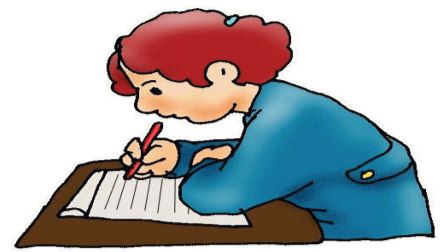
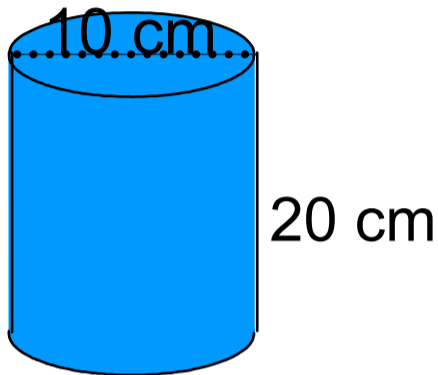


Warm Up Grade 8



1) Find the Surface Area



Given

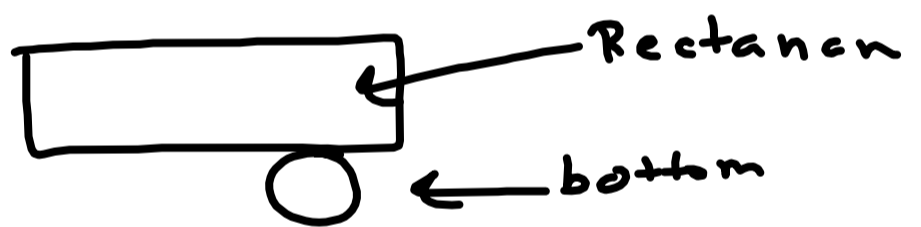
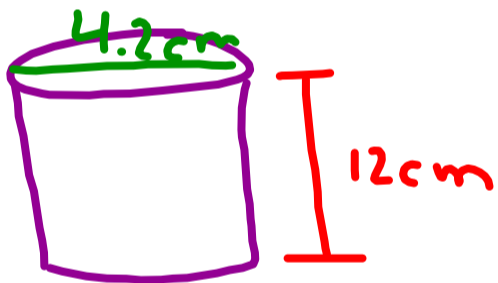
$$d = 10 \text{ cm}$$

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

$$H = 20 \text{ cm}$$

$$\begin{aligned} SA_{cy} &= 2\pi r^2 + 2\pi rH \\ &= 2(3.14)(5 \text{ cm})^2 + 2(3.14)(5 \text{ cm})(20 \text{ cm}) \\ &= \underbrace{2(3.14)25 \text{ cm}^2}_{157 \text{ cm}^2} + \underbrace{2(3.14)(5 \text{ cm})(20 \text{ cm})}_{628 \text{ cm}^2} \\ &= 785 \text{ cm}^2 \end{aligned}$$

2) A paper cup has the shape of a cylinder that is 12 cm tall and a diameter of 4.2 cm across. Find the area of the paper to make the cup.



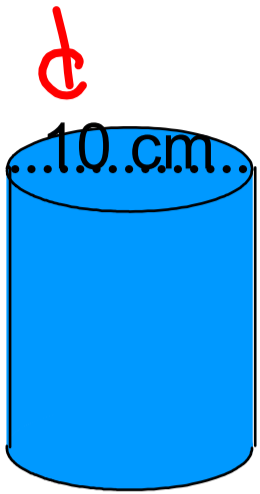
$$\begin{aligned} SA &= \underbrace{1}_{1 \text{ circle}} \pi r^2 + 2\pi rH \\ &= (3.14)(2.1 \text{ cm})^2 + 2(3.14)(2.1 \text{ cm})(12 \text{ cm}) \\ &= \underbrace{(3.14)4.41 \text{ cm}^2}_{13.85 \text{ cm}^2} + \underbrace{2(3.14)(2.1 \text{ cm})(12 \text{ cm})}_{158.26 \text{ cm}^2} \\ &= 172.11 \text{ cm}^2 \end{aligned}$$

