

[Aim: 100/100 in Maths]

अभ्यास CLASS 10

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SURFACE AREAS AND VOLUME

[FORMULA SHEET]



[Cuboid]



[cube]



[cone]



[cylinder]



[Sphere]



[Hemisphere]

CSA/
LSA

$$2(l+b)h$$

$$4a^2$$

$$\pi r l$$

$$2\pi r h$$

$$4\pi r^2$$

$$2\pi r^2$$

TSA

$$2(lb+bh+hl)$$

$$6a^2$$

$$\pi r l + \pi r^2$$

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

$$4\pi r^2$$

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

$$\Rightarrow \underline{3\pi r^2}$$

Volume

$$lbh$$

$$a^3$$

$$\frac{1}{3}\pi r^2 h$$

$$\pi r^2 h$$

$$\frac{4}{3}\pi r^3$$

$$\frac{2}{3}\pi r^2$$

LP : From a solid cylinder of height 30cm and radius 7cm , a conical cavity of height 24 cm and same radius is hollowed out . Find the total surface area of the remaining solid.

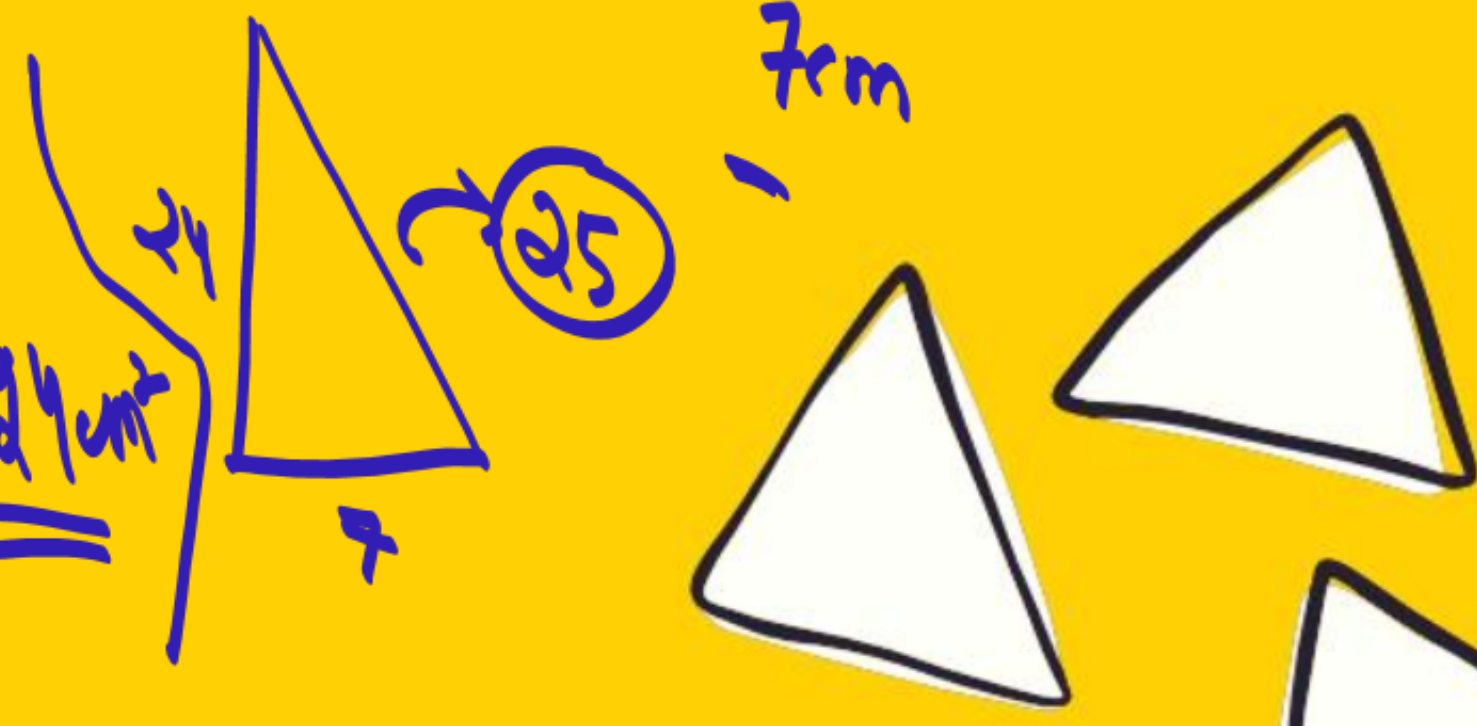
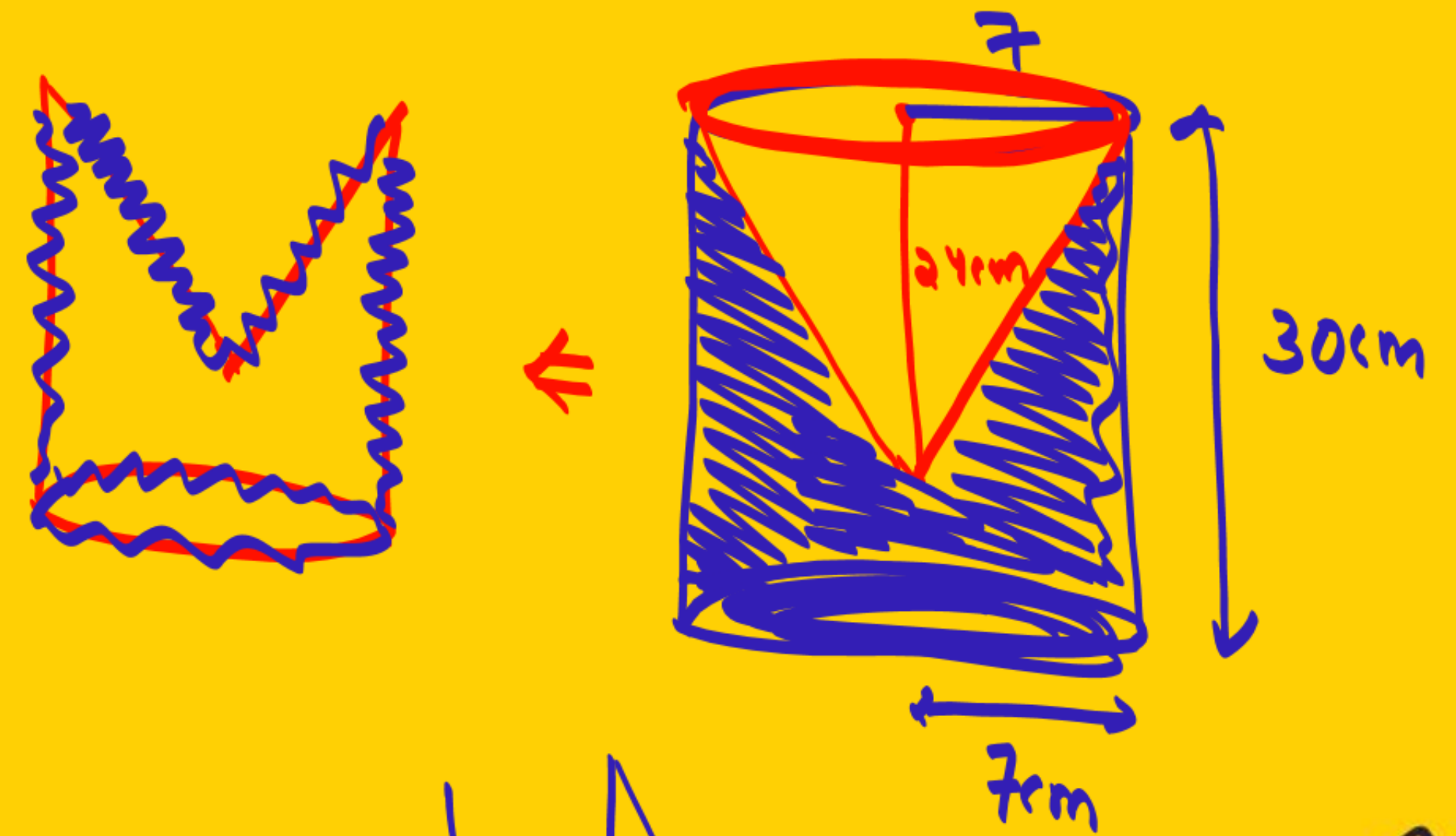
TSA of this solid formed

