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CLASS – 9

MATHEMATICS

Chapter – 11

Surface Areas and Volumes

Part – 11

Exercice 11.3 (Question 6 - 9)

Vikas Saini

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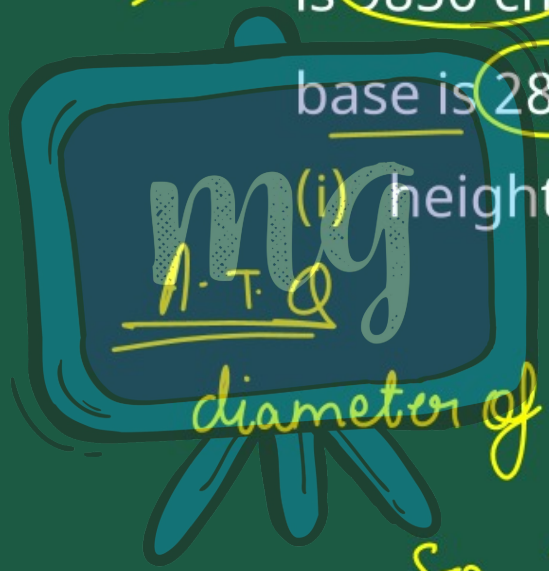
6. The volume of a right circular cone is 9856 cm^3. If the diameter of the base is 28 cm, find

(i) height of the cone



M.T.Q

diameter of base of cone = 28 cm

So, Radius = $\frac{D}{2} = \frac{28}{2} = 14$ cm

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Vol. of cone = 9856 cm^3

Now, we know that



Vol. of cone $= \frac{1}{3} \times \pi \times r^2 \times h = 9856$

$\Rightarrow \frac{1}{3} \times \frac{22}{7} \times 14 \times 14 \times h = 9856$

$\Rightarrow \frac{22 \times 2 \times 14 \times h}{3} = 9856$

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$$h = \frac{\cancel{4928}\ 704 \times 3}{22 \times \cancel{2} \times 14_{2}}$$

$$h = \frac{\cancel{176}\ 16 \times 3}{\cancel{22} \times \cancel{2}\ 1}$$

$$h = 16 \times 3 = 48$$

height = 48 cm

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(ii) slant height of the cone

Now we know that



$$l^2 = r^2 + h^2$$

$$l^2 = (14)^2 + (48)^2$$

$$= 196 + 2304$$

$$l^2 = 2500$$

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$l^2 = 2500$

$l = \sqrt{2500}$

$l = 50\ cm$

Slant height of cone = 50 cm

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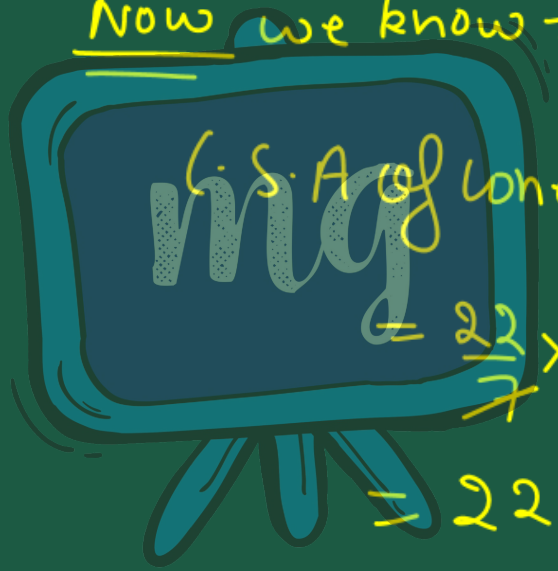
(iii) curved surface area of the cone



Now we know that

C.S.A of cone $= \pi \times r \times l$

$= \frac{22}{7} \times 14 \times 50$

$= 22 \times 100$

$= 2200\ cm^2$

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height = 48 cm, Slant height = 50 cm

