

# ME8-17 Surface Area of Cylinders

REMINDER ► A cylinder is like a prism, but with circles for bases.



1. A paper towel tube is a cylinder without the top and bottom circles.

a) Cut a paper towel tube vertically. What shape do you get when you open it up?

rectangle

b) Cut a paper towel tube diagonally. What shape do you get when you open it up?

parallelogram

c) If the tube has circumference 15 cm and height 12 cm, what are the base and height of the shapes in parts a) and b)?

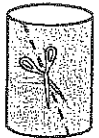
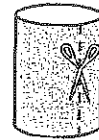
i) base = 15 cm  
height = 12 cm

ii) base = 15 cm  
height = 15 cm

d) Do the shapes in parts a) and b) have the same area? Yes

Why does this make sense? The tubes are identical; only cut differently

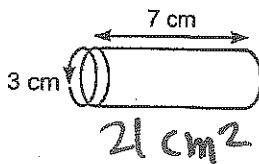
e) What is the surface area of the tube?  $b \times h = 180 \text{ cm}^2$



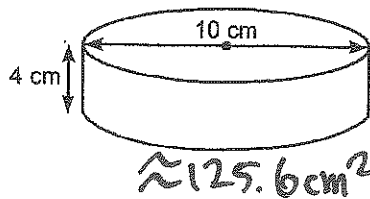
REMINDER ► A tube is a cylinder without the top and bottom circles.

2. Find the surface area of the tube by finding the length and width of a rectangle with the same area.

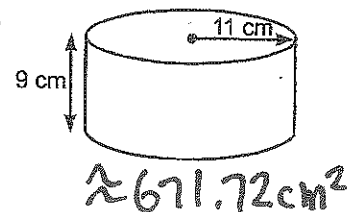
a)



b)



c)



3. Write a formula for the surface area (SA) of a tube in terms of...

a) the circumference  $C$  of the circular base and the height  $h$ .

SA =  $C \times h$

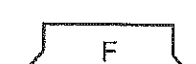
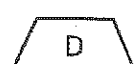
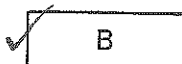
b) the diameter  $d$  of the circular base and the height  $h$ .

SA =  $\pi d \times h$

c) the radius  $r$  of the circular base and the height  $h$ .

SA =  $2\pi r \times h$

4. Which of these shapes can be the net for a tube? A B C E Explain.

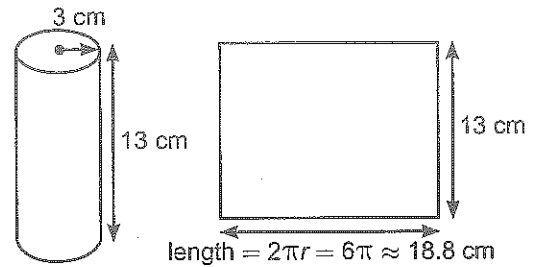


164 These 4 nets are made from rectangles and/or parallelograms. The other two aren't. They include a trapezoid.

5. A can of food is a cylinder. It has both top and bottom circles.

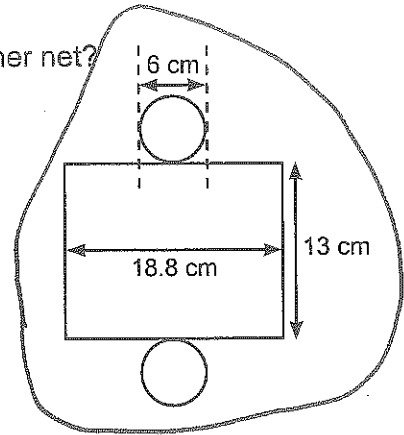
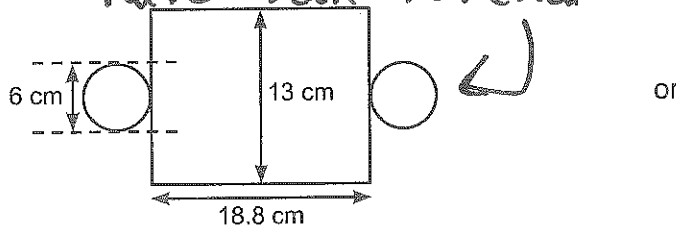
a) Find the surface area of the can.