⇒ Area of circular base + CSA cylinder + CSA cone

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

$$\Rightarrow \pi r [r + 2h + l]$$

$$\Rightarrow \frac{22}{7} \times 7 [7 + 2(30) + 25] = 22[100] = 2200 \text{ cm}^2$$



LP : Two cones have their heights in the ratio 1 : 3 and radii in the ratio 3 : 1 .
What is the ratio of their volumes ?

$$\frac{h_1}{h_2} = \frac{1}{3}$$

$$\frac{r_1}{r_2} = \frac{3}{1}$$



$$\frac{V_1}{V_2} =$$

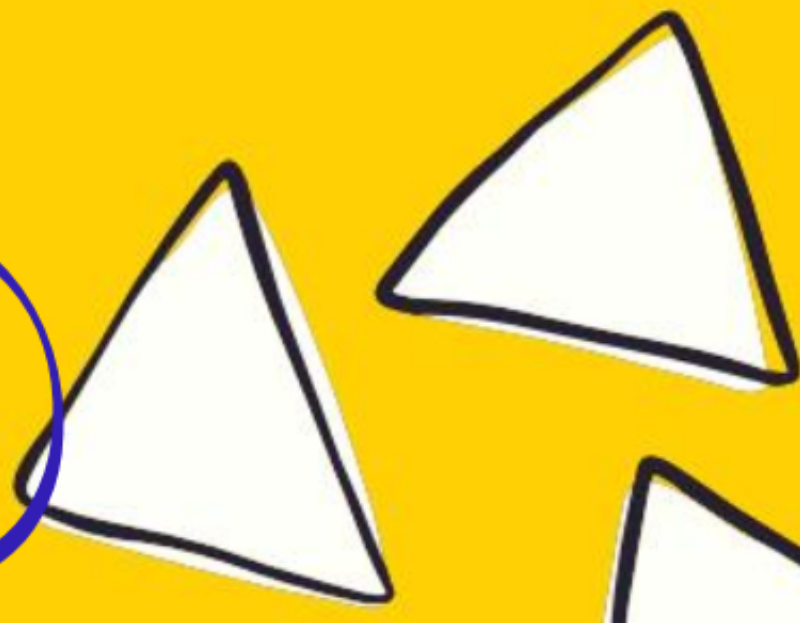
$$\frac{\frac{1}{3} \pi r_1^2 h_1}{\frac{1}{3} \pi r_2^2 h_2}$$

$$= \frac{r_1^2 h_1}{r_2^2 h_2}$$

$$\Rightarrow \left(\frac{r_1}{r_2}\right)^2 \left(\frac{h_1}{h_2}\right)$$

$$\Rightarrow \left(\frac{3}{1}\right)^2 \left(\frac{1}{3}\right) = \frac{9}{3} = 3$$

$$V_1 : V_2 \Rightarrow 3 : 1$$



LP : A tent is in the shape of a cylinder surmounted by a conical top of same diameter . If the height and diameter of cylindrical part are 2.1m and 3m respectively and the slant height of conical part is 2.8m , find the cost of canvas needed to make the tent if the canvas is available at the rate of ₹500/sq. metre(Use $\pi = 22/7$)