Warm Up Grade 8



Find the Surface Area

$$SA_{cyl} = 2\pi r^2 + 2\pi r h$$



20 cm

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

$$H = 20 \text{ cm}$$

$$2(3.14)(5 \text{ cm})^2 + 2(3.14)(5 \text{ cm})(20 \text{ cm})$$

$$2(3.14)(25 \text{ cm}^2) + 2(3.14)(5 \text{ cm})(20 \text{ cm})$$

$$157 \text{ cm}^2$$

+

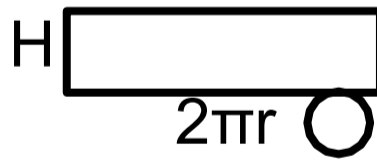
$$628 \text{ cm}^2$$

$$785 \text{ cm}^2$$

2) A paper cup has the shape of a cylinder that is 12cm tall and a diameter of 4.2cm across. Find the area of the paper to make the cup.

$$SA_{cyl} = 2 \text{ circle} + \text{rec}$$

$$2(\pi r^2) + 2\pi r H$$



$$\text{Area of rectangle} = 2\pi r H$$

$$= 2 \times 3.14 \times 2.1 \text{ cm} \times 12 \text{ cm}$$

$$= 158.256 \text{ cm}^2$$

$$\text{Need bottom} = \pi r^2$$

$$= 3.14 (2.1 \text{ cm})^2$$

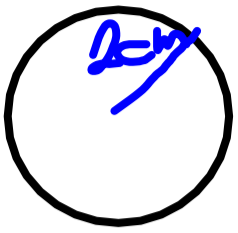
$$= 3.14 \times 4.41 \text{ cm}^2$$

$$= 13.847 \text{ cm}^2$$

$$\text{Total} = 158.256 \text{ cm}^2 + 13.847 \text{ cm}^2$$

$$= 172.1034 \text{ cm}^2$$

8a)



$$r = 2$$

$$d = 4$$

$$A = \pi r^2$$

$$= 3.14 \times 2^2$$

$$= 3.14 \times 4$$

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



15cm

$$\pi d$$

$$3.14 \times 4$$

$$12.56$$

$$A = l \times w$$

$$= 15 \times 12.56$$

$$= 188.4$$

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

$$= 25.12 + 188.4$$

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

$$S_{a_{cyl}} = 2\pi r^2 + 2\pi rH$$

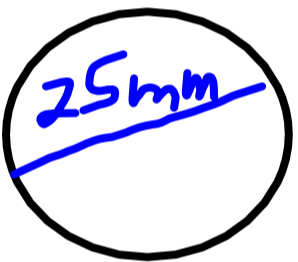
$$= 2(3.14)(4\text{cm})^2 + 2(3.14)(4\text{cm})(15\text{cm})$$

$$= 2(3.14)(16\text{cm}^2) + 2(3.14)(4\text{cm})(15\text{cm})$$

$$= 25.12 \text{ cm}^2 + 188.4 \text{ cm}^2$$

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

b)



