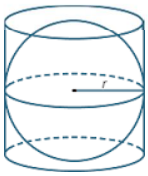
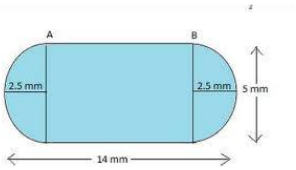
SSLC Class Notes

Chapter 15

Mensuration

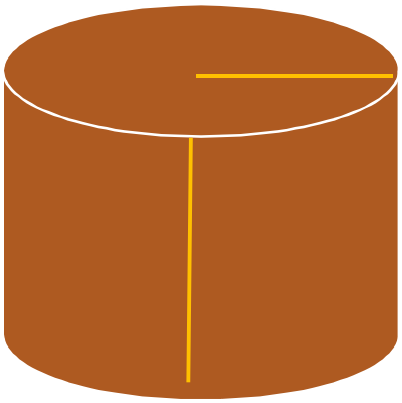




Yakub koyyur

GHS Nada, belthangady tq, D.K.-574214.ph:9008983286 email:yhokkila@GmAIL.COM

Cylinder



Curved surface area of the cylinder

$A = 2\pi r$

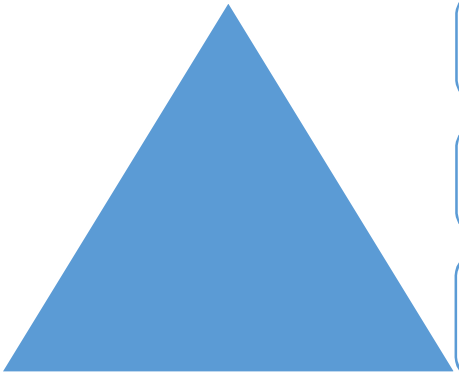
Total surface area of a cylinder

$A = 2\pi r(r + h)$

Volume of a cylinder

$V = \pi r^2 h$

Cone



Curved surface area of the cone

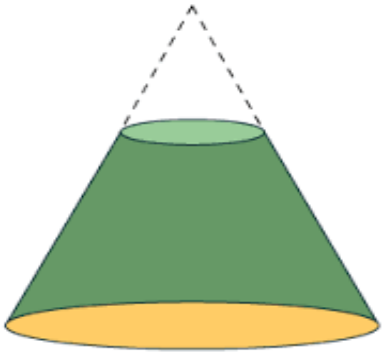
$\mathbf{A = \pi r l}$

The total surface area of the cone

$\mathbf{A = \pi r(r + l)}$

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

The frustum of a cone



Curved surface area

$A = \pi(r_1 + r_2)l$

Total Surface area

$A = \pi\{(r_1 + r_2)l + r_1^2 + r_2^2\}$

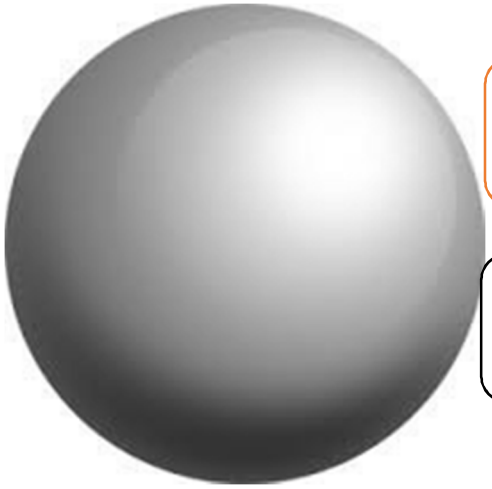
Volume

$V = \frac{1}{3}\pi h(r_1^2 + r_2^2 + r_1 r_2)$

Yakub Koyyur,GHS Nada,Belthangady Tq, D.K.-574214. Email:yhokkila@gmail.com

$$l = \sqrt{h^2 + (r_1 - r_2)^2}$$

Sphere



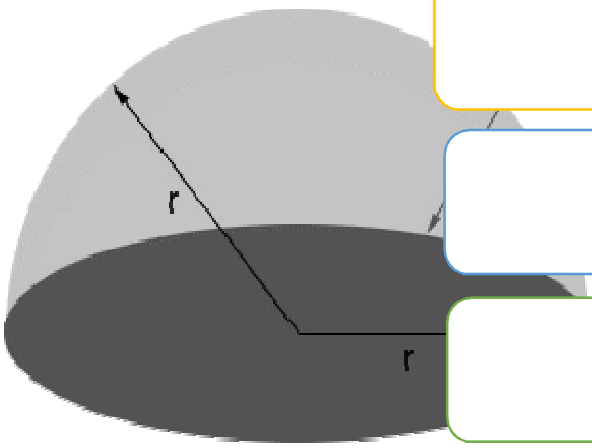
Curved/Total Surface area

$$A = 4\pi r^2$$

Volume

$$V = \frac{1}{3}\pi r^3$$

Hemisphere



Curved Surface area

