Surface Area

Narrator:

Surface Area. How much area covers the entire outside of the figure?

In our first example, we have a rectangular prism. To find the surface area, we need to find the area of all 6 sides of this figure. Now, when it's drawn this way, it's a little difficult to see, but what you need to look at is, we've got the front rectangle right here, which happens to be a 10 by 12. And there's one of those here, and there's one of those back here in the back. So, we've got a 10 by 12 as the front and we have one as the back. Now, if you look, we also have a right side here, which is a 12 by 8. So, the right side is 12 by 8, and we have one of those here on the left side as well. And then, finally, we have a top, which is 8 by 10, and we have a bottom that is also 8 by 10. Now, to find the surface area, we're simply going to add all those measurements together. So, let's calculate: 10 by 12 is 120, 12 by 8 is 96, and 8 by 10 is 80. So, the surface area will be 120 plus 120 plus 96 plus 96 plus 80 plus 80. And, when we add all that together, we get 592 and this is cm and it's an area, so it's squared. So, we have to find the area of the front, the back, the top, the bottom, the right, and the left sides. Add them all together, that's the surface area of the figure.

Here we have a triangular prism. So, we're going to do the same thing. We have to find the area of all the sides of this figure. So here, right in the front, we see a triangle, and we have a second triangle here in the back. So, we have to find the area of that triangle, which is ½ base times height, and remember the base and the height meet at that right angle, so, here's our right angle, so base and height. And we have two of those, we have the front triangle and the back triangle. And then, you can see, we have rectangle here on the left side, which is 3 by 7. So, we've got a 3 by 7 rectangle. Here on the bottom, we have a 7 by 4 rectangle, here on the bottom. And then, here at the very top of this figure, what looks like the slope or the sliding board, we have a 5 by 7 rectangle. So, to find the surface area, we need to do all these calculations: so the front triangle, ½ times 4 is 2 times 3 is 6, the back triangle will be the same, the 3 by 7 rectangle is 21, the 7 by 4 rectangle is 28 and the 7 by 5 rectangle is 35. So, we're going to add all those measurements together, and we get a surface area of 96 ft squared.

Again, it helps if you have colored pencils or markers handy, so that you can mark up your figure like I've done here, so you can see each of the shapes a little more clearly.

Let's look at one more example. Now, here we have a cylinder. We've got the circle on the top, and you also know that there is also a circle on the bottom. So, to find the area of the circle, we take pi r squared. So, in this case we're going to use 3.14 as pi, our diameter is 12, so our radius is 6 and we need to square that. So, we've got the top circle and we've got the bottom circle – and that's going to be the same measurement. And then we have this piece in the middle, that when we cut it apart, we have one really long rectangle. So the net for a cylinder, looks like this. And, this length measurement of the cylinder is going the whole way around the circle, so that's the circumference of the circle. And, then the width of this rectangle is the height of the cylinder, which in this case is 4. So, to find the rectangle, we have to find the circumference, which is pi times diameter, so we'll use 3.14 times our diameter of 12. And, then to find that area, we'll take that times 4. So, 3.14 times 12 gives us a circumference of 37.68 feet. And then

to find the area of that rectangle, we'll take our circumference times the height of 4, and we'll get an area for the rectangular part of this cylinder of 150.72 ft squared. Now, we need to calculate the area of our circles, so 6 squared is 36 times pi is 113.04, so they'll both be the same. So, to find the surface area, we're going to add the area of each circle plus the area of the rectangular part of the cylinder, and we get a surface area of 376.8 ft. squared.

So, to find the surface area, you need to find the area of all the sides and add them together. When you have a cylinder, you find the area of the circles at the top and bottom and then the middle section of the cylinder becomes a rectangle that is the dimensions of the circumference of the circle times the height of the cylinder.