## 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

### Answer 1:

**(i)** Radius of cone $r$ = 6 cm and height $h$ = 7 cm

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

$= \frac{1}{3} \times \frac{22}{7} \times 6 \times 6 \times 7 \quad = 264 \text{ cm}^3$

Hence, the volume of right circular cone is 264 $\text{cm}^3$.

**(ii)** Radius of cone $r$ = 3.5 cm and height $h$ = 12 cm

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

$= \frac{1}{3} \times \frac{22}{7} \times 3.5 \times 3.5 \times 12 \quad = 154 \text{ cm}^3$

Hence, the volume of right circular cone is 154 $\text{cm}^3$.

### 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

### Answer 2:

**(i)** Radius of conical vessel $r$ = 7 cm and slant height $l$ = 25 cm.

Let, the height of conical vessel = $h$ cm

We know that, $l^2 = r^2 + h^2$

$\Rightarrow 25^2 = 7^2 + h^2$

$\Rightarrow 625 = 49 + h^2 \Rightarrow h^2 = 625 - 49 = 576$

$\Rightarrow h = \sqrt{576} = 24$ cm

Capacity of conical vessel = $\frac{1}{3}\pi r^2 h$

$= \frac{1}{3} \times \frac{22}{7} \times 7 \times 7 \times 24 \quad = 1232 \text{ cm}^3 \quad = \frac{1232}{1000} = 1.232$ litres

Hence, the capacity of conical vessel is 1.232 litres.

**(ii)** Height of conical vessel $h$ = 12 cm and slant height $l$ = 13 cm

Let, the radius of conical vessel = $r$ cm

We know that, $l^2 = h^2 + r^2$

$\Rightarrow 13^2 = 12^2 + r^2$

$\Rightarrow 169 = 144 + r^2$

$\Rightarrow r^2 = 169 - 144 = 25 \Rightarrow$

$r = \sqrt{25} = 5$ cm

Capacity of conical vessel = $\frac{1}{3}\pi r^2 h$

$= \frac{1}{3} \times \frac{22}{7} \times 5 \times 5 \times 12 \quad = \frac{2200}{7} \text{ cm}^3$

$= \frac{2200}{7 \times 1000} = \frac{11}{35}$ litres

Hence, the capacity of conical vessel is $\frac{11}{35}$ 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 π = 3.14)

### Answer 3:

Volume of cone $V$ = 1570 $cm^3$ and height $h$ = 15 cm
Let, the radius of base of cone = $r$ cm
Volume of cone = $\frac{1}{3}\pi r^2 h$

$$\Rightarrow 1570 = \frac{1}{3} \times 3.14 \times r^2 \times 15 \quad \Rightarrow 1570 = 3.14 \times r^2 \times 5 \quad \Rightarrow r^2 = \frac{1570}{3.14 \times 5} = 100$$

$$\Rightarrow r = \sqrt{100} = 10 \text{ cm}$$

Hence, the radius of base of cone is 10 cm.

## 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 4:

Volume of cone $V = 48\pi$ $cm^3$ and height $h$ = 9 cm
Let, the radius of base of cone = $r$ cm
Volume of cone = $\frac{1}{3}\pi r^2 h$

$$\Rightarrow 48\pi = \frac{1}{3} \times \pi \times r^2 \times 9 \quad \Rightarrow 48\pi = \pi \times r^2 \times 3 \quad \Rightarrow r^2 = \frac{48\pi}{\pi \times 3} = 16 \quad \Rightarrow r = \sqrt{16} = 4 \text{ cm}$$

Therefore, the diameter of base = $2 \times 4 = 8$ cm
Hence, the diameter of base of cone is 8 cm.

## Question 5:

A conical pit of top diameter 3.5 m is 12 m deep. What is its capacity in kilolitres?

### Answer 5:

Radius of pit $r$ = 3.5/2 = 1.75 m and height $h$ = 12 m.
Volume of pit = $\frac{1}{3}\pi r^2 h$

$$= \frac{1}{3} \times \frac{22}{7} \times 1.75 \times 1.75 \times 12 \quad = 38.5 \text{ m}^3$$

$= 38.5$ Kilolitres $\quad [\because 1 \text{ m}^3 = 1 \text{ kilolitres}]$
Hence, the capacity of pit is 38.5 kilolitres.