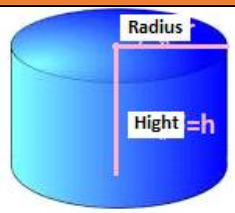
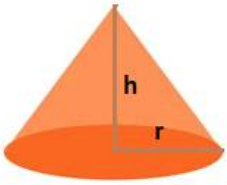
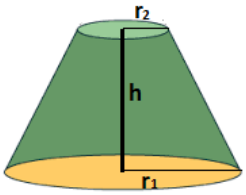
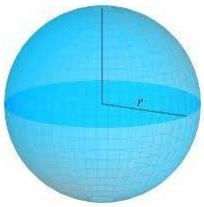
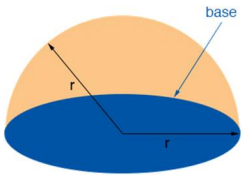
$$A = 4\pi r^2$$

Total Surface area

$$A = 4\pi r^2$$

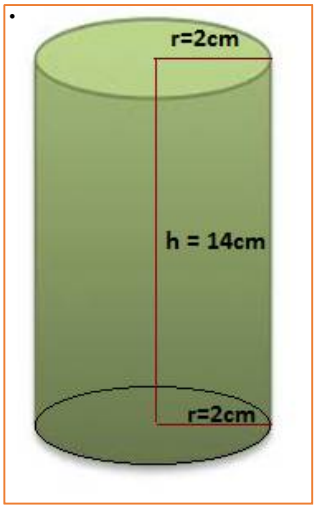
Volume

$$V = \frac{1}{3}\pi r^3$$

Figure	Name	Curved Surface area	Total Surface area	Volume
	Cylinder	$2\pi rh$	$2\pi r(r+h)$	$\pi r^2 h$
	Cone	πrl	$\pi r(r+l)$	$\frac{1}{3}\pi r^2 h$
	Frustum of Cone	$\pi(r_1+r_2)l$	$\pi\{(r_1+r_2)l+r_1^2+r_2^2\}$	$\frac{1}{3}\pi h(r_1^2+r_2^2+r_1r_2)$
	Sphere	$4\pi r^2$	$4\pi r^2$	$\frac{4}{3}\pi r^3$
	Hemisphere	$2\pi r^2$	$3\pi r^2$	$\frac{2}{3}\pi r^3$

EXERCISE 15.1

1. The height of a right circular cylinder is 14 cm and the radius of its base is 2 cm.Find its (i) CSA (ii) TSA .



(i) CSA

$A = 2\pi rh$

$A = 2x\frac{22}{7}x2x14$

$A = 2x22x2x2$

$A = 176cm^2$

(ii) TSA

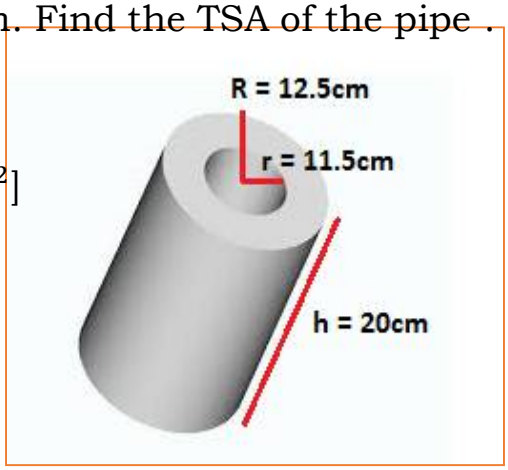
$A = 2\pi r(r + h)$

$A = 2x\frac{22}{7}x2(2 + 14)$

$A = \frac{88}{7}(16)$

$A = 201.14cm^2$

2. An iron pipe 20cm long has external radius equal to 12.5cm and internal radius equal to 11.5cm. Find the TSA of the pipe .



