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Solving surface area word problems

You have learned how to solve word problems that ask about area of a two-dimensional figure. Here is a problem like that:

Luis must paint a large wall in his office building. The wall is 30 feet long and 12 feet high. What is the area of this wall?

Remember the steps we use to solve a word problem?
1. Draw a simple picture.
2. Decide which numbers to use.
3. Solve the problem.

12 ft

30 ft

$A = b \times h$
$A = 30 \times 12$
$A = 360$ sq ft

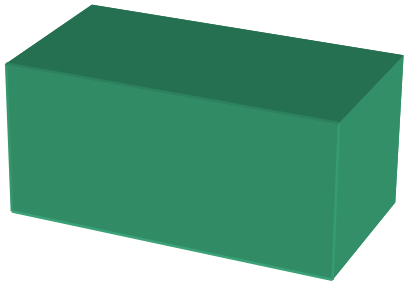
The area of the wall Luis has to paint is 360 square feet.

Some problems ask about the surface area of a three-dimensional figure, instead of the area inside a two-dimensional figure. Here's a problem like that:

Thea wants to wrap a present in a box that is 10.5 inches wide, 5 inches high, and 4 inches deep. What is the surface area of the box she wants to wrap?

This problem tells about three dimensions: width, height, and depth. Our steps will be the same as in a problem with a two-dimensional figure. Let's draw a simple picture:

5 in.



4 in.

10.5 in.

Remember, Thea has to wrap the entire area of the box. What equation do we use to find the surface area of a box?

$SA = 2(ba) + 2(ha) + 2(da)$

Now let's put in the numbers from the problem and solve. First, we need to find the base area.
$ba = 10.5 \times 4$
$ba = 42$ sq in.

Next, we need to find the height area.
$ha = 5 \times 10.5$
$ha = 52.5$ sq in.

Now let's find the depth area.
$da = 5 \times 4$
$da = 20$ sq in.

Now that we know these numbers, we can use them in the equation to find surface area.

$SA = 2(ba) + 2(ha) + 2(da)$
$SA = 2(42) + 2(52.5) + 2(20)$
$SA = 84 + 105 + 40$
$SA = 229$ sq in.

When an area problem shows or tells about three dimensions, you usually have to find the surface area. If an area problem shows or tells about two dimensions, you usually have to find the area inside the figure.

Here's a problem:

Juanita is making a pyramid out of triangles. Each triangle has a base of 5 meters and a height of 10 meters. What is the area of each triangle?

Is the problem asking you to find the surface area of a three-dimensional figure or the area inside a two-dimensional figure? This problem is asking you to find the area inside a two-dimensional figure, a triangle. What equation should you use to solve the problem? The formula you would use to solve this problem is:

$$A = b \times \frac{1}{2}(h)$$