$$d = 25$$

$$r = 12.5$$

$$A = \pi r^2$$

$$= 3.14 \times 12.5^2$$

$$= 3.14 \times 156.25$$

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



230mm

$$\pi d$$

$$3.14 \times 25$$

$$78.5$$

$$A = l \times w$$

$$= 230 \times 78.5$$

$$= 18055$$

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

$$= 981.25 + 18055$$

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

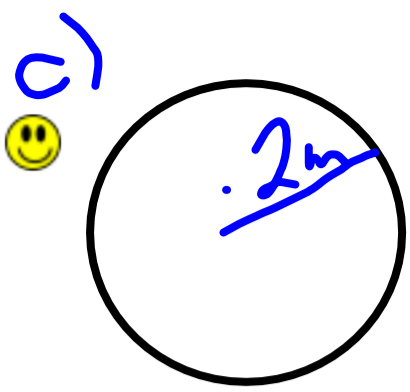
$$S_{a_{cyl}} = 2\pi r^2 + 2\pi rH$$

$$= 2(3.14)(12.5\text{mm})^2 + 2(3.14)(12.5\text{mm})(230\text{mm})$$

$$= 2(3.14)(156.25\text{mm}^2) + 2(3.14)(12.5\text{mm})(230\text{mm})$$

$$= 981.25 \text{ mm}^2 + 18055 \text{ mm}^2$$

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



$$r = 0.2$$

$$d = 0.4$$



$$\pi d$$

$$3.14 \times 0.4$$

$$1.256$$

$$2.8$$

$$A = \pi r^2$$

$$= 3.14 \times 0.2^2$$

$$= 3.14 \times 0.04$$

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

$$A = l \times w$$

$$= 2.8 \times 1.256$$

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

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

$$= 0.2512 + 3.5168$$

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

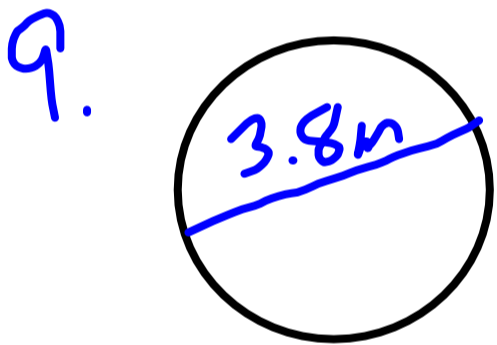
$$S_{a_{cyl}} = 2\pi r^2 + 2\pi rH$$

$$= 2(3.14)(0.2\text{m})^2 + 2(3.14)(0.2\text{m})(2.8\text{m})$$

$$= 2(3.14)(0.04\text{m}^2) + 2(3.14)(0.2\text{m})(2.8\text{m})$$

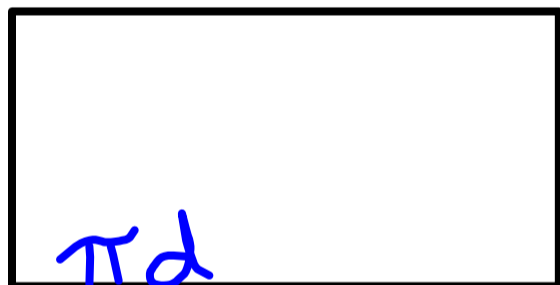
$$= 0.2512 \text{ m}^2 + 3.5168 \text{ m}^2$$

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



$$d = 3.8$$

$$r = 1.9$$



$$12.7$$

$$\pi d$$

$$3.14 \times 3.8$$

$$11.932$$

$$A = \pi r^2$$

$$= 3.14 \times 1.9^2$$

$$= 3.14 \times 3.61$$

$$= 11.3354 \text{ m}^2$$

$$A = l \times w$$

$$= 11.932 \times 12.7$$

$$= 151.5364$$

$$SA = 2 \times 11.3354 + 151.5364$$

$$= 22.6708 + 151.5364$$

$$= 174.2072 \text{ m}^2$$

$$S_{a_{cyl}} = 2\pi r^2 + 2\pi rH$$

$$= 2(3.14)(1.9\text{m})^2 + 2(3.14)(1.9\text{m})(12.7\text{m})$$

$$= 2(3.14)(3.61\text{m}^2) + 2(3.14)(1.9\text{m})(12.7\text{m})$$

$$= 22.6708 \text{ m}^2 + 151.5364 \text{ m}^2$$

$$= 174.2072 \text{ m}^2$$

10. Curved Face



2.5

$$A = l \times w$$

$$= 4.71 \times 2.5$$

$$= 11.775 \text{ m}^2$$

$$\pi d$$

$$3.14 \times 1.5$$

$$4.71 \text{ m}$$

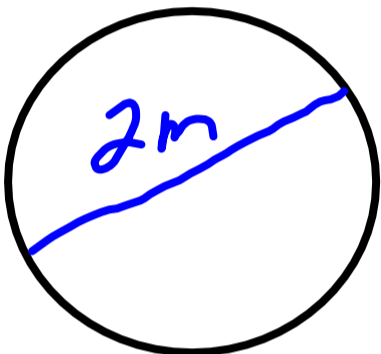
$$S_{a_{cyl}} = 2\pi r^2 + 2\pi rH$$

circles + curved rectangles

$$\text{so curved rec} = 2(3.14)(0.75\text{m})(2.5\text{m})$$

$$= 11.775 \text{ m}^2$$

1) a)



