

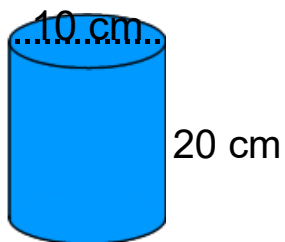
Ch 4



Warm Up Grade 8 Lesson 6 E-Learning



Find the Surface Area



Ch 4

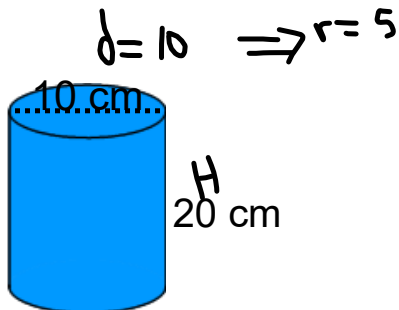
Solution to warm up



Warm Up Grade 8 Lesson 6 E-Learning



Find the Surface Area



diameter = 10 cm
radius = 5cm

H = 20 cm

$$\begin{aligned} \text{Total SA}_{\text{cyl}} &= 2\text{Circles} + \text{Rectangle} \\ &= 2 \pi r^2 + 2 \pi r H \\ &= [2 \times 3.14 \times r \times r] + [2 \times 3.14 \times r \times H] \end{aligned}$$

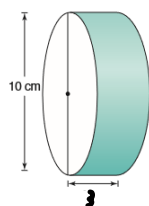
Fill in the radius and the Height of the cylinder

$$= [2 \times 3.14 \times 5\text{cm} \times 5\text{cm}] + [2 \times 3.14 \times 5\text{cm} \times 20\text{cm}]$$

Use a calculator and multiply each bracket separately

$$\begin{aligned} &= [157 \text{ cm}^2] + [628 \text{ cm}^2] \\ &= 785 \text{ cm}^2 \end{aligned}$$

★ 6 b)



diameter = 10 cm

SO

Radius = 5 cm

$$H = 3 \text{ cm}$$

$$r = 5 \text{ cm}$$

$$\begin{aligned} \text{Total SA}_{\text{cyl}} &= 2\text{Circles} + \text{Rectangle} \\ &= 2 \pi r^2 + 2 \pi r H \\ &= [2 \times 3.14 \times r \times r] + [2 \times 3.14 \times r \times H] \end{aligned}$$

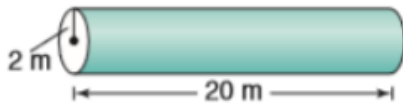
Fill in the radius and the Height of the cylinder

$$= [2 \times 3.14 \times 5 \text{ cm} \times 5 \text{ cm}] + [2 \times 3.14 \times 5 \text{ cm} \times 3 \text{ cm}]$$

Use a calculator and multiply each bracket separately

$$\begin{aligned} &= [157 \text{ cm}^2] + [94.2 \text{ cm}^2] \\ &= 251.2 \text{ cm}^2 \end{aligned}$$

★ 6
c)



$$\begin{aligned}
 \text{Total SA}_{\text{cyl}} &= 2\text{Circles} + \text{Rectangle} \\
 &= 2 \pi r^2 + 2 \pi r H \\
 &= [2 \times 3.14 \times r \times r] + [2 \times 3.14 \times r \times H]
 \end{aligned}$$

Fill in the radius and the Height of the cylinder

$$= [2 \times 3.14 \times 2\text{cm} \times 2\text{cm}] + [2 \times 3.14 \times 2\text{cm} \times 20\text{cm}]$$

Use a calculator and multiply each bracket separately

$$\begin{aligned}
 &= [25.12 \text{ cm}^2] + [251.2 \text{ cm}^2] \\
 &= 276.32 \text{ cm}^2
 \end{aligned}$$

8a)



$$r=2$$

$$d=4$$

$$A = \pi r^2$$

$$= 3.14 \times 2^2$$

$$= 3.14 \times 4$$

$$= 12.56 \text{ cm}^2$$



$$\pi d$$

$$3.14 \times 4$$

$$12.56$$

15cm

$$A = l \times w$$

$$= 15 \times 12.56$$

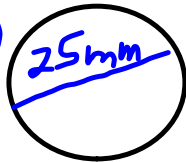
$$= 188.4$$

$$SA = 2 \times 12.56 + 188.4$$

$$= 25.12 + 188.4$$

$$= 213.52 \text{ cm}^2$$

b)