$$\begin{aligned}
 \text{Area of rectangle} &= \underline{244.4} \\
 \text{Area of top circle} &= \underline{28.26} \\
 + \text{Area of bottom circle} &= \underline{28.26} \\
 \hline
 \text{Surface area of can} &= \underline{300.92 \text{ cm}^2}
 \end{aligned}$$

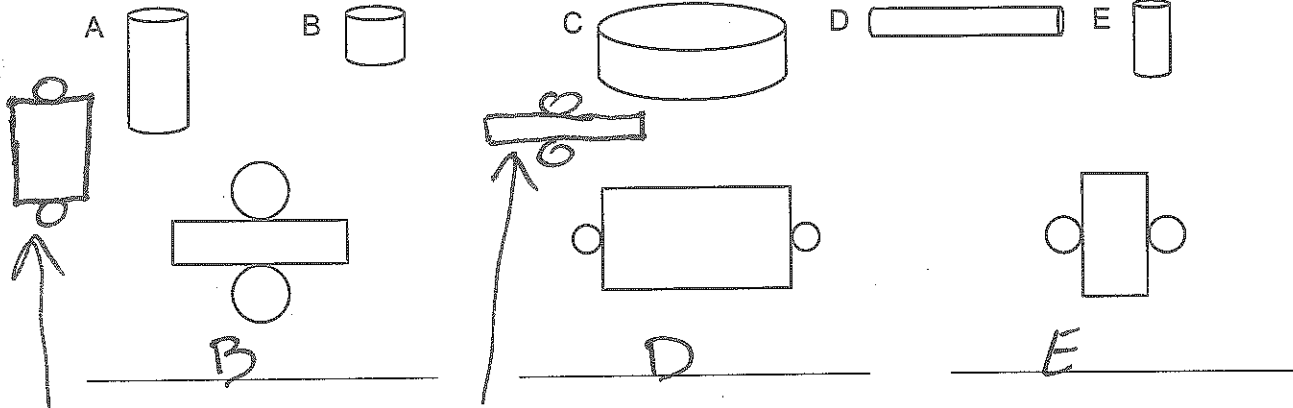


b) Which net matches the can in part a)? What is wrong with the other net?

The circumference and height have been reversed



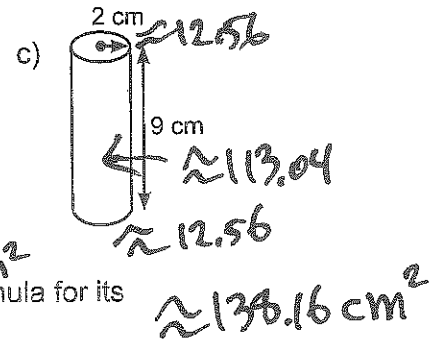
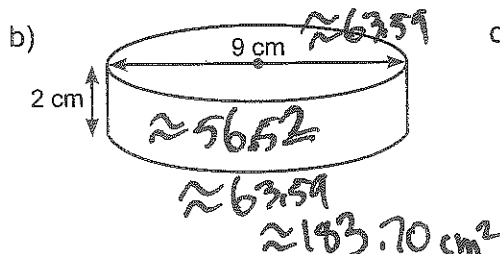
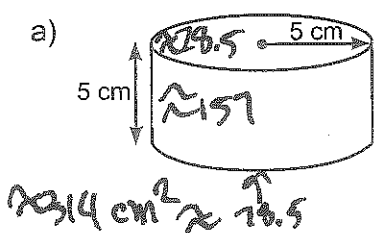
6. a) Which cylinder matches each net?



b) Sketch nets for the two cylinders that were not matched.

c) How does the surface area of a cylinder compare to the area of its net? Explain. *The surface area is equal to the area of its net. Everything is the same size.*

7. Find the surface area of each can by first finding the area of a rectangle and the area of the top and bottom circles.



8. A cylindrical can has a circular base of radius  $r$  and height  $h$ . Write a formula for its surface area. Do not forget to include the top and bottom.

$$2\pi r^2 + 2\pi r h$$