d=2
r=1



$$\pi d$$

$$3.14 \times 2$$

$$6.28$$

14

$$A = \pi r^2$$

$$= 3.14 \times 1^2$$

$$= 3.14 \times 1$$

$$= 3.14 \text{ cm}^2$$

$$A = l \times w$$

$$= 14 \times 6.28$$

$$= 87.92 \text{ cm}^2$$

$$SA = 2 \times 3.14 + 87.92$$

$$= 6.28 + 87.92$$

$$= 94.2 \text{ cm}^2$$

$$S_{a_{cyl}} = 2\pi r^2 + 2\pi rH$$

$$= 2(3.14)(1\text{cm})^2 + 2(3.14)(1\text{cm})(14\text{cm})$$

$$= 2(3.14)(1\text{cm}^2) + 2(3.14)(1\text{cm})(14\text{cm})$$

$$= 6.28 \text{ cm}^2 + 87.92 \text{ cm}^2$$

$$= 94.2 \text{ cm}^2$$

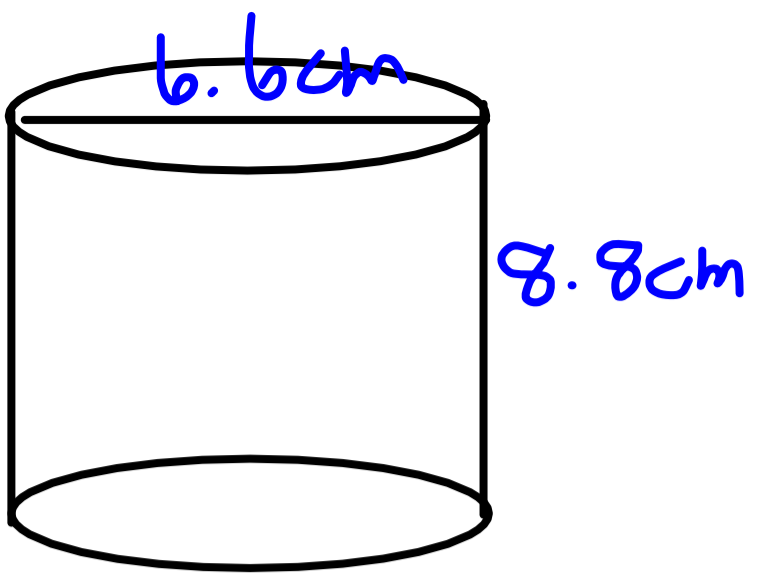
b) $1 \text{ m}^2 = 10000 \text{ cm}^2$

$40 \text{ m}^2 = 400000 \text{ cm}^2$

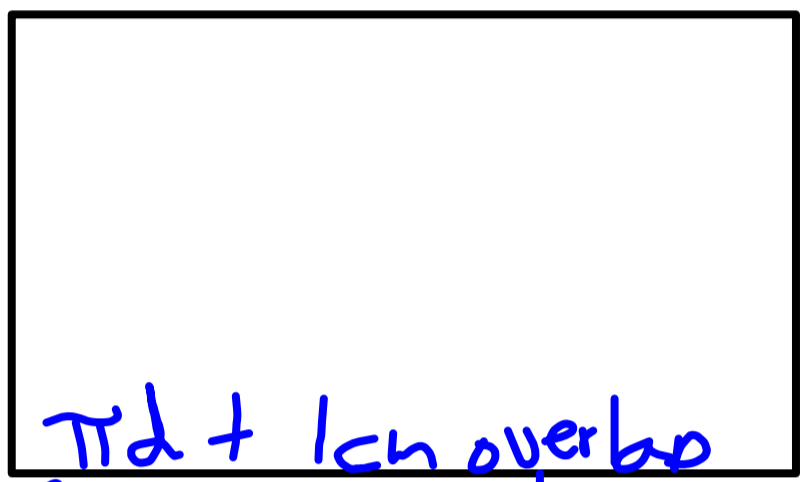
$$\frac{400000}{94.2} = 4246.3$$

4246 cylinders can be painted

12. 😊



$$\begin{aligned} \text{so curved rec} &= 2(3.14)(6.6\text{cm})(2.5\text{m}) \\ &= 20.724 \text{ m}^2 \\ &\quad + 1\text{cm overlap} \\ &= 21.724 \text{ cm} \end{aligned}$$