$$d=25$$

$$r=12.5$$

$$A = \pi r^2$$

$$= 3.14 \times 12.5^2$$

$$= 3.14 \times 156.25$$

$$= 490.625 \text{ mm}^2$$



$$\pi d$$

$$3.14 \times 25$$

$$78.5$$

230mm

$$A = l \times w$$

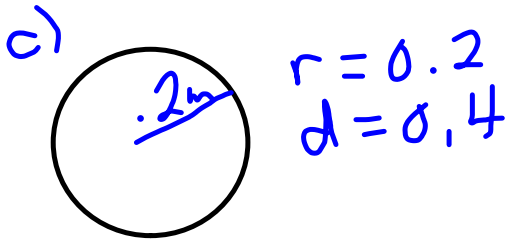
$$= 230 \times 78.5$$

$$= 18055$$

$$SA = 2 \times 490.625 + 18055$$

$$= 981.25 + 18055$$

$$= 19036.25 \text{ mm}^2$$



$$A = \pi r^2$$

$$= 3.14 \times 0.2^2$$

$$= 3.14 \times 0.04$$

$$= 0.1256 \text{ m}^2$$

$$SA = 2 \times 0.1256 + 3.5168$$

$$= 0.2512 + 3.5168$$

$$= 3.768 \text{ m}^2$$



2.8

$$A = l \times w$$

$$= 2.8 \times 1.256$$

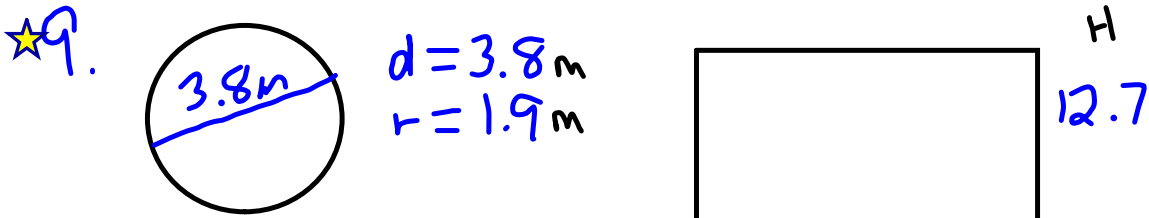
$$= 3.5168 \text{ m}^2$$

$$\pi d$$

$$3.14 \times 0.4$$

$$1.256$$

9. A cylindrical tank has diameter 3.8 m and length 12.7 m. What is the surface area of the tank?



$$\begin{aligned}
 \text{Total SA}_{\text{cyl}} &= 2\text{Circles} + \text{Rectangle} \\
 &= 2 \pi r^2 + 2 \pi r H \\
 &= [2 \times 3.14 \times r \times r] + [2 \times 3.14 \times r \times H]
 \end{aligned}$$

Fill in the radius and the Height of the cylinder

$$= [2 \times 3.14 \times 1.9\text{cm} \times 1.9\text{cm}] + [2 \times 3.14 \times 1.9\text{cm} \times 12.7\text{cm}]$$

Use a calculator and multiply each bracket separately

$$\begin{aligned}
 &= [22.6705 \text{ cm}^2] + [151.5364 \text{ cm}^2] \\
 &= 174.2069 \text{ cm}^2
 \end{aligned}$$

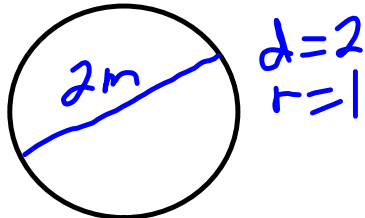
10. Curved Face



$$\pi r d \\ 3.14 \times 1.5 \\ 4.71 \text{ m}^2$$

$$A = l \times w \\ = 4.71 \times 2.5 \\ = 11.775 \text{ m}^2$$

11 a)



$$A = \pi r^2 \\ = 3.14 \times 1^2 \\ = 3.14 \times 1 \\ = 3.14 \text{ cm}^2$$



$$A = l \times w \\ = 14 \times 6.28 \\ = 87.92 \text{ cm}^2$$

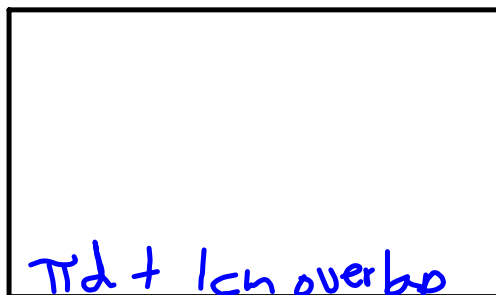
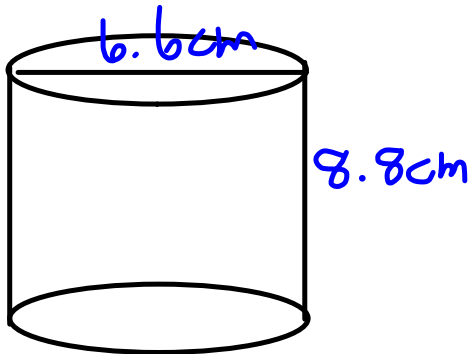
$$SA = 2 \times 3.14 + 87.92 \\ = 6.28 + 87.92 \\ = 94.2 \text{ cm}^2$$