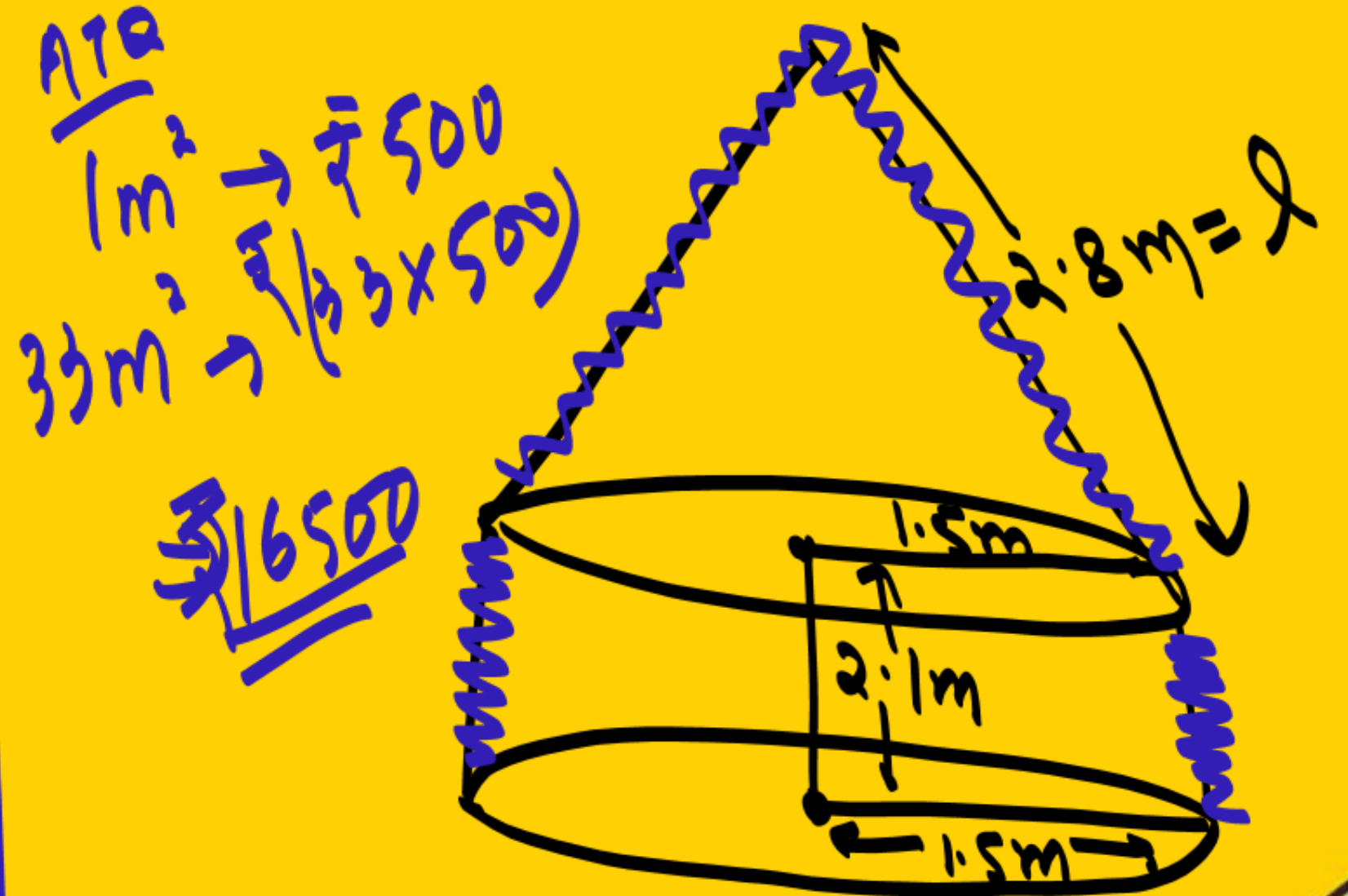
$$T.S.A. \Rightarrow CSA \text{ cylinder} + CSA \text{ cone}$$

$$\Rightarrow 2\pi r h_c + \pi r l$$

$$= \pi r [2h_c + l]$$

$$= \frac{22}{7} \times \frac{3}{2} [2(2.1) + 2.8]$$

$$= \frac{33}{7} [7] = 33m^2$$



हर पे mount

अभय

LP : A vessel is in the form of a hemispherical bowl surmounted by a hollow cylinder of same diameter . The diameter of the hemispherical bowl is 14 cm and the total height of the vessel is 13 cm . Find the total surface area of the vessel. (Use $\pi = 22/7$)