$A = 2\pi R(R + h)+2\pi rh - 2\pi r^2$

$\Rightarrow A = 2\pi[R(R + h)+rh - r^2]$

$= 2x\frac{22}{7}[12.5(12.5 + 20)+11.5x20 - 11.5^2]$

$= 2x\frac{22}{7}[12.5x32.5+11.5x20 - 132.25]$

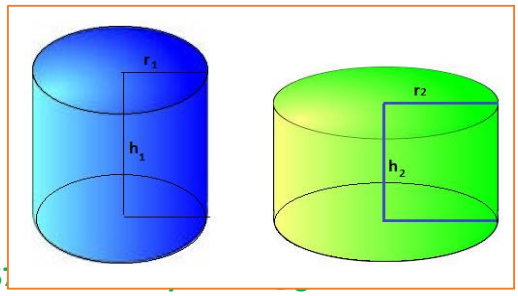
$= 2x\frac{22}{7}[406.25+230 - 132.25]$

$= \frac{44}{7}[504]$

$= 44[72]$

$= 3168cm^2$

3. The radii of two right circular cylinders are in the ratio 2 : 3 and the ratio of their curved surface areas is 5 : 6. Find the ratio of their heights .



$$\frac{\text{CSA of Cylinder 1}}{\text{CSA of Cylinder 2}} = \frac{5}{6}$$

$$\frac{2\pi r_1 h_1}{2\pi r_2 h_2} = \frac{5}{6}$$

$$\frac{r_1 h_1}{r_2 h_2} = \frac{5}{6}$$

$\frac{2_{h_1}}{3h_2} = \frac{5}{6}$

$6x2h_1 = 5x3h_2$

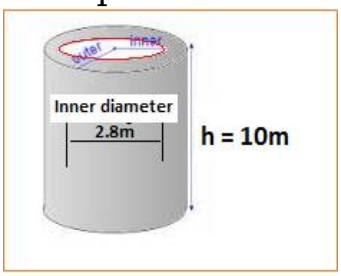
$12h_1 = 15h_2$

$\frac{h_1}{h_2} = \frac{15}{12}$

$\frac{h_1}{h_2} = \frac{5}{4}$

$h_1 : h_2 = 5:4$

4. The inner diameter of a circular well is 2.8m. It is 10 m deep. Find its inner curved surface area. Also find the cost of plastering this curved surface at the rate of 42 per m^2?



The inner CSA of a well

A = $2\pi rh$

A = $2x\frac{22}{7}x1.4x10$

A = $2x0.2x10$

A = $88m^2$

Cost of plastering @ 42 per m^2

=88 x 42 = Rs 3696

5. Craft teacher of a school taught the students to prepare cylindrical pen holders out of card board. In a class of strength 42, if each child prepared a pen holder of radius 5 cm and height 14 cm, how much cardboard was consumed?

A = $\pi r[2h + r]$ [∵CSA of Cylinder + Area Of the Bottom]