😊 b) $1 \text{ m}^2 = 10\,000 \text{ cm}^2$
 $40 \text{ m}^2 = 400\,000 \text{ cm}^2$

$$\frac{400\,000}{94.2} = 4246.3$$

4246 cylinders can be painted

12.



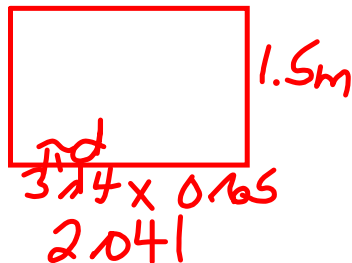
$$\begin{aligned} &3.14 \times 6.6 + 1 \\ &20.724 + 1 \\ &21.724 \end{aligned}$$

$$\begin{aligned} A &= l \times w \\ &= 21.724 \times 8.8 \\ &= 191.17 \text{ cm}^2 \end{aligned}$$

13.



$$\begin{aligned} d &= 6.5 \text{ cm} \\ &= 0.65 \text{ m} \\ r &= 0.325 \text{ m} \end{aligned}$$



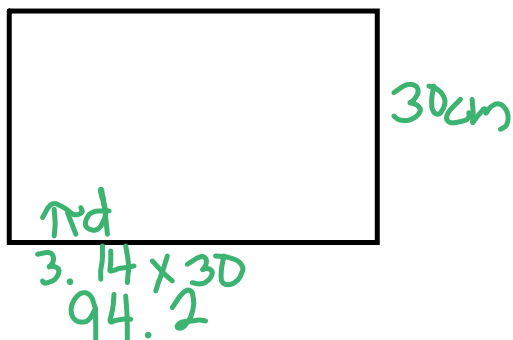
$$\begin{aligned} &3.14 \times 0.65 \\ &2.041 \end{aligned}$$

$$\begin{aligned} A &= \pi r^2 \\ &= 3.14 \times 0.325^2 \\ &= 3.14 \times 0.105625 \\ &= 0.3316 \end{aligned}$$

$$\begin{aligned} A &= l \times w \\ &= 2.041 \times 1.5 \\ &= 3.0615 \end{aligned}$$

$$\begin{aligned} SA &= 2 \times 0.3316 + 3.0615 \\ &= 0.6632 + 3.0615 \\ &= 3.7247 \text{ m}^2 \\ &37247 \text{ cm}^2 \end{aligned}$$

14. a) Shell is the curved face



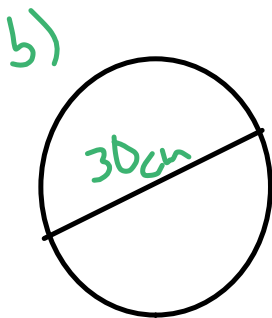
$$\begin{aligned}
 A &= l \times w \\
 &= 94.2 \times 30 \\
 &= 2826 \text{ cm}^2
 \end{aligned}$$

5 layers

$$5 \times 2826_2$$

$$14130 \text{ cm}$$

of sheathing needed

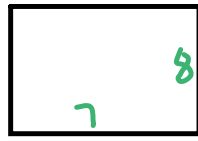
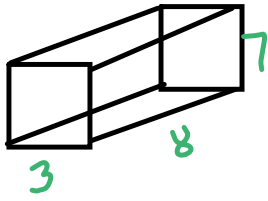


$$\begin{aligned}
 A &= \pi r^2 \\
 &= 3.14 \times 15^2 \\
 &= 3.14 \times 225 \\
 &= 706.5
 \end{aligned}$$