TSA vessel \Rightarrow CSA hemisphere + CSA cylinder

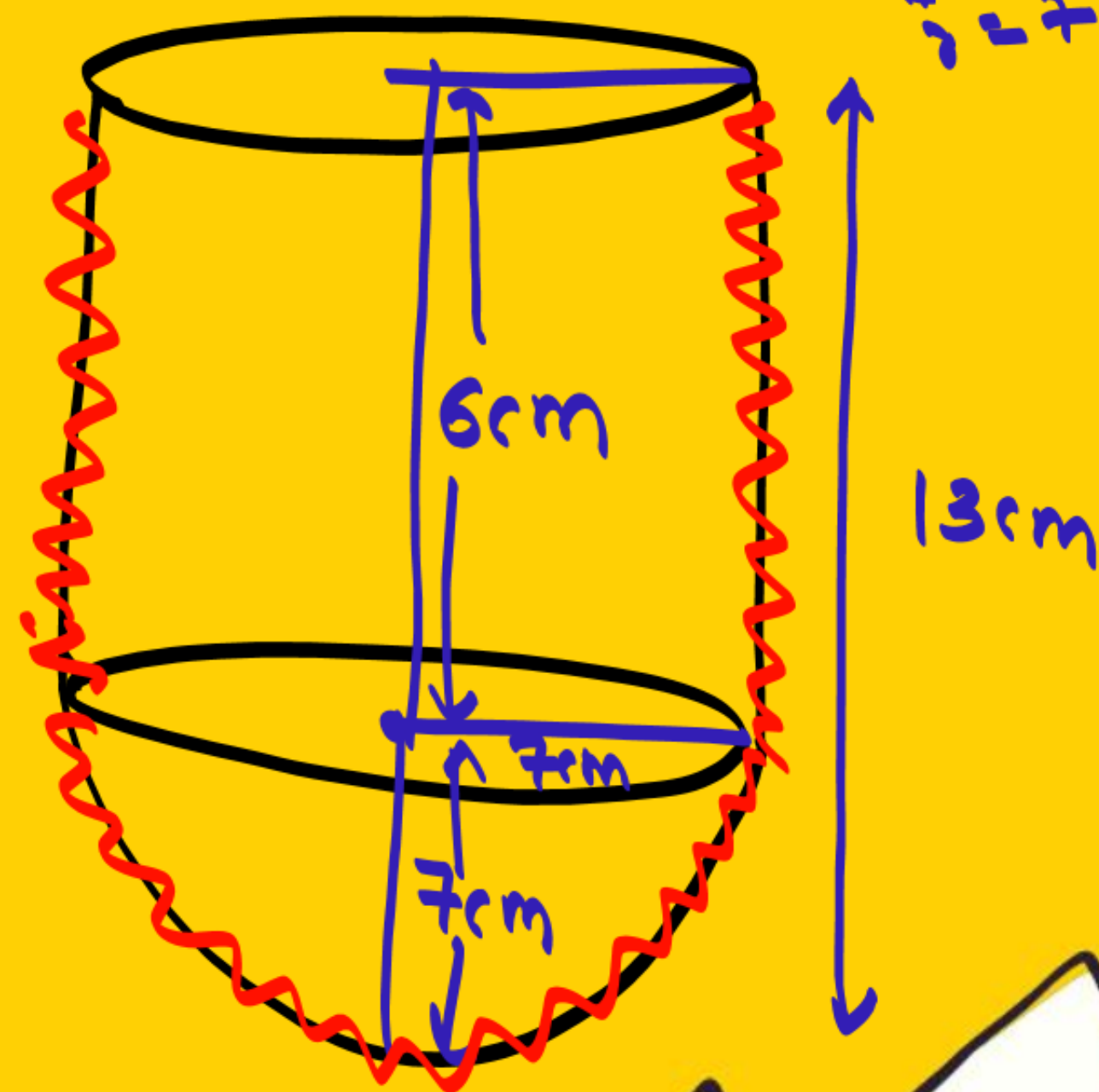
$$\Rightarrow 2\pi r^2 + 2\pi rh$$

$$\Rightarrow 2\pi r [r + h]$$

$$\Rightarrow 2 \times \frac{22}{7} \times 7 (7 + 6)$$

$$\Rightarrow 44 \times 13$$

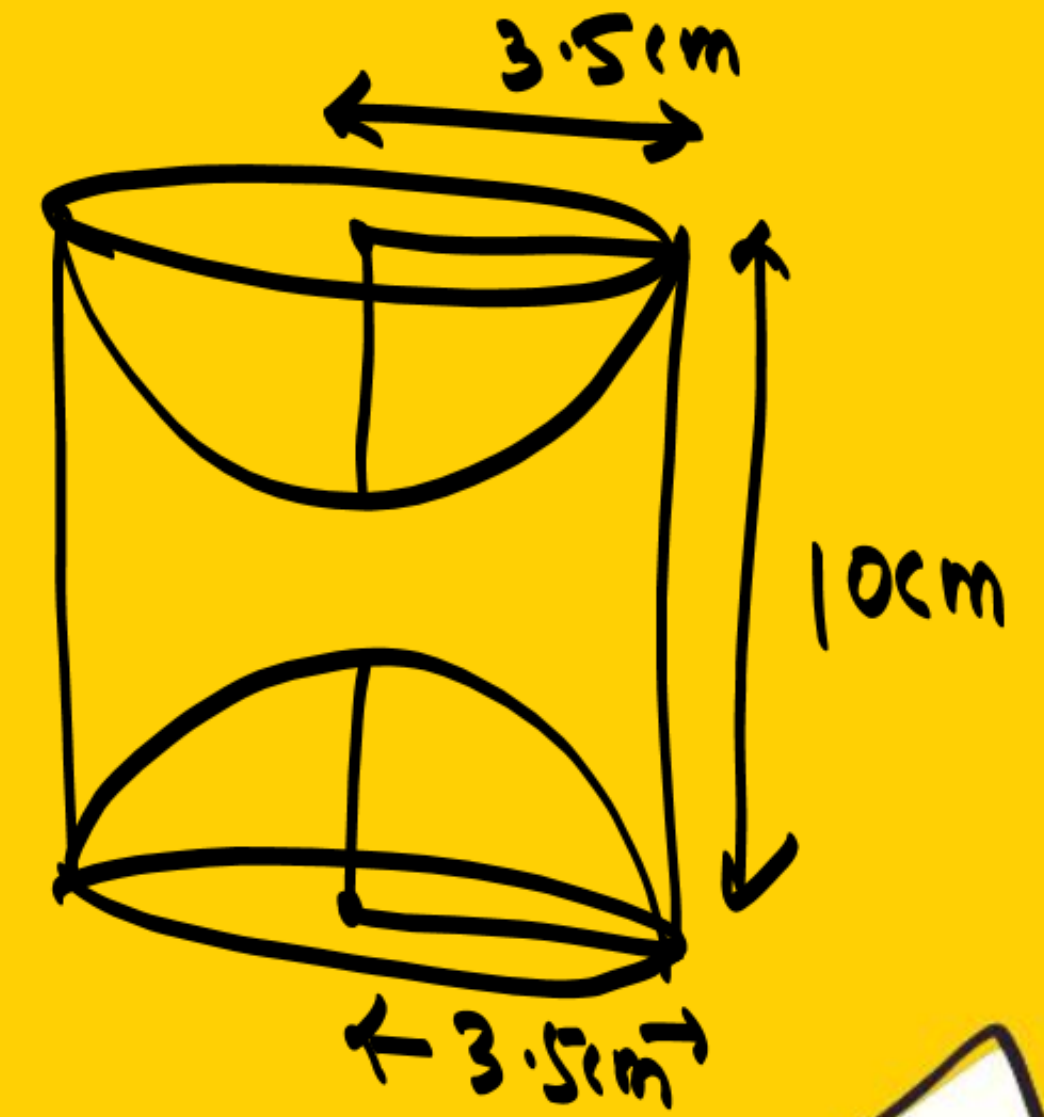
$$\text{TSA} \Rightarrow 572 \text{ cm}^2$$