C.S.A of cone = 2200 cm^2



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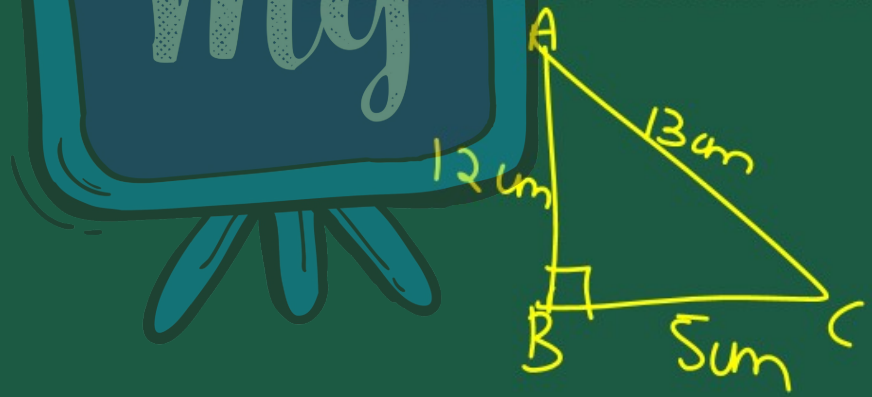
7. A right triangle ABC with sides 5 cm, 12 cm and 13 cm is revolved about the side 12 cm. Find the volume of the solid so obtained.



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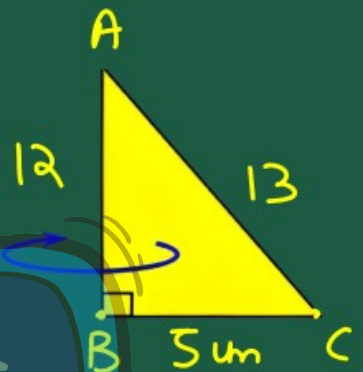

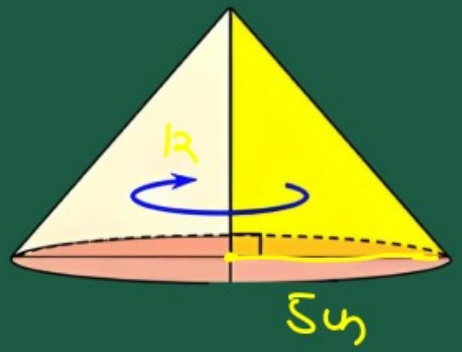

A.T.Q

In ΔABC, $\angle B = 90^\circ$

$AB = 12$ cm

$BC = 5$ cm

$AC = 13$ cm

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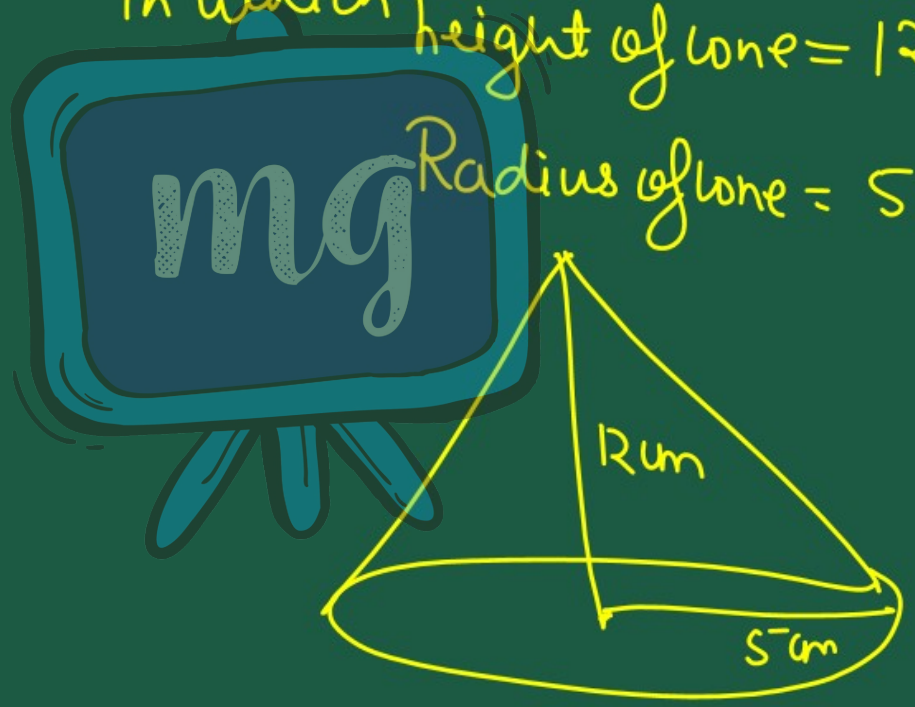
So when it is Revolved around Rum Side it forms a Solid cone.