2 heads

$$\begin{aligned}
 &706.5 \times 2 \\
 &1413 \text{ cm}^2
 \end{aligned}$$

15. Rectangular Box



$$A = l \times w \\ = 8 \times 7 \\ = 56 \text{ cm}^2$$

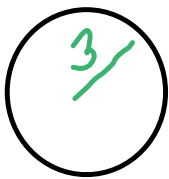
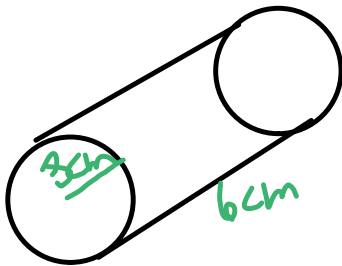


$$A = l \times w \\ = 7 \times 3 \\ = 21 \text{ cm}^2$$

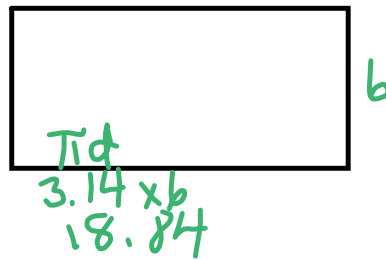


$$A = l \times w \\ = 8 \times 3 \\ = 24 \text{ cm}^2$$

$$SA = 2 \times 56 + 2 \times 21 + 2 \times 24 \\ = 112 + 42 + 48 \\ = 202 \text{ cm}^2$$



$$A = \pi r^2 \\ = 3.14 \times 3^2 \\ = 3.14 \times 9 \\ = 28.26$$



$$A = l \times w \\ = 18.84 \times 6 \\ = 113.04$$

$$SA = 2 \times 28.26 + 113.04 \\ = 56.52 + 113.04 \\ = 169.56 \text{ cm}^2$$

The cylindrical tube uses less material

$$16. \text{ Curved SA} = 660 \text{ cm}^2$$

$$\text{Height } 10 \text{ cm}$$

$$a) A = l \times w$$

$$= \text{Cir} \times h$$

$$660 = \text{Cir} \times 10$$

$$66 = \text{Cir}$$

$$b) \text{ Cir} = \pi d$$

$$66 = 3.14 \times d$$

$$\frac{66}{3.14} = d$$

$$21.02 = d$$

$$\text{radius} = \frac{21.02}{2}$$

$$= 10.51 \text{ cm}$$

$$c) A_0 = \pi r^2$$

$$= 3.14 \times 10.51^2$$

$$= 3.14 \times 110.4601$$

$$= 346.84$$

$$d) \text{ SA} = 2 \text{ Circular Bases} + \text{Curved Face}$$

$$= 2 \times 346.84 + 660$$

$$= 693.68 + 660$$

$$= 1353.68 \text{ cm}^2$$

Volume of a Cylinder

We use the same formula to find the volume of a cylinder.

★ Volume = Area of the base x height ★

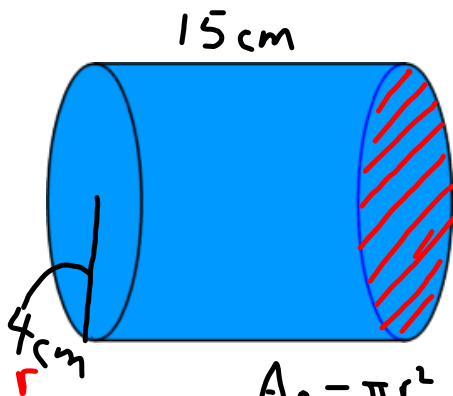
What is the base of a cylinder? circle

$$\text{Volume}_{\text{cylinder}} = \pi r^2 \times H$$

Study

$$\text{Volume}_{\text{cylinder}} = 3.14 \times r \times r \times H$$

Examples:



$$\begin{aligned} A_0 &= \pi r^2 \\ &= 3.14 \times r \times r \\ &= 3.14 \times 4\text{cm} \times 4\text{cm} \\ A_0 &= 50.24\text{cm}^2 \end{aligned}$$

$$\text{Volume}_{\text{cylinder}} = 3.14 \times r \times r \times H$$

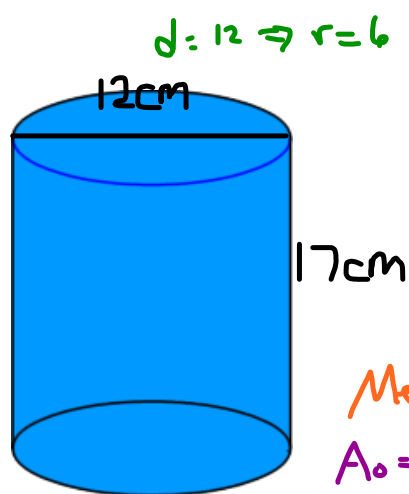
$$\begin{aligned} \text{Volume}_{\text{cylinder}} &= 3.14 \times 4\text{cm} \times 4\text{cm} \times 15\text{cm} \\ &= 753.6\text{cm}^3 \end{aligned}$$