LP : A wooden toy was made by scooping out a hemisphere of same radius from each end of a solid cylinder . If height of the cylinder is 10 cm and its base is of radius 3.5 cm , find the volume of wood in the toy. (Use $\pi = 22/7$)
+ TSA?

$$\text{Vol} \Rightarrow \text{Vol. cyl} - 2(\text{hemisphere})$$

$$\text{TSA} = \text{CSA of cylinder} + 2(\text{CSA hemisphere})$$



LP : The ratio of radius and height of a cone & cylinder are 2 : 3 and 4 : 5 .
Find the ratio of their volume.

$$\frac{r_{co}}{r_{cy}} = \frac{2}{3}$$

$$\frac{h_{co}}{h_{cy}} = \frac{4}{5}$$

$$\frac{V_{co}}{V_{cy}} = \frac{\frac{1}{3} \pi r_{co}^2 h_{co}}{\pi r_{cy}^2 h_{cy}}$$

$$\Rightarrow \frac{1}{3} \left(\frac{r_{co}}{r_{cy}} \right)^2 \left(\frac{h_{co}}{h_{cy}} \right)$$

$$\Rightarrow \frac{1}{3} \left(\frac{2}{3} \right)^2 \left(\frac{4}{5} \right)$$

$$\Rightarrow \frac{16}{135}$$



~~Q~~ LP : 150 spherical marbles, each of diameter 1.4 cm are dropped in a cylindrical vessel of diameter 7 cm containing some water, which are completely immersed in water. Find the rise in the level of water in the vessel.

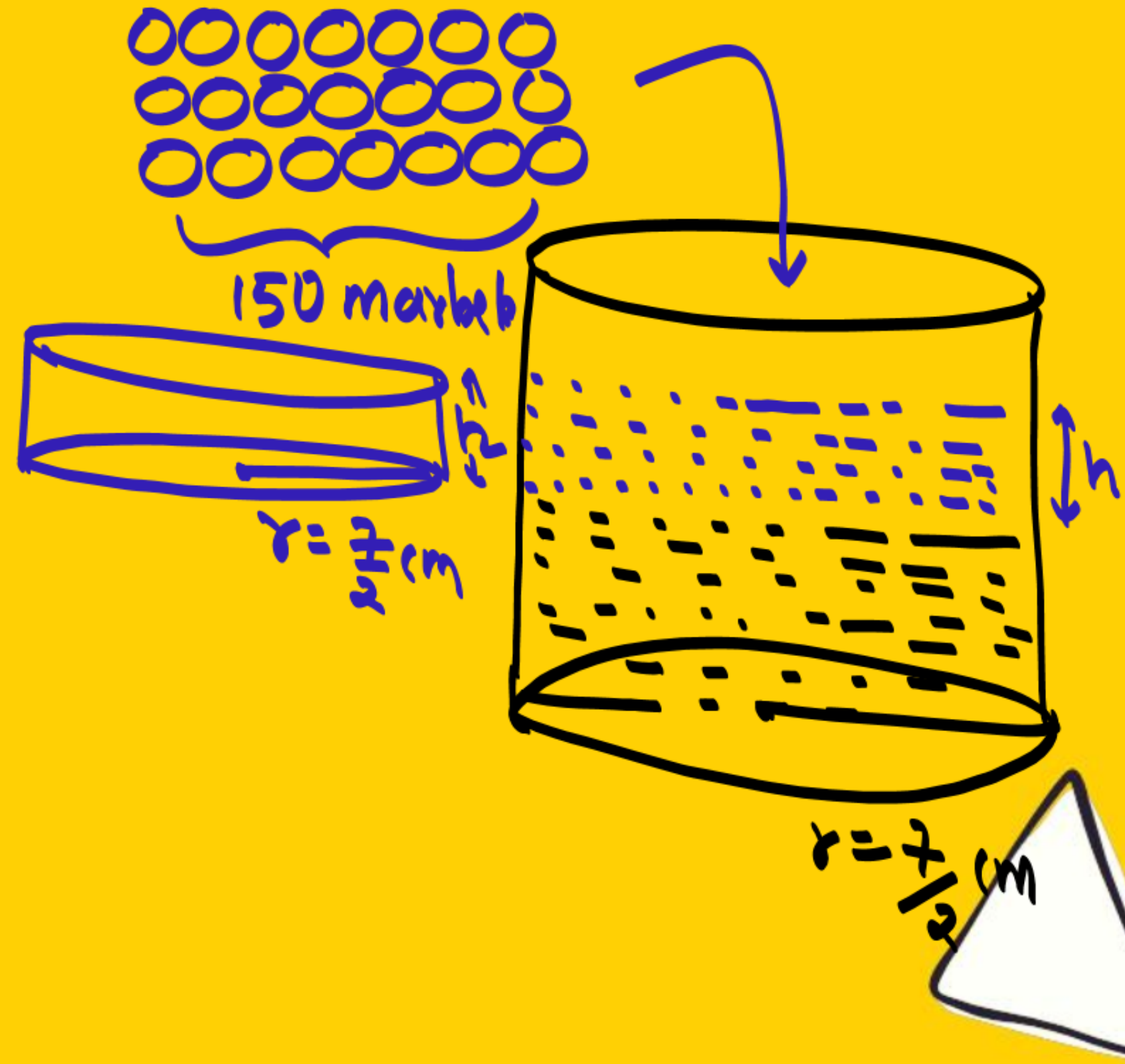
SO $(Vol)_{150 \text{ marbles}} = (Vol)_{\text{displaced}}$

$$150 \times \frac{4}{3} \pi \left(\frac{0.7}{2}\right)^3 = \pi \left(\frac{7}{2}\right)^2 h$$

$$\cancel{2} \cancel{\pi} \times \frac{7}{10} \times \frac{7}{10} \times \frac{7}{10} = \frac{7}{2} \times \frac{7}{2} \times h$$

$$\frac{56}{10} = h$$

$$h = 5.6 \text{ cm}$$



LP : Sushant has a vessel, of the form of an inverted cone, open at the top, of height 11 cm and radius of top as 2.5 cm and is full of water. Metallic spherical balls each of the diameter 0.5 cm are put in the vessel due to which 2/5th of the water in the vessel flows out. Find how many balls were put in the vessel.