A = $\frac{22}{7}x5[2x14 + 5]$

A = $\frac{22}{7}x5[28 + 5]$

A = $\frac{110}{7}x33$

A = $\frac{22}{7}x5x33$

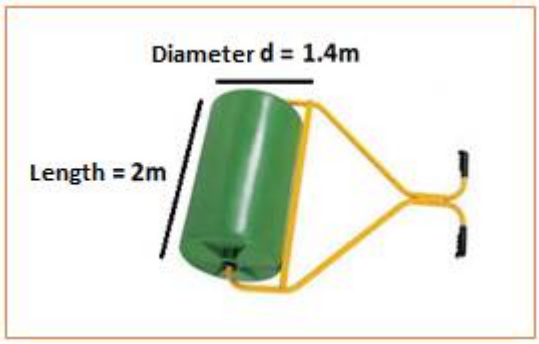
A = $\frac{22}{7}x165$

∴ 42 ಧಾರಕಗಳಿಗೆ ಬೇಕಾಗುವ ರಟ್ಟು

= $\frac{22}{7}x165x42$

= $21780cm^2$

6. The diameter of a garden roller is 1.4 m and is 2 m long. How much area will it cover in 5 revolutions ?



∴ The area cover in 5 revolutions

A = $2\pi rh$x5

A = 2x$\frac{22}{7}$x0.7x2 x5

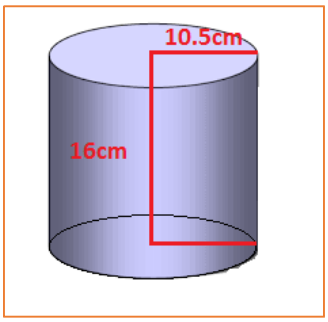
A = 44x0.1x2x5

A = 44x0.1x2x5

A = $44cm^2$

7. Find the volume of a right circular cylinder whose radius is 10.5 cm and height is 16 cm.

The volume of a right circular cylinder V = $\pi r^2 h$



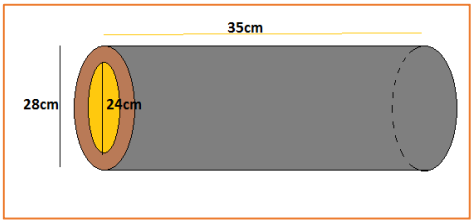
A = $\frac{22}{7}(10.5)^2 16$

A = $\frac{22}{7}$x$(10.5)^2$x16

A = $\frac{22}{7}$x110.25x16

A = $5544cm^3$

8. The inner diameter of a cylindrical wooden pipe is 24 cm and its outer diameter is28 cm. The pipe is 35 cm long. Find the mass of the pipe if 1cm^3 of wood has a mass of 0.6 gm.



Volume of a Wooden pipe V = $\pi R^2 h - \pi r^2 h$

Volume of a Wooden pipe V = $\pi h[R^2 - r^2]$

Volume of a Wooden pipe V = $\frac{22}{7}$x35$[14^2 - 12^2]$

Volume of a Wooden pipe V = $\frac{22}{7}$x35$[196 - 144]$

Volume of a Wooden pipe V = $\frac{22}{7}$x35x52

Volume of a Wooden pipe V = $5720cm^3$

The mass of the pipe if $1cm^3$ of wood has a mass of 0.6 gm.

$\therefore$ *The mass of* 5720 cm^3wooden pipe

= 5720x 0.6 =3432 Gram = 3.432Kg

9. Two circular cylinders of equal volumes have their heights in the ratio 1 : 2. Find the ratio of their radii.

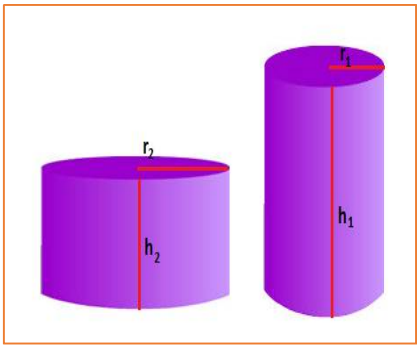
$\frac{\pi r_1^2 h_1}{\pi r_2^2 h_2} = \frac{V_1}{V_2} = 1$

