Exercise 13.7

Question :1 Find the volume of the right circular cone with

(i) Radius 6 cm, height 7 cm

(ii) Radius 3.5 cm, height 12 cm

Ans.: (i) Radius (r) = 6 cm

Height (h) = 7 cm

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

= $\frac{1}{3} \times \frac{22}{7} \times 6 \times 6 \times 7$

= 12 × 22

= 264 cm^3

(ii) Radius (r) = 3.5 cm

Height (h) = 12 cm

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

= $\frac{1}{3} \times \frac{22}{7} \times 3.5 \times 3.5 \times 12$

= 154 cm3

Question :2 Find the capacity in litres of a conical vessel with

(i) Radius 7 cm, slant height 25 cm

(ii) Height 12 cm, slant height 13 cm

v (i) Radius (r) = 7 cm

Slant height (l) = 25 cm

As we know $l^2 = h^2 + b^2$

So,

$h = \sqrt{625 - 49}$

$h = \sqrt{576}$

= 24 cm

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

= $\frac{1}{3} \times \frac{22}{7} \times 7 \times 7 \times 24$

= 154 × 8

= 1232 cm^3

= Capacity of conical vessel = $\left(\frac{1232}{1000}\right)$ litres

= 1.232 litres

(ii) Height (h) = 12 cm

Slant height (l) = 13 cm

$r = \sqrt{13^2 - 12^2}$

$r = \sqrt{16 - 144}$

$r = \sqrt{125}$

= 5 cm

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

= $\frac{1}{3} \times \frac{22}{7} \times 5 \times 5 \times 12$

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

Capacity of conical vessel = $\left(\frac{2200}{7000}\right)$ litres

$= \frac{11}{35}$litres

Question :3 The height of a cone is 15 cm. If its volume is 1570 cm^3, find the radius of the base. (Use $\pi = 3.14$)

Ans.: Height (h) of cone = 15 cm

Let the radius be r

Volume of cone = 1570 cm^3

$\frac{1}{3}\pi r^2 h = 1570$

$\frac{1}{3} \times 3.14 \times r \times r \times 15 = 1570$

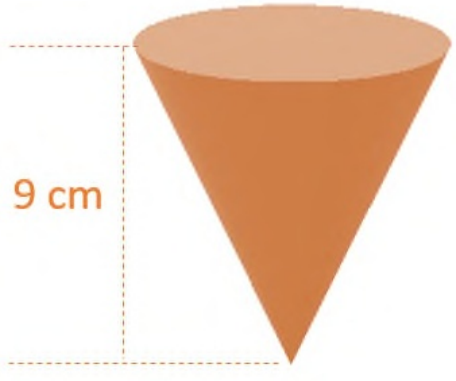
$$r^2 = \frac{1570^{5} \times 3 \times 100}{314_{1} \times 15}$$

$$= \frac{15 \times 100}{15}$$

$r^2 = 100$

r = 10cm.

Question :4 If the volume of a right circular cone of height 9 cm is 48 π cm^3, find the diameter of its base



Answer:

Height (h) = 9 cm

Let the radius be r

Volume = $48\pi cm^3$

We know volume of cone = $\frac{1}{3}\pi r^2 h$

So,

$\frac{1}{3}\pi r^2 h = 48\ \pi$

$r^2 = 16$ cm

$r = \pm 4$ cm

As radius cannot be negative,

r = 4

Diameter = 2r

$= 2 \times 4$

= 8 cm

Question :5 A conical pit of top diameter 3.5 m is 12 m deep. What is its capacity in kiloliters?

Ans.:

Radius = 1.75 m

Height (h) = 12 m

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

= $\frac{1}{3}\times \pi \times 1.75 \times 1.75 \times 12$

= 38.5 m^3

Since, 1 m^3 = 1 kiloliter

Capacity of the pit = (38.5 × 1)

= 38.5 kiloliters

Question :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

(ii) Slant height of the cone

(iii) Curved surface area of the cone

Ans.:

(i) Radius = 14 cm

Let the height be h

Volume = 9856 cm^3

$\frac{1}{3}\pi r^2 h = 9856$

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

h = 48 cm

(ii) Slant height (l) = $\sqrt{r * r + h * h}$

= $\sqrt{14 * 14 + 48 * 48}$

= $\sqrt{196 + 2304}$

= 50 cm

(iii) CSA = πrl

= $\frac{22}{7}$× 14 × 50

= 2200 cm^2

Question :7 A right triangle ABC with sides 5 cm, 12 cm, and 13 cm is revolved about the side 12 cm.