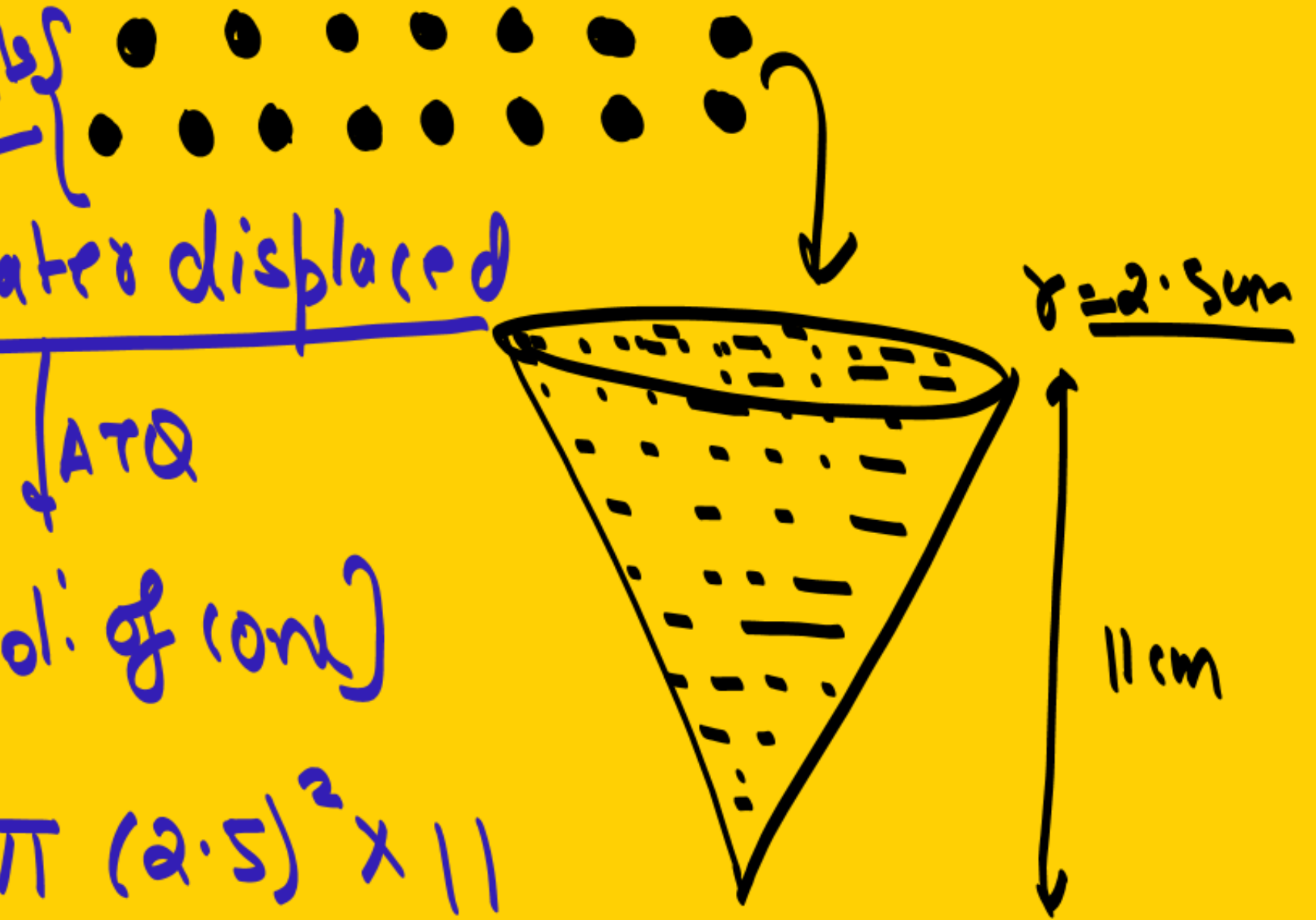
Vol. of 'n' balls = Vol. of water displaced

Let 'n' balls

$$n \times \frac{4}{3} \pi r^3 = \frac{2}{5} (\text{Vol. of cone})$$

$$n \times \frac{4}{3} \pi \left(\frac{0.5}{2}\right)^3 = \frac{2}{5} \times \frac{1}{3} \pi (2.5)^2 \times 11$$

$n = 1$



17 Jan → Syllabus complete

18
19
20] → SQP

21 days ← Maths Revision (14 days / 4 chapters)

