Surface Areas of Prisms and Pyramids

What You'll Learn

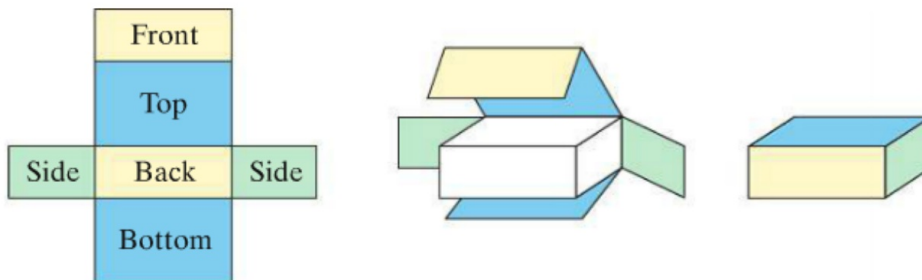To use nets and to find the surface areas of prisms and pyramids
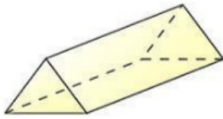
🔊 **New Vocabulary** net, surface area

Why Learn This?

Package designers make creative labels. The surface area of an object is the space designers have to work with.

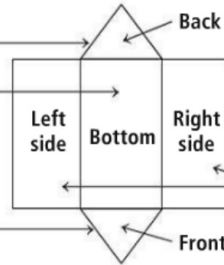A **net** is a pattern you can fold to form a three-dimensional figure.

EXAMPLE   **Drawing a Net**

1   Draw a net for the triangular prism at the left.

Step 1 Draw one base.

Step 2 Draw one face that connects the two bases.

Back

Left side | Bottom | Right side

Front

Step 3 Draw the other base.

Step 4 Draw the remaining faces.

Get ready to play the net game. How many can we get right in a row?

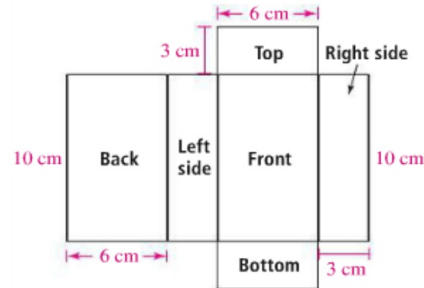http://illuminations.nctm.org/ActivityDetail.aspx?ID=84

The **surface area** of a three-dimensional figure is the sum of the areas of its surfaces.

EXAMPLE Finding the Surface Area of a Prism

② **Package Design** Find the surface area of the juice box at the left.

Step 1 Draw and label a net for the prism.

$h = 10$ cm

$w = 3$ cm

$\ell = 6$ cm

	6 cm	
3 cm	Top	Right side
10 cm Back	Left side Front	10 cm
6 cm	Bottom 3 cm	

Step 2 Find and add the areas of all the rectangles.

Top	Back	Left	Front	Right	Bottom
3×6	$+ \ 10 \times 6$	$+ \ 10 \times 3$	$+ \ 10 \times 6$	$+ \ 10 \times 3$	$+ \ 3 \times 6$
$= \ 18$	$+ \ 60$	$+ \ 30$	$+ \ 60$	$+ \ 30$	$+ \ 18$

$= 216$

The surface area of the juice box is 216 square centimeters.

12 m

12 m

30 m
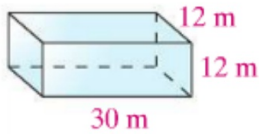
✓ **Quick Check**

2. Find the surface area of the prism.

3 Find the surface area of the square pyramid at the left.

Step 1 Draw and label a net for the pyramid.

Step 2 Find and add the areas of the square and the triangles. Since the base is a square, the triangular faces are congruent.
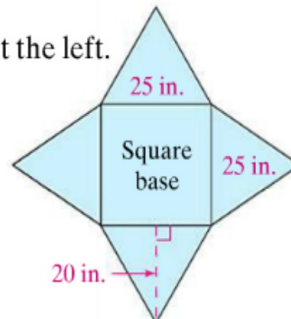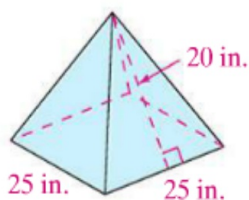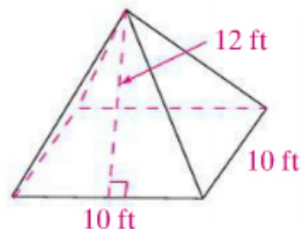
Square	Triangle	Triangle	Triangle	Triangle
25×25	$+ \frac{1}{2}(25 \times 20)$	$+ \frac{1}{2}(25 \times 20)$	$+ \frac{1}{2}(25 \times 20)$	$+ \frac{1}{2}(25 \times 20)$
$= 625$	$+ \quad 250$	$+ \quad 250$	$+ \quad 250$	$+ \quad 250$

$= 1{,}625$

The surface area of the pyramid is 1,625 square inches.

✓ **Quick Check**

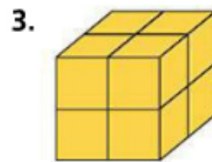**3.** Find the surface area of the square pyramid at the right.

Table talk to answer these 3 questions.

✓ Check Your Understanding

1. **Vocabulary** Describe how a net can help you find the surface area of an object.

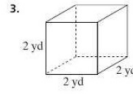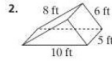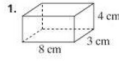**Find the surface area. A small cube measures 1 cm on a side.**

2.

3.

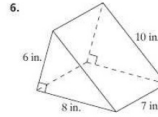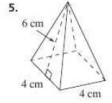**Your assignment is a practice worksheet on surface area. We will begin it together.**

Practice 8-4
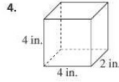
Surface Areas of Prisms

Draw a net for each three-dimensional figure.

1.

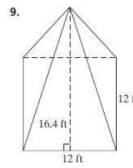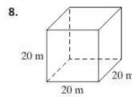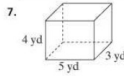4 cm
8 cm
3 cm

2.

8 ft   6 ft
5 ft
10 ft

3.

2 yd
2 yd   2 yd

Find the surface area of each prism or pyramid.

4.

4 in.
4 in.   2 in.

5.

6 cm
4 cm   4 cm

6.

10 in.
6 in.
8 in.   7 in.

_____   _____   _____

7.

4 yd
5 yd   3 yd

8.

20 m
20 m   20 m

9.

12 ft
16.4 ft
12 ft

_____   _____   _____

10. Jan is making a pencil holder out of plastic canvas. The pencil holder will
be 4 inches high. It will not have a top. Each edge of the square base is
3 inches long. How much plastic canvas does Jan need?

_____