in which, height of cone = 12cm

Radius of cone = 5cm



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Sinle

Vol. of cone $= \frac{1}{3} \times \pi \times r^2 \times h$

$r^2 = r \times r$

$= \frac{1}{3} \times \pi \times 5 \times 5 \times 12^{4}$

$= \pi \times 5 \times 5 \times 4$

Vol. of cone $= 100\pi \text{ cm}^3$

$= \frac{22}{7} \times 100 = \frac{2200}{7} \text{ cm}^3$

$= 3.14 \times 100 = 314 \text{ cm}^3$

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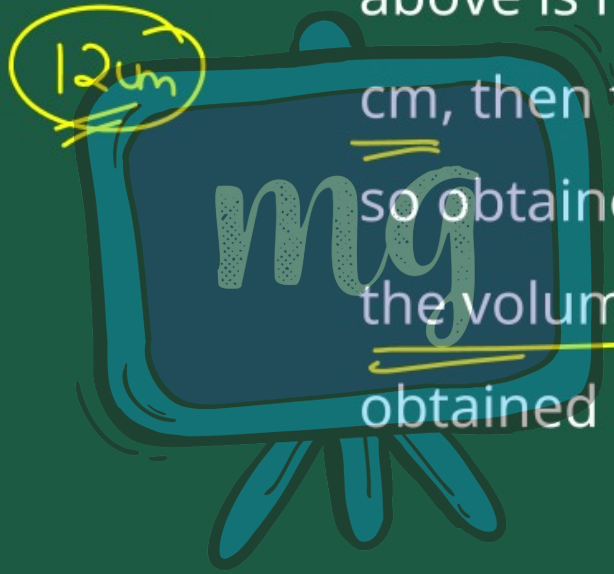
8. If the triangle ABC in the Question 7 above is revolved about the side 5 cm, then find the volume of the solid so obtained. Find also the ratio of the volumes of the two solids obtained in Questions 7 and 8.



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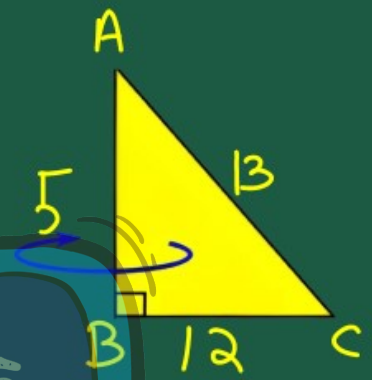