10 Feb → Eng & IT prep start

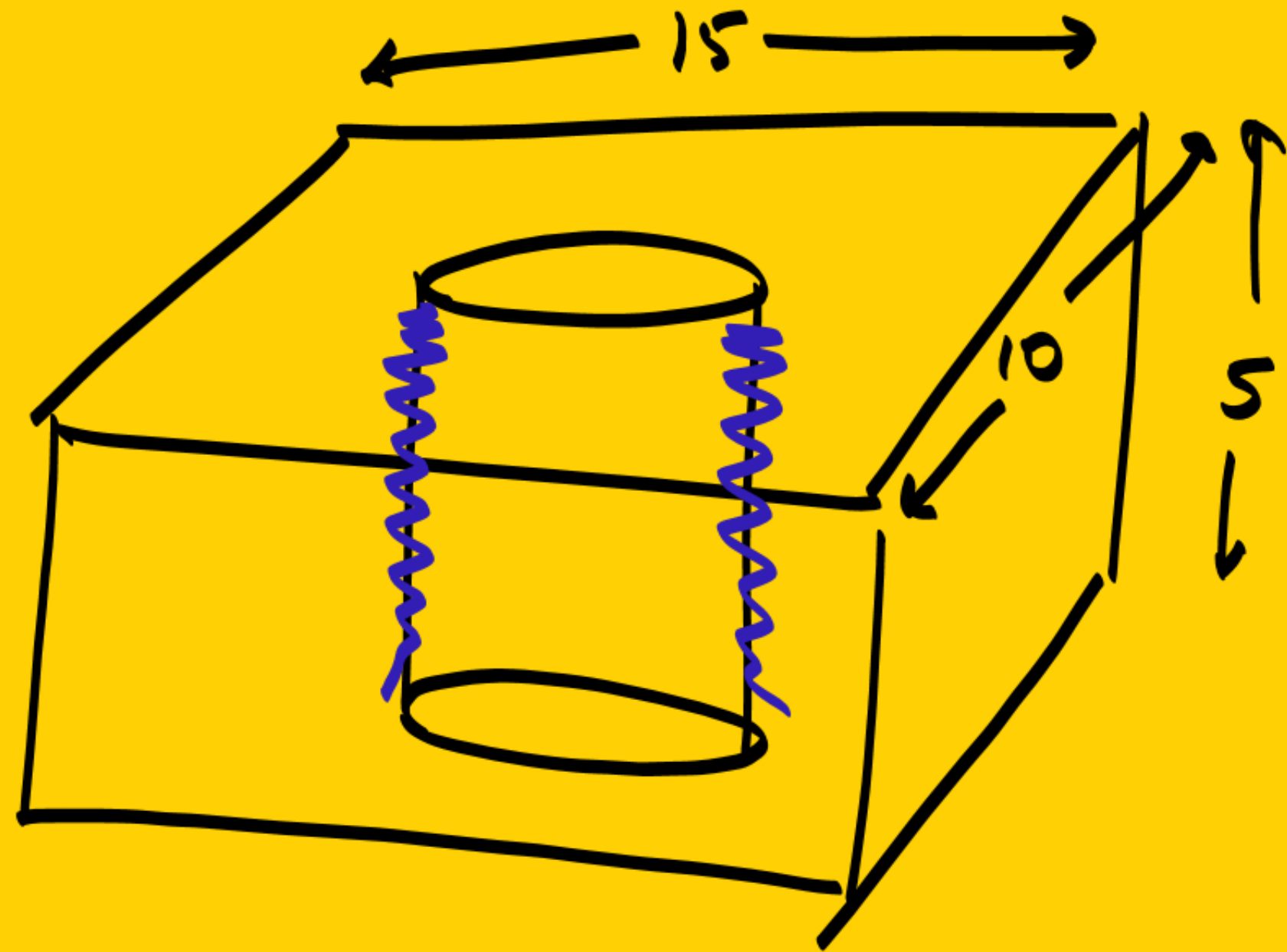
⊗ [15 Feb → Eng.

LP : From a cuboidal solid metallic block of dimension 15 cm X 10 cm X 5 cm cylindrical hole of diameter 7 cm is drilled out . Find the surface area of the remaining block . (Use $\pi = \frac{22}{7}$)

TSA of remaining block.

TSA cuboid - 2(ar of circle)