$\frac{r_1^2}{2r_2^2} = 1$

$\frac{r_1^2}{r_2^2} = \frac{2}{1}$

$r_1^2 : r_2^2 = 2 : 1$

$r_1 : r_2 = \sqrt{2} : 1$



10. A rectangular sheet of paper, 44 cm × 20 cm is rolled along its length to form a

$2\pi r$ = 44cm

$2x\frac{22}{7}xr$ = 44cm

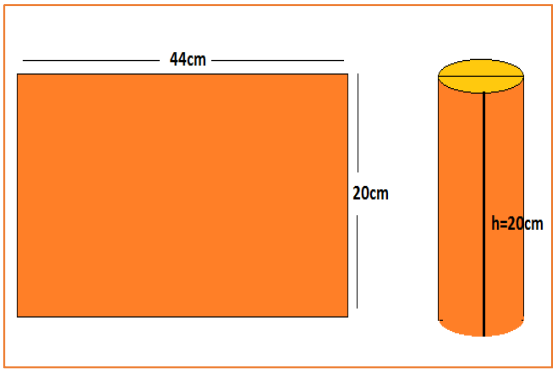
$\frac{44}{7}xr$ = 44cm

r = 7cm

Volume of the Volume V = $\pi r^2 h$

V = $\frac{22}{7}x7^2x20$

V = $3080cm^3$



EXERCISE 15.2

1. Find the curved surface area of a cone, if its slant height is 60 cm and the radius of its base is 21 cm.

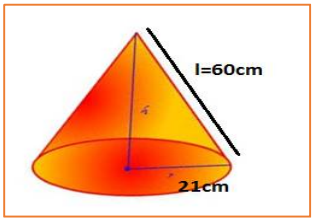
Curved surface area of a cone

A = πrl

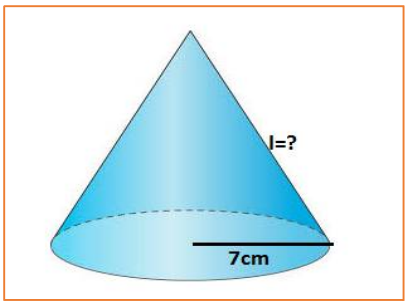
A = $\frac{22}{7}x21x60$

A = 22x3x60

A = $3960cm^2$



2. The radius of a cone is 7cm and area of curved surface is 176 cm^2. Find its slant height.



Curved surface area of a cone A = πrl

$\frac{22}{7}$x7xl = 176

$22l = 176$

$l = \frac{176}{22}$

$l = 8cm$

3. The area of the curved surface of a cone is 60□cm^2. If the slant height of the cone is 8 cm, find the radius of the base.

Curved surface of a cone A = πrl

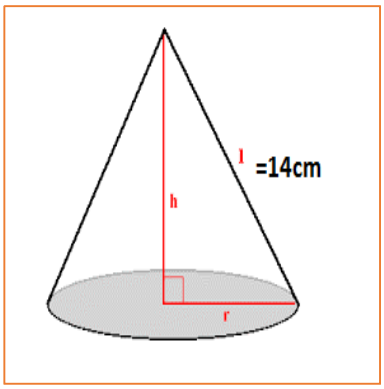
$\pi xrx8 = 60\pi$

$r = \frac{60\pi}{8\pi}$

$r = \frac{15}{2}$

$r = 7.5cm$

4. Curved surface area of a cone is 308cm^2 and its slant height is 14cm. Find the radius of the base and total surface area of the cone.



Curved surface area of a cone A = πrl

$\frac{22}{7}xrx14 = 308$

$44r = 308$

$r = \frac{308}{44}$

$r = 7cm$

Total surface area of the cone A =$\pi r(r + l)$

A =$\frac{22}{7}$x7(7 + 14)

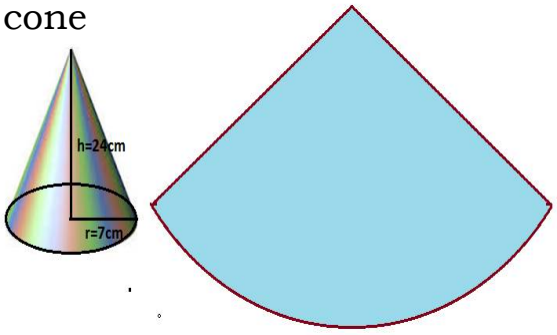
A =22x21

A =462cm^2

5. A clown's cap is in the form of a right circular cone of base radius 7cm and height 24 cm. Find the area of the sheet required to make 10 such caps?

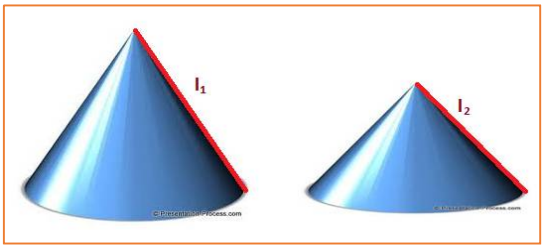
The sheet required tomake1cap = Curved surface area of a cone

$\therefore$ The sheet required to make 10 caps
$= 10$x Curved surface area of a cone
$= 10\pi rl$
$= 10\text{x}\frac{22}{7}\text{x}7\text{x}l$
$l = \sqrt{h^2 + r^2}$
$l = \sqrt{576 + 49}$
$l = \sqrt{625}$
$l = 25cm$



$\therefore$ The sheet required to make 10 caps $= 10\text{x}\frac{22}{7}\text{x}7\text{x}25$
$\therefore$ The sheet required to make 10 caps $= 10\text{x}22\text{x}25$
$\therefore$ The sheet required to make 10 caps $= 5500cm^2$

6. Find the ratio of the curved surface areas of two cones if their diameters of the bases are equal and slant heights are in the ratio 4 : 3.