8.8 cm

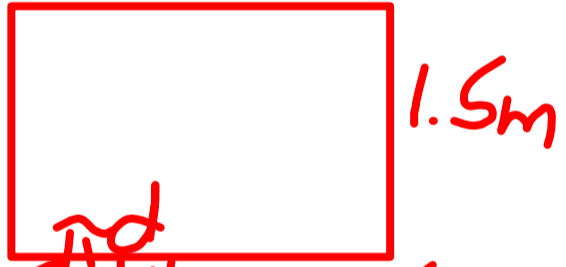
$$\begin{aligned} A &= l \times w \\ &= 21.724 \text{ cm} \times 8.8 \text{ cm} \\ &= 191.17 \text{ cm}^2 \end{aligned}$$

$$\begin{aligned} &\pi d + 1\text{cm overlap} \\ &3.14 \times 6.6 + 1 \\ &20.724 + 1 \\ &21.724 \end{aligned}$$

13.



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



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

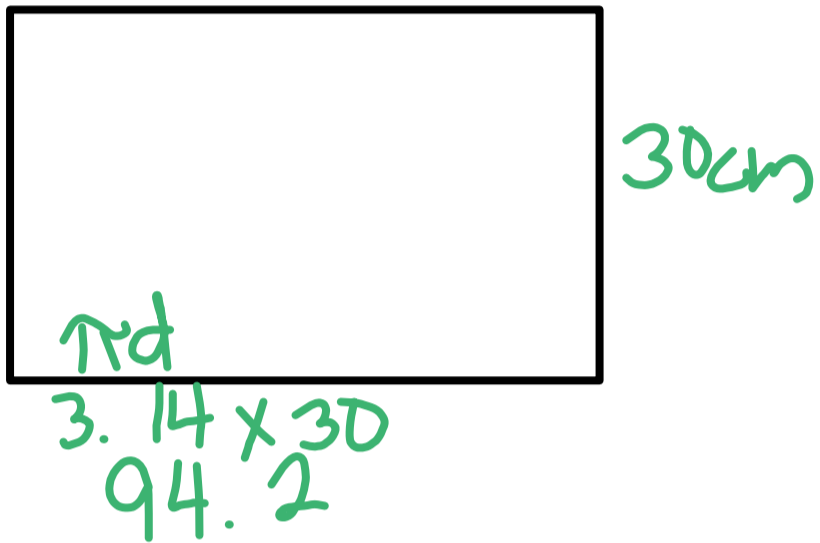
$$\begin{aligned} A &= \pi r^2 \\ &= 3.14 \times 0.325^2 \\ &= 3.14 \times 0.105625 \\ &= 0.3316 \end{aligned}$$

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

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

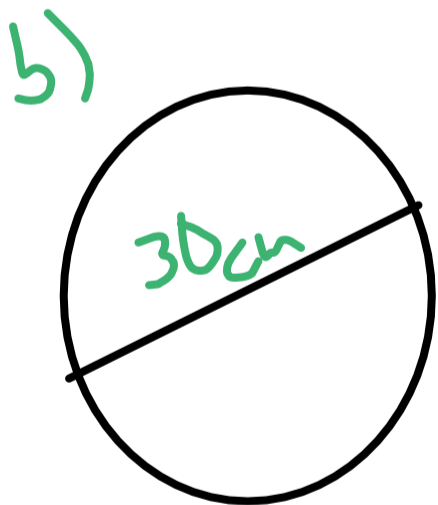
$$\begin{aligned} S_{a_{\text{cyl}}} &= 2\pi r^2 + 2\pi rH \\ &= 2(3.14)(0.325\text{m})^2 + 2(3.14)(0.325\text{m})(1.5\text{m}) \\ &= 2(3.14)(0.10625\text{m}^2) + 2(3.14)(0.325\text{m})(1.5\text{m}) \\ &= 0.6632 \text{ m}^2 + 3.0615 \text{ m}^2 \\ &= 3.7247 \text{ m}^2 \\ &= 37247 \text{ cm}^2 \end{aligned}$$

14. a Shell is the curved face



$$\text{so curved rec} = 2(3.14)(15\text{cm})(30\text{ cm})$$
$$= 2826\text{ cm}^2$$