## 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

### Answer 6:

**(i)** Volume of cone $V$ = 9856 $cm^3$ and radius $r$ = 28/2 = 14 cm
Let, the height of cone be $h$ cm, therefore volume of cone = $\frac{1}{3}\pi r^2 h$

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

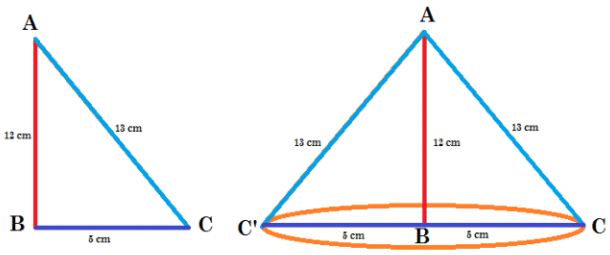
$$\Rightarrow 9856 = \frac{1}{3} \times 22 \times 2 \times 14 \times h$$

$$\Rightarrow h = \frac{9856 \times 3}{22 \times 2 \times 14} \quad \Rightarrow h = 48 \text{ cm}$$

Hence, the height of cone is 48 cm.

**(ii)** Height of cone $h$ = 48 cm and radius $r$ = 14 cm
Let, the slant height of cone = $l$ cm
We know that, $l^2 = h^2 + r^2$
$\Rightarrow l^2 = 48^2 + 14^2 \quad \Rightarrow l^2 = 2304 + 196$
$\Rightarrow l^2 = 2500 \quad \Rightarrow l = \sqrt{2500} = 50$ cm
Hence, the slant height of cone is 50 cm.

**(iii)** Slant height of cone $l$ = 50 cm and radius $r$ = 14 cm
Curved surface area of cone = $\pi rl$
$= \frac{22}{7} \times 14 \times 50 = 22 \times 2 \times 50 = 2200$ cm$^2$
hence, the curved surface area of cone is 2200 cm$^2$.




## Question 7:

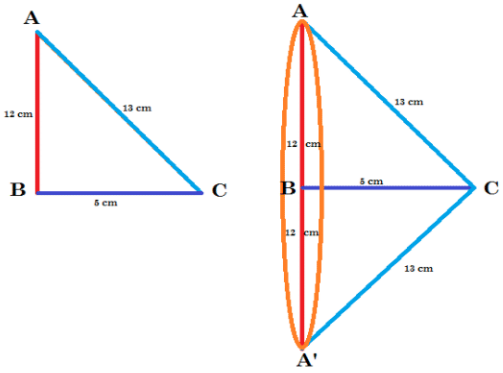
A right triangle ABC with sides 5 cm, 12 cm and 13 cm is revolved about the side 12 cm. Find the volume of the solid so obtained.

### Answer 7:

If the triangle is revolved about 12 cm side, a cone will be formed. Therefore, the radius of cone $r$ = 5 cm, height $h$ = 12 cm and slant height $l$ = 13 cm.
Volume of solid (cone) = $\frac{1}{3}\pi r^2 h = \frac{1}{3} \times \pi \times 5 \times 5 \times 12 = 100\pi$ cm$^3$
Hence, the volume of solid is $100\pi$ 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.




### Answer 8:

If the triangle is revolved about 5 cm side, a cone will be formed with radius $r$ = 12 cm, height $h$ = 5 cm slant height $l$ = 13 cm.
Volume of solid = $\frac{1}{3}\pi r^2 h = \frac{1}{3} \times \pi \times 12 \times 12 \times 5 = 240\pi$ cm$^3$
Hence, the volume of solid is $240\pi$ cm$^3$.

## 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.

### Answer 9:

Radius of heap of wheat $r$ = 10.5/2 = 5.25 m and height $h$ = 3 m
Volume of heap of wheat = $\frac{1}{3}\pi r^2 h = \frac{1}{3} \times \frac{22}{7} \times 5.25 \times 5.25 \times 3 = 22 \times 0.75 \times 5.25 = 86.625$ m$^3$
Hence, the volume of heap of wheat is 86.625 m$^3$.
Let, the slant height of heap of wheat = $l$ m
We know that, $l^2 = h^2 + r^2 \Rightarrow l^2 = 3^2 + (5.25)^2 \Rightarrow l^2 = 9 + 27.5625 \Rightarrow l^2 = 36.5625$
$\Rightarrow l = \sqrt{36.5625} = 6.05$ m (approx.)
Required area of canvas = $\pi rl$
$= \frac{22}{7} \times 5.25 \times 6.05 = 22 \times 0.75 \times 6.05 = 99.825$ m$^2$
Hence, the required area of canvas to protect wheat is 99.825 m$^2$.