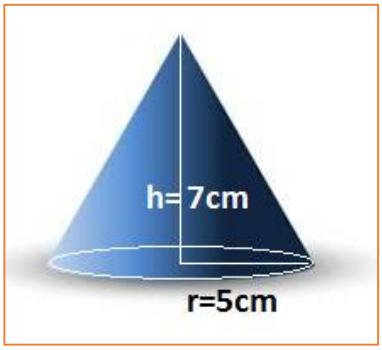


$\frac{A1}{A2} = \frac{\pi r_1 l_1}{\pi r_2 l_2}$

$\frac{A1}{A2} = \frac{4}{3}$ $[\because r_1 = r_2; l_1 : l_2 = 4:3]$

$\Rightarrow A1 : A2 = 4:3$

7. Find the volume of a right circular cone with radius 5 cm, height 7 cm.



the volume of a cone V $= \frac{1}{3}\pi r^2 h$

the volume of a V $= \frac{1}{3}\text{x}\frac{22}{7}\text{x}\,5^2\text{x}\,7$

the volume of a cone V $= \frac{1}{3}\text{x}\frac{22}{7}\text{x}25\text{x}7$

the volume of a cone $\mathbf{V = 183.33}\boldsymbol{cm^3}$

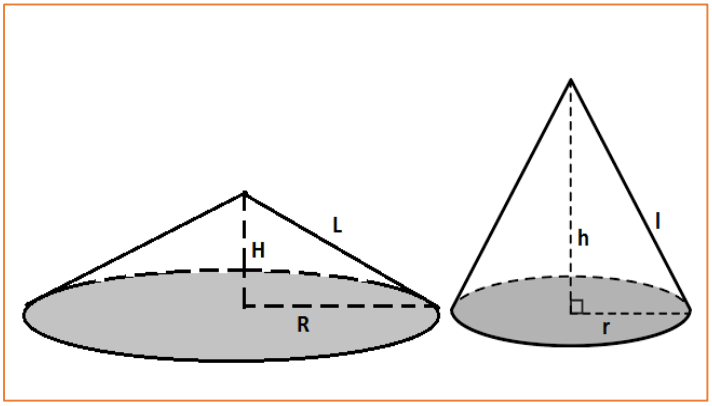
8. Two cones have their heights in the ratio 1 : 3 and the radii of their bases in the ratio 3 : 1. Find the ratio of their volumes.

$$\frac{V_1}{V_2} = \frac{\frac{1}{3}\pi R^2 H}{\frac{1}{3}\pi r^2 h}$$

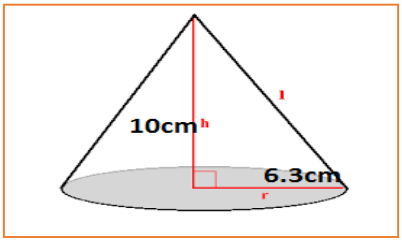
$$\frac{V_1}{V_2} = \frac{3^2 x 1}{1^2 x 3}$$

$$\frac{V_1}{V_2} = \frac{3}{1}$$

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



9. A right angled triangle of which the sides containing the right angle are 6.3 cm and 10 cm in length, is made to turn around on the longer side. Find the volume of the solid thus generated.



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

$$V = \frac{1}{3} x \frac{22}{7} x (6.3)^2 10$$

$$V = \frac{1}{3} x \frac{22}{7} x 6.3 x 6.3 x 10$$

$$V = 22x\ 0.3 x\ 6.3 x10$$

$$V = 22x\ 0.3 x\ 6.3 x10$$

$$V = 415.8 cm^3$$

10. A tent is of the shape of a right circular cylinder upto a height of 3 m and then becomes a right circular cone with a maximum height of 13.5m above the ground. Calculate the cost of painting the inner side of the tent at the rate of Rs. 2 per sq m, if the radius of the base is 14 m?