5 layers
 $5 \times 2826_2$
14130cm²
of sheathing needed

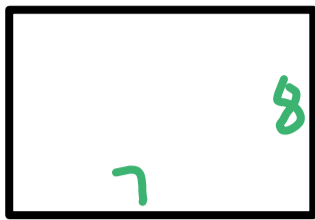
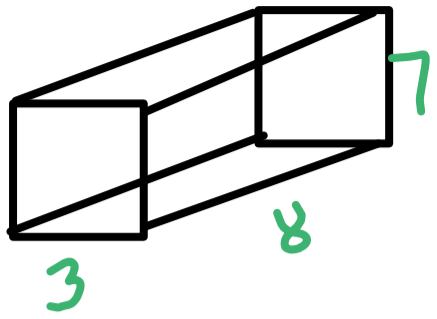


$$A = \pi r^2$$
$$= 3.14 \times 15^2$$
$$= 3.14 \times 225$$
$$= 706.5$$

2 heads

$$706.5 \times 2$$
$$1413\text{ cm}^2$$

15. Rectangular Box



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

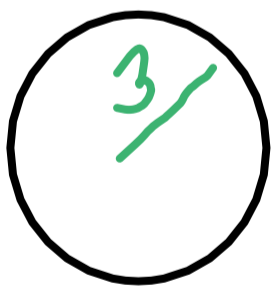
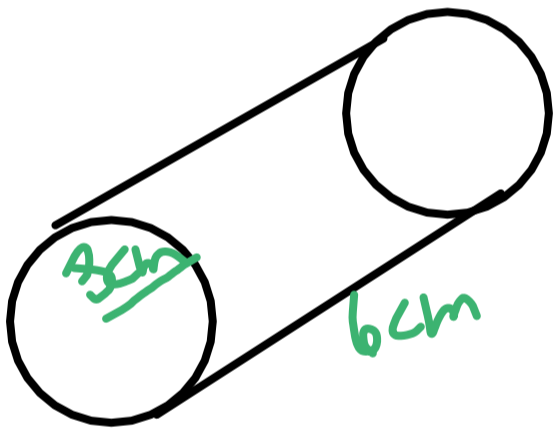


$$A = l \times w \\ = 7 \times 3 \\ = 21 \text{ cm}^2$$

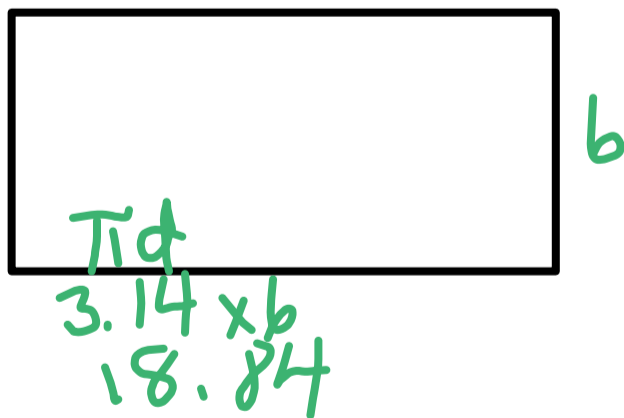


$$A = l \times w \\ = 8 \times 3 \\ = 24 \text{ cm}^2$$

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



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



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

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

The cylindrical tube uses less material

16. Curved SA = 660 cm^2
Height 10 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.

$$\text{Volume} = \text{Area of the base} \times \text{height}$$

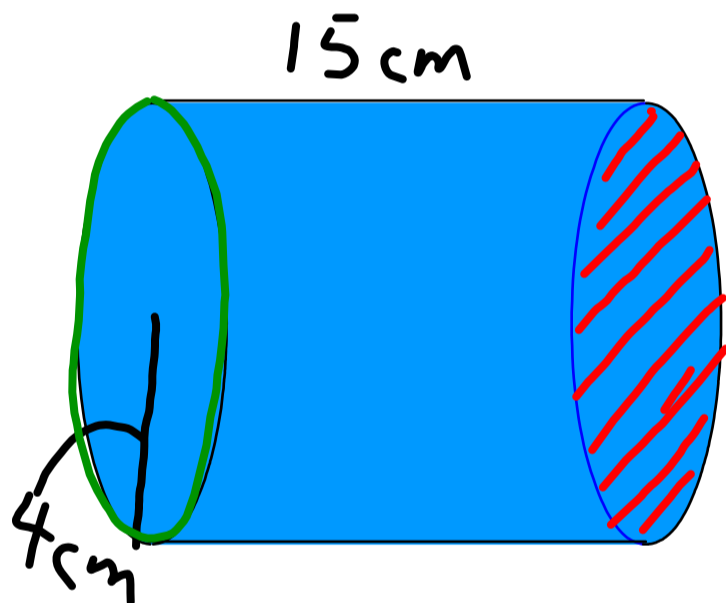
What is the base of a cylinder? ~~Circle~~

$$\text{Area of Circle} = \pi r^2$$

$$\text{Vol cy} = \pi r^2 H$$

* units are cubed *

Examples:

