What are the names of these 3-D shapes?

What 2-D shapes are needed to create them?

Oct 20-08:15

(Re)Introducing the Cylinder

Oct 20-08:19

Surface Area

What do we mean by the phrase surface area?

Area of all of the FACES.

Drawing a NET can help us with this.

How can we calculate the surface area of a cylinder?

Unfold it into 2 circles and 1 rectangle.

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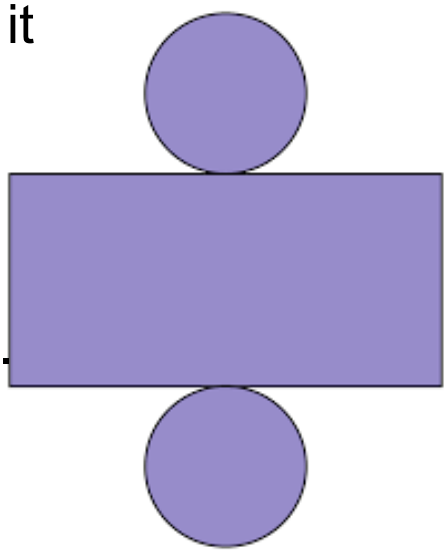
If we were to unfold a cylinder it could look like this:



We have the **two circles** (we know how to find their area) and we also have a **rectangle**.

How can we find the area of the rectangle?

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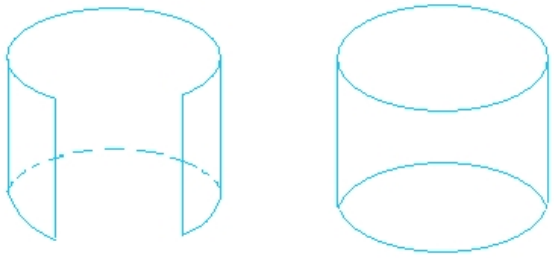
Let's think about the rectangle for a moment.

How does it relate to the circles?



It joins them together.

What will be the **length** and **width** of the rectangle?

height of cylinder = length

circumference of circle = width.

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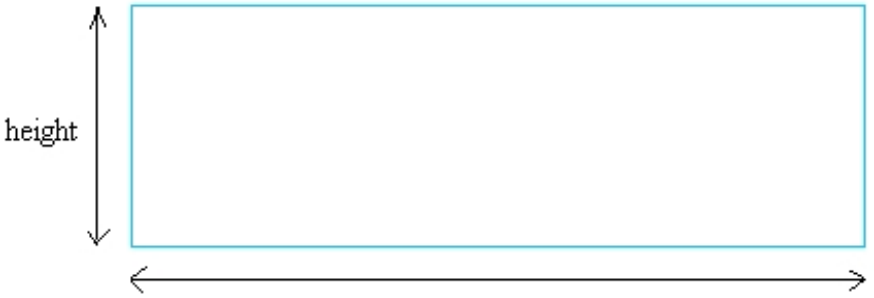
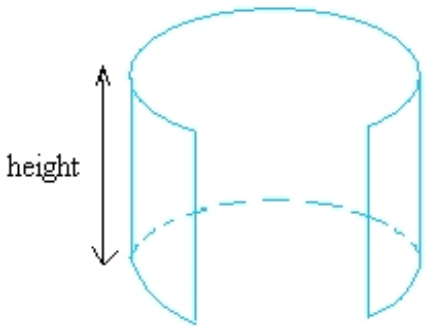
As this rectangle is being folded, this side becomes the perimeter or circumference of the resulting top circle



As this rectangle is being folded, this side becomes the perimeter or circumference of the resulting bottom circle



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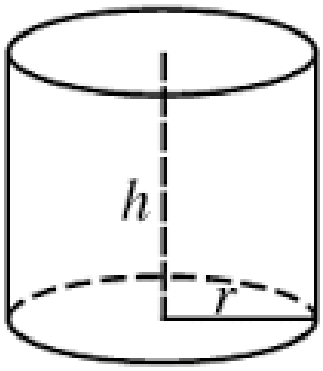
To calculate the surface area we again need to know the height of the cylinder and its radius.

Surface Area $_{\text{cylinder}} = 2\pi r^2 + 2\pi rh$

The "$2\pi r^2$"represents the area of the two circles (top and bottom) and the "$2\pi rh$" represents the area of the rectangle that joins the circles together.



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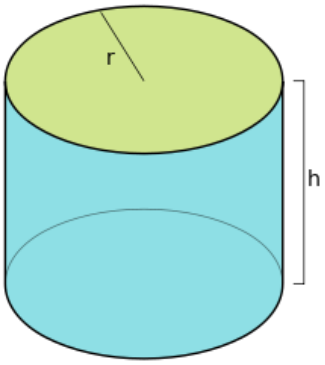
Example

Find the surface area of a cylinder that has a radius of 7 cm and a height of 8 cm.



$SA = 2\pi r^2 + 2\pi rh$

$= 2 \times 3.14 \times 7^2 + 2 \times 3.14 \times 7 \times 8$

$= 307.72 + 351.68$

$= 659.4 \text{ cm}^2$

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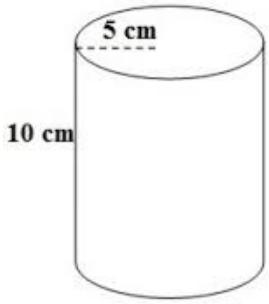

Find the surface area of this cylinder.

$SA = 2\pi r^2 + 2\pi rh$

$= 2 \times 3.14 \times 5^2 + 2 \times 3.14 \times 5 \times 10$

$= 157 + 314$

$= 471 \text{ cm}^2$

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Find the surface area of a cylinder with radius of 2 cm and a height of 1 cm.

$SA = 2\pi r^2 + 2\pi rh$

$= 2 \times 3.14 \times 2^2 + 2 \times 3.14 \times 2 \times 1$

$= 25.12 + 12.56$

$= 37.68 \text{ cm}^2$

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Find the surface area of a cylinder with height of 4 cm and a radius of 3 cm.

$SA = 2\pi r^2 + 2\pi rh$

$= 2 \times 3.14 \times 3^2 + 2 \times 3.14 \times 3 \times 4$

$= 56.52 + 75.36$

$= 131.88 cm^2$

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Find the surface area of a cylinder with height of 4 cm and a diameter of 5 cm.

$SA = 2\pi r^2 + 2\pi rh$

Change diameter $\Rightarrow$ radius

$\Rightarrow d = 5cm \Rightarrow r = 2.5cm$

$SA = 2 \times 3.14 \times 2.5^2 + 2 \times 3.14 \times 2.5 \times 4$

$= 39.25 + 62.8$

$= 102.05 cm^2$

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Careful with this one:

Find the surface area of a cylindrical garbage can with height of 50 cm and a radius of 15 cm.

This cylinder has no top to it!

$SA = \pi r^2 + 2\pi rh$ ← one circle not two

$= 3.14 \times 15^2 + 2 \times 3.14 \times 15 \times 50$

$= 706.5 + 4710$

$= 5416.5 \text{ cm}^2$

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Online Cylinder Calculator!

http://www.numberempire.com/cylinder_calculator.php

Yes, just put in the radius and height and it will calculate the volume and surface area for you.

Great for checking your answers, not so great for tests when you have to show your working.

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