The area of Tent =
CSA of Cylinder shape + CSA of conical shape

$$2\pi rh + \pi rl$$

$$2x \frac{22}{7} x\ 14x\ 3 + \frac{22}{7} x14\ x\ l$$

$$l = \sqrt{14^2 + 10.5^2}$$

$l = \sqrt{196 + 110.25}$

$l = \sqrt{306.25} = 17.5$

$2x \frac{22}{7} x\ 14x\ 3 + \frac{22}{7} x14\ x\ 17.5$

Inner CSA of tent = $2x\ 22x2x\ 3 + 22x2\ x\ 17.5$

Inner CSA of tent = $264 + 770$

Inner CSA of tent = $1034cm^2$

The cost of painting = $1034x2$

The cost of painting = $Rs2068$

EXERCISE 15.3

1. A flower vase is in the form of a frustum of a cone. The perimeter of the ends are 44 cm and 8.4□□cm. If the depth is 14 cm, find how much water it can hold?

$V = \frac{1}{3}\pi h(r_1^2 + r_2^2 + r_1 r_2)$

$2\pi r_1 = 44$

$2x \frac{22}{7} x\ r_1 = 44$

$r_1 = 7cm$

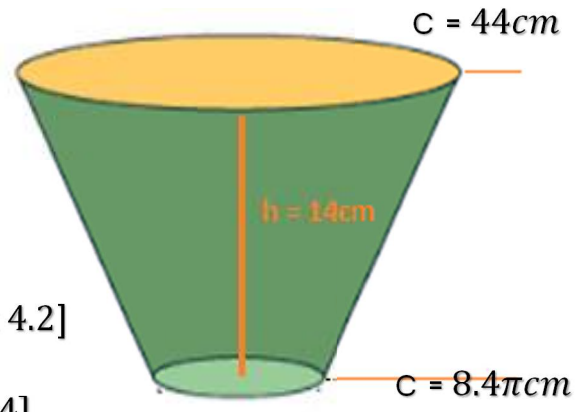
$2\pi r_2 = 8.4\pi$

$r_2 = 4.2cm$

$V = \frac{1}{3} x \frac{22}{7} x\ 14[7^2 + (4.2)^2 + 7\ x\ 4.2]$

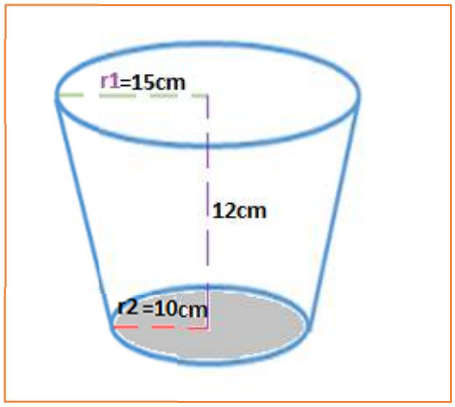
$V = \frac{1}{3} x \frac{22}{7} x\ 14[49 + 17.64 + 29.4]$

$V = \frac{1}{3} x22x\ 2\ x\ 96.04$



V =1408.58cm^3

2. A bucket is in the shape of a frustum with the top and bottom circles of radii15cm and 10cm. Its depth is 12 cm. Find its curved surface area and total surface area. (Express the answer in terms of □□



. Curved surface area $A = \pi(r_1 + r_2)$

$l = \sqrt{h^2 + (r_1 - r_2)^2}$

$l = \sqrt{12^2 + (15 - 10)^2}$

$l = \sqrt{12^2 + 5^2}$

$l = \sqrt{169}$

$l = 13cm$

Curved surface area $A = \frac{22}{7}(15 + 10)13$

$A = \frac{22}{7}$x25x13

$A = 1021.43cm^2$

Total surface area A $= \pi\{(r_{1+}r_2)l + r_1^2 + r_2^2\}$

A $= \frac{22}{7}\{(15 + 10)13 + 15^2 + 10^2\}$

A $= \frac{22}{7}[\,25$ x13 $+ 225 + 100]$

A $= 1021.43 + 325$

A $= 2042.85cm^2$

3. From the top of a cone of base radius 24 cm and height 45 cm, a cone of slant height17cm is cut off. What is the volume of the remaining frustum of the cone?

Hight of the cone H = 45cm

slant height $l = \sqrt{h^2 + r_1^2}$

$l = \sqrt{45^2 + 24^2}$

$l = \sqrt{2025 + 576}$

$l = \sqrt{2061}$

$l = 51cm$

ΔABC ಯಲ್ಲಿ $DE \| BC$