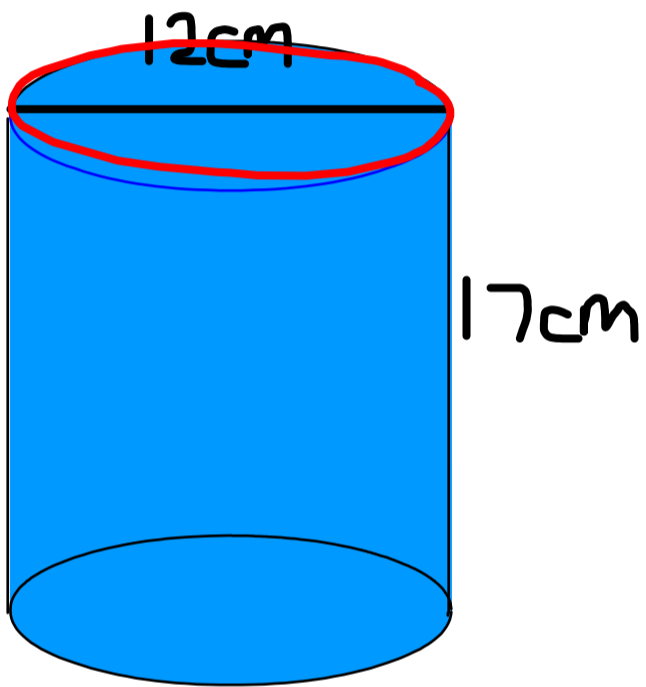


Given
 $r = 4 \text{ cm}$
 $H = 15 \text{ cm}$

$$\begin{aligned} \text{Vol cy} &= A_0 \times H \\ &= \pi r^2 \times H \\ &= (3.14)(4 \text{ cm})^2 (15 \text{ cm}) \\ &= (3.14)(16 \text{ cm}^2)(15 \text{ cm}) \\ &= 753.6 \text{ cm}^3 \end{aligned}$$

Ex 2)

Your Turn



Given

$$d = 12\text{cm}$$

$$\Downarrow$$
$$r = 6\text{cm}$$

$$H = 17\text{cm}$$

$$\begin{aligned} V_{\text{cyl}} &= A_0 \times H \\ &= \pi r^2 H \\ &= 3.14 (6\text{cm})^2 (17\text{cm}) \\ &= (3.14) 36\text{cm}^2 (17\text{cm}) \\ &= 192.168 \text{cm}^3 \end{aligned}$$

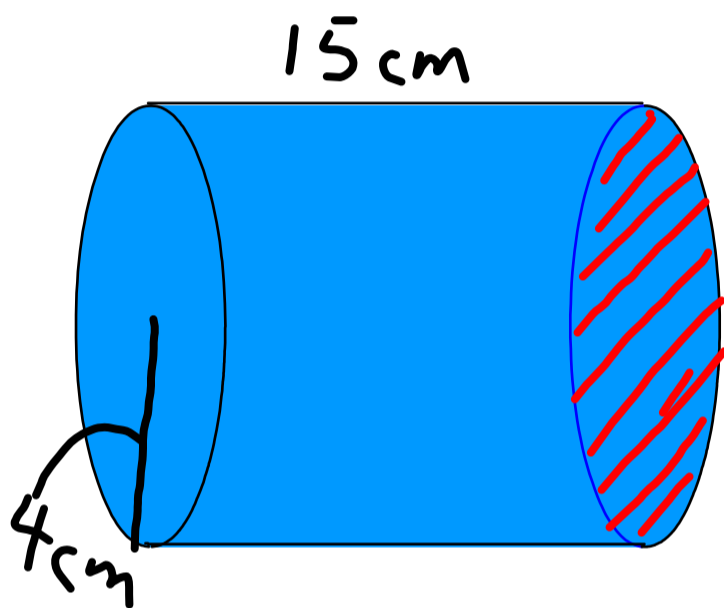
Volume of a Cylinder

We use the same formula, Volume = Area of the base x height to find the volume of a cylinder.