OR

$$\begin{aligned} V_{\text{cyl}} &= A_0 \times H \\ &= 50.24\text{cm}^2 \times 15\text{cm} \\ &= 753.6\text{cm}^3 \end{aligned}$$

Ex 2)

Make sure to use radius

Your Turn

Method 2

$$\text{Volume}_{\text{cylinder}} = 3.14 \times r \times r \times H$$

$$= 3.14 \times 6\text{cm} \times 6\text{cm} \times 17\text{cm}$$

$$= 1921.68 \text{ cm}^3$$

Method 1

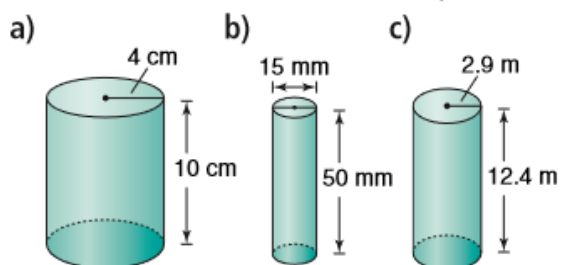
$$\begin{aligned} A_0 &= \pi r^2 \\ &= 3.14 \times r \times r \\ &= 3.14 \times 6\text{cm} \times 6\text{cm} \\ &= 113.04 \text{ cm}^2 \end{aligned}$$

$$\begin{aligned} V_{\text{cyl}} &= A_0 \times H \\ &= 113.04 \text{ cm}^2 \times 17\text{cm} \\ &= 1921.68 \text{ cm}^3 \end{aligned}$$

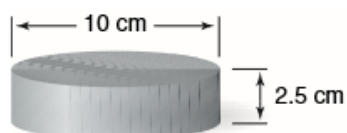
Class/Homework

pg. 217 # 5,8

5. Calculate the volume of each cylinder.



8. A hockey puck is a solid piece of rubber with the dimensions shown. How much rubber is used to make a hockey puck?



Solutions to 5 & 8

$$\begin{aligned}
 5. \quad A_b &= \pi r^2 \\
 &= 3.14 \times 4^2 \\
 &= 3.14 \times 16 \\
 &= 50.24 \text{ cm}^2
 \end{aligned}$$

$$\begin{aligned}
 d &= 15 \\
 r &= 7.5
 \end{aligned}$$

$$\begin{aligned}
 \text{Vol} &= A_b \times h \\
 &= 50.24 \times 10 \\
 &= \boxed{502.4 \text{ cm}^3}
 \end{aligned}$$

$$\begin{aligned}
 b) \quad A_b &= \pi r^2 \\
 &= 3.14 \times 7.5^2 \\
 &= 3.14 \times 56.25 \\
 &= 176.625 \text{ cm}^2
 \end{aligned}$$

$$\begin{aligned}
 \text{Vol} &= A_b \times h \\
 &= 176.625 \times 50 \\
 &= \boxed{8831.25 \text{ cm}^3}
 \end{aligned}$$

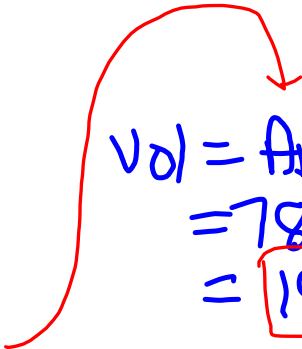
$$\begin{aligned}
 c) \quad A_b &= \pi r^2 \\
 &= 3.14 \times 2.9^2 \\
 &= 3.14 \times 8.41 \\
 &= 26.4074 \text{ cm}^2
 \end{aligned}$$

$$\begin{aligned}
 \text{Vol} &= A_b \times h \\
 &= 26.4074 \times 12.4 \\
 &= \boxed{327.45 \text{ cm}^3}
 \end{aligned}$$

$$8. \quad d = 10\text{cm}$$

$$r = 5\text{cm}$$

$$\begin{aligned} A_b &= \pi r^2 \\ &= 3.14 \times 5^2 \\ &= 3.14 \times 25 \\ &= 78.5\text{cm}^2 \end{aligned}$$


$$\begin{aligned} \text{Vol} &= A_b \times h \\ &= 78.5 \times 2.5 \\ &= 196.25\text{cm}^3 \end{aligned}$$

196.25 cm³ of rubber needed for the hockey puck