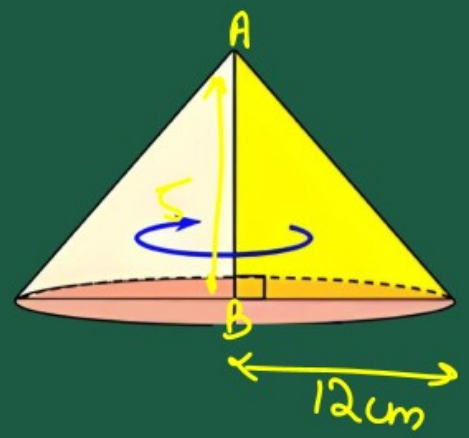

A.T.Q

In ΔABC, $\angle B = 90^\circ$

$AB = 5cm$

$BC = 12cm$

$AC = 13cm$

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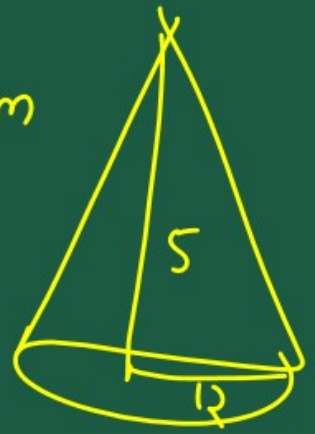
Since when Right angle Δ is Revolved around it's side of length 5cm it form Solid shape [Cone].

Sol:

Radius of Cone = 12cm

height of Cone = 5cm



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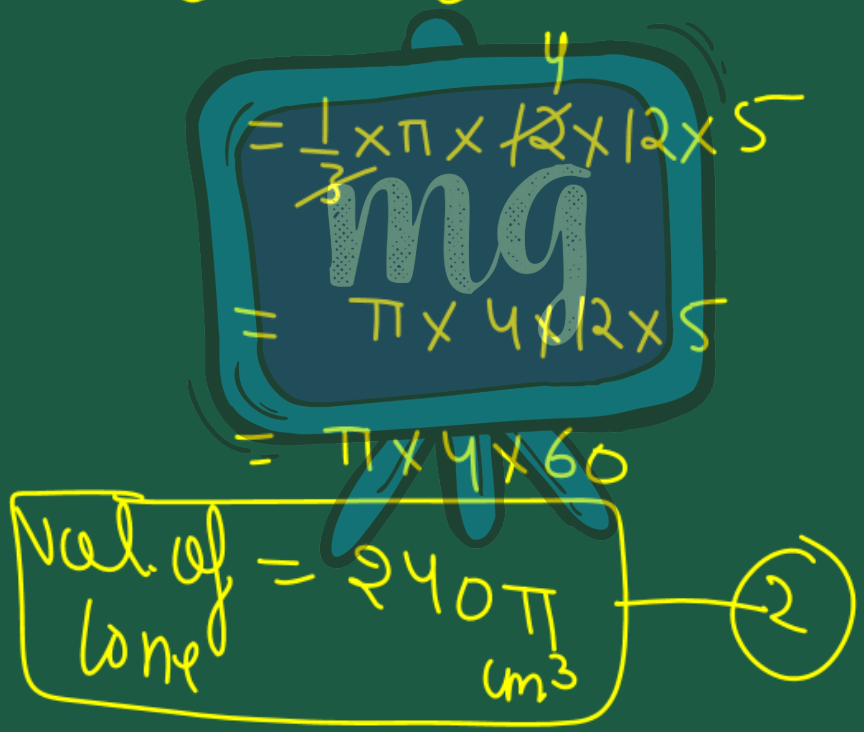

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Ratio of both Scenario Created Solid's Volume $= \dfrac{\overset{5}{\cancel{100}}\,\cancel{\pi}}{\underset{12}{\cancel{240}}\,\cancel{\pi}} = \dfrac{5}{12}$

$\boxed{\text{Required Ratio is } 5:12}$

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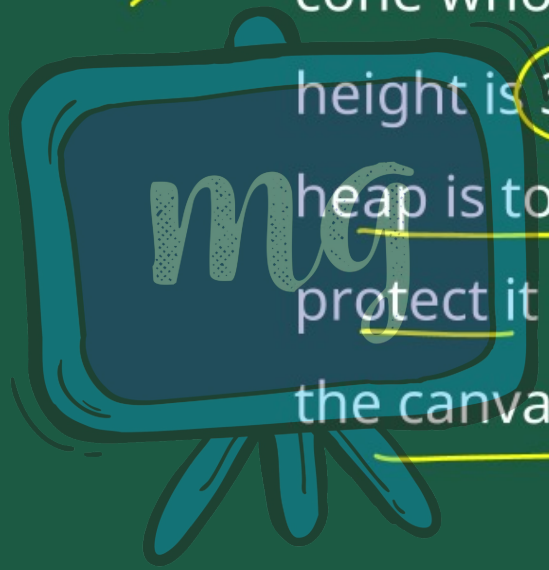
9 A heap of wheat is in the form of a cone whose diameter is 10.5 m and height is 3 m. Find its volume. The heap is to be covered by canvas to protect it from rain. Find the area of the canvas required.