What is the base of a cylinder

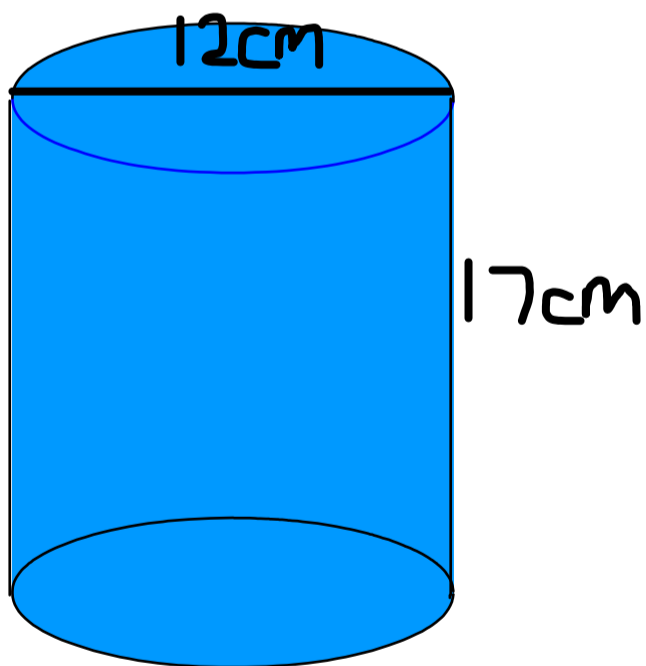
Circle and Area of Circle = πr^2

Examples:



$$\begin{aligned} \text{Vol} &= A_{\text{base}} \times h \\ &= 50.24 \times 15 \\ &= 753.6 \text{ cm}^3 \end{aligned}$$

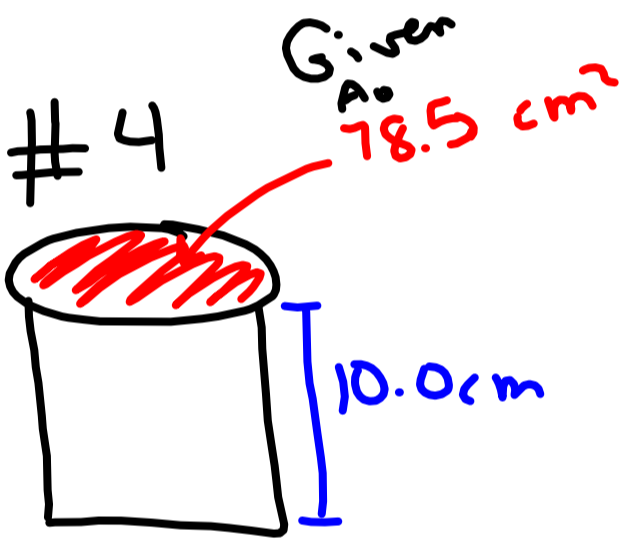
$$\begin{aligned} A_{\text{base}} &= \pi r^2 \\ &= 3.14 \times 4^2 \\ &= 3.14 \times 16 \\ &= 50.24 \text{ cm}^2 \end{aligned}$$



$$\begin{aligned} \text{Vol} &= A_{\text{of base}} \times h \\ &= 113.04 \times 17 \\ &= 1921.68 \text{ cm}^3 \end{aligned}$$

$$\begin{aligned} A_{\text{of base}} &= \pi r^2 \\ &= 3.14 \times 6^2 \\ &= 3.14 \times 36 \\ &= 113.04 \text{ cm}^2 \end{aligned}$$

Class/Homework



pg. 217 # ~~1~~, 4, 5, 6, 8

Give A base

$$V = A_{\text{base}} \times H$$

$\times H$

$$\begin{aligned} V_{\text{cy}} &= A_0 \times H \\ &= 78.5 \text{ cm}^2 \times 10 \text{ cm} \\ &= 785 \text{ cm}^3 \end{aligned}$$

find

$$A_0 = \pi r^2$$
$$Vol = A_0 \times H$$
$$\pi r^2 H$$

\downarrow

$$3.14 (\quad)^2 (\quad)$$