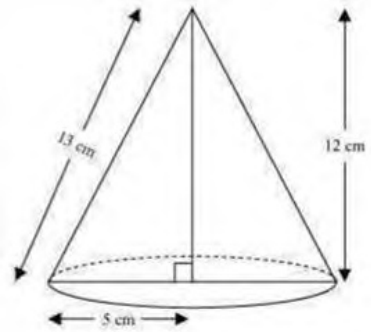
Find the volume of the solid so obtained.

Ans.: When right-angled ΔABC is revolved about its side 12 cm then a cone is formed having

Height (h) = 12 cm

Radius (r) = 5 cm

Slant height (l) = 13 cm



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

= $\frac{1}{3}$ × π × 5 × 5 × 12

= 25 × 4 Π cm^3

= 100 Π cm^3

Now Π = 3.14So 100 π = 3.14 x 100 = 314 cm^3

Hence Volume of the figure = 314 cm^3

Question :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.

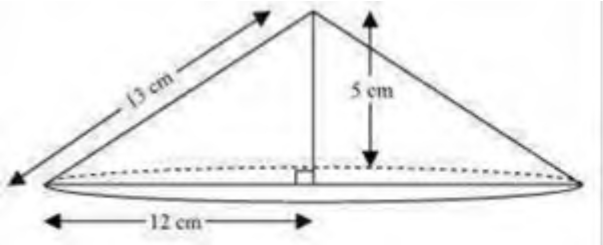
Ans.:

Case 1: When right-angled ΔABC is revolved about its side 5 cm a cone will be formed

Radius (r) = 12 cm

Height (h) = 5 cm

Slant height (l) = 13 cm

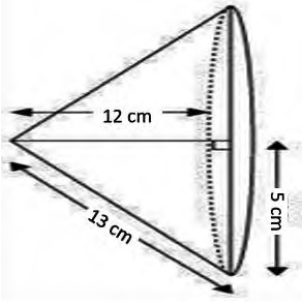


Volume = $\frac{1}{3}\pi r^2 h$

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

= 240 π cm^3

Case 2: when a right triangle ABC is revolved about the side 12cm, a cone is formed as shown in the above figure, where



radius r = 5 cm

height h = 12 cm

and slant height l = 13cm

Now, volume of the cone = $\pi r^2 h/3$

$$= \frac{1}{3}\pi 5^2 \times 12$$

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

$$= \pi \times 25 \times 4$$

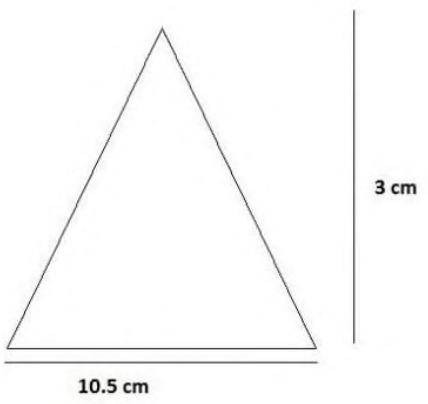
$$= 100\pi$$

Ratio $= \frac{100\pi}{240\pi}$

$= \frac{5}{12} = 5:12$

Question :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.

Ans.:



Radius $= \frac{Diameter}{2}$

Radius of Heap $= \frac{10.5}{2}$

Radius (r) = 5.25 m

Height (h) = 3 m

Volume of Heap = Volume of Cone

Volume of Heap = $\frac{1}{3}\pi r^2$h

Volume of Heap= $\frac{1}{3} \times \frac{22}{7} \times 5.25 \times 5.25 \times 3$

Volume of Heap = $22 \times 0.75 \times 0.75$

Volume of Heap = 86.625m^2

Volume of Heap = 86.625 m^3

Now for the Area of Canvas needed we need to calculate the curved surface Area of Cone.

Curved Surface Area of Cone = π r l

where r = radius and l = slant height

Slant Height is

given by $l = \sqrt{r^2 + h^2}$

$l = \sqrt{5.25^2 + 3^2} = \sqrt{27.5625 + 9} = \sqrt{36.5625} = 6.046$

Area of canvas = $\frac{22}{7} \times 5.25 \times 6.046$

= 99.756 m^2