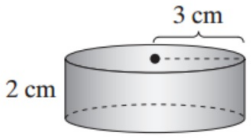
Step 2 Find the area of one circle.

$A = \pi r^2$

$= \pi(\square)^2$

$= \pi(\square)$

$\approx \square$



Step 3 Find the area of the rectangle.

$(2\pi r)\square = 2\pi(3)\left(\square\right) = \square\,\pi \approx \square$ cm^2

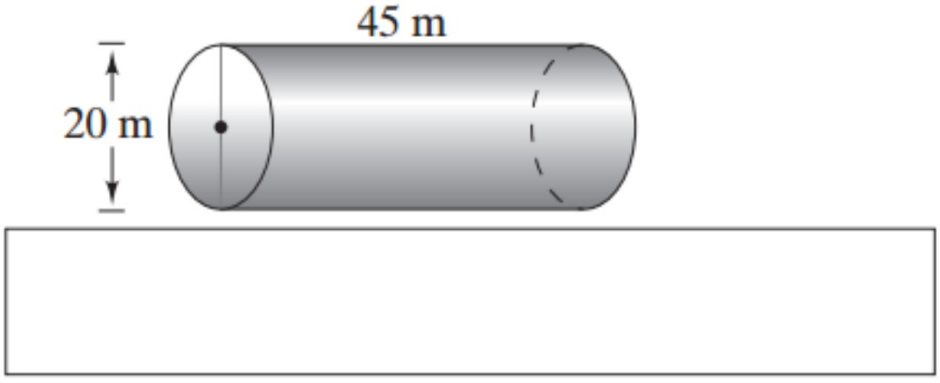
Step 4 Add the areas of the two circles and the rectangle.

Surface Area $= \square + \square + \square = \square$

The surface area of the cylinder is about $\square$ cm^2.

Quick Check

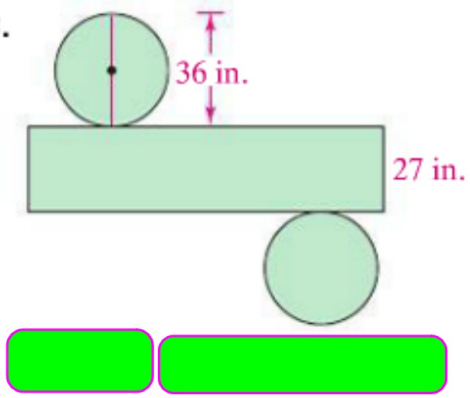
3. What is the surface area of the cylinder? Round to the nearest tenth.



Check Your Understanding

Identify the figure formed by each net. Then find its surface area.

3.



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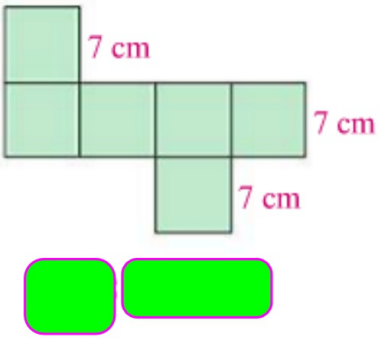

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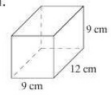
You have an assignment on surface area of rectangular prisms and cylinders. There are four math questions on the assignment. Feel free to use your calculators and notes.

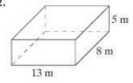
Name _____ Class _____ Date _____

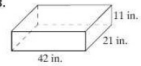
Practice 7-2

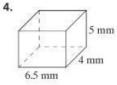
Surface Areas of Prisms and Cylinders

Find the surface area of each prism.

1. 

2. 

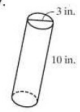
3. 

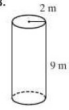
4. 

Find the surface area of each cylinder. Round to the nearest whole number.

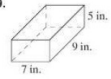
5. 

6. 

7. 

8. 

Draw a net for each three-dimensional figure.

9. 

10.