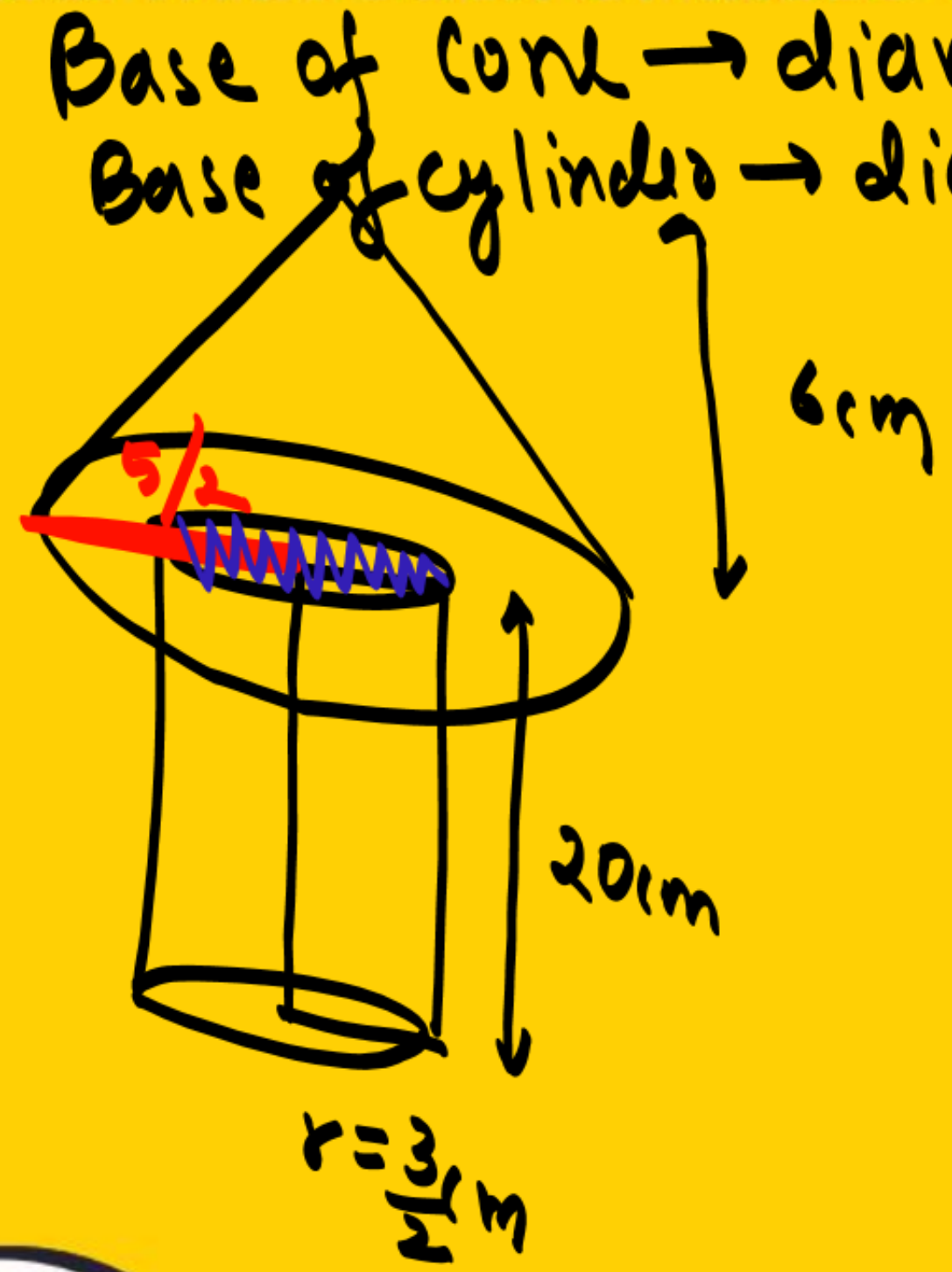
+ CSA cylinder



Frustum



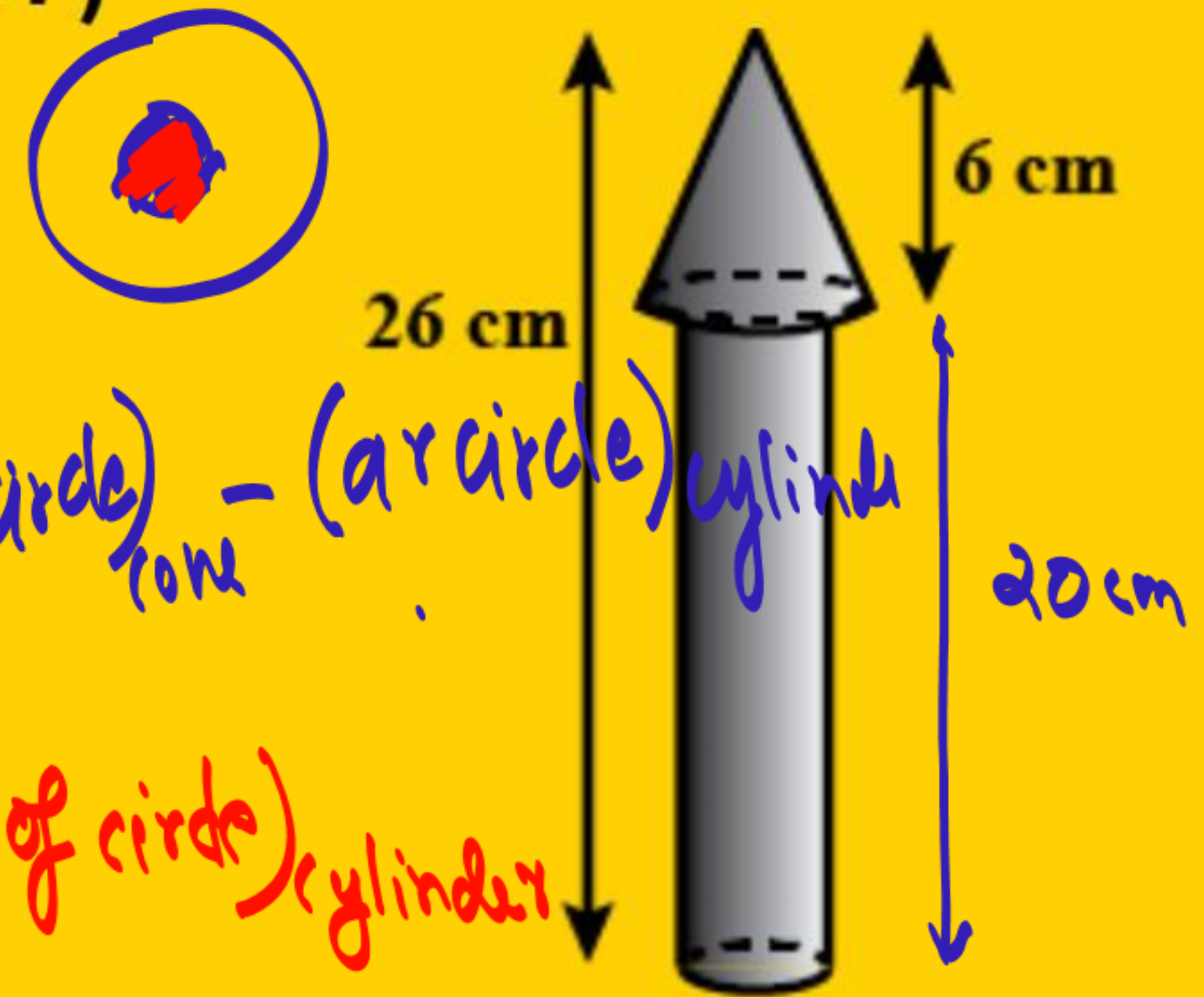
LP : A wooden toy rocket is in the shape of a cone mounted on a cylinder . The height of the entire rocket is 26 cm while the height of the conical part is 6cm . ~~The base of the conical portions is 2cm~~ . If the conical portion is to be painted orange and the cylindrical portion yellow , find the area of the rocket painted with each of these colours . (Take $\pi = 3.14$)



Cone \rightarrow orange

$$\text{CSA cone} + (\text{ar of circle})_{\text{cone}} - (\text{ar circle})_{\text{cylinder}}$$

or
 $\text{TSA cone} - (\text{ar of circle})_{\text{cylinder}}$



Cylinder → yellow

CSA cylinder $\rightarrow 2\pi r h$

THANK YOU

COODIES



$1+2=3$
 $3+5=$