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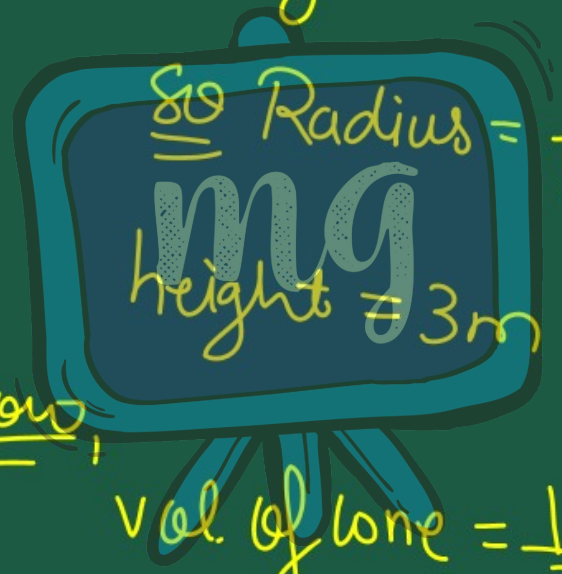
A·T·Q

diameter of cone = $10.5\,m = \frac{105}{10} = \frac{21}{2}\,m$

So Radius = $\frac{1}{2} \times d = \frac{1}{2} \times \frac{21}{2} = \frac{21}{4}\,m$



Now,

Vol. of cone = $\frac{1}{3} \times \pi \times r^2 \times h$

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$$= \frac{1}{\cancel{3}} \times \frac{\overset{11}{\cancel{22}}}{\cancel{7}} \times \frac{\cancel{3}}{\cancel{21}_{\,2}} \times \frac{21}{4} \times 3$$

$$= \frac{11 \times 21 \times 3}{2 \times 4}$$

$$= \frac{11 \times 63}{8}$$

$$= \frac{693}{8}\ m^3 = 86.625\ m^3$$

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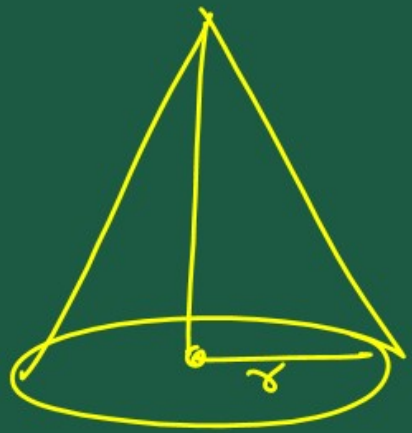

$r = \frac{21}{4}$

$h = 3$

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Now, we know that

$$l^2 = r^2 + h^2$$

$$l^2 = \left(\frac{21}{4}\right)^2 + (3)^2$$

$$= \frac{441}{16} + \frac{9}{1}$$

$$= \frac{441 + 144}{16} = \frac{585}{16}$$

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$$l^2 = \frac{585}{16}$$

$$l^2 = 36.5625$$

$$l = \sqrt{36.5625}$$

$$l = 6.046 \text{ m}$$

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C.S.A of Conical heap = $\pi \times r \times l$

$= \frac{11}{\cancel{22}} \times \frac{\cancel{3}}{\cancel{7}} \times \frac{\cancel{21}}{1} \times 3.023$

$= 11 \times 3 \times 3.023$

$= 11 \times 9.069$

$= 99.759\ m^2$

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Volume = $86.625\ m^3$



C.S.A = $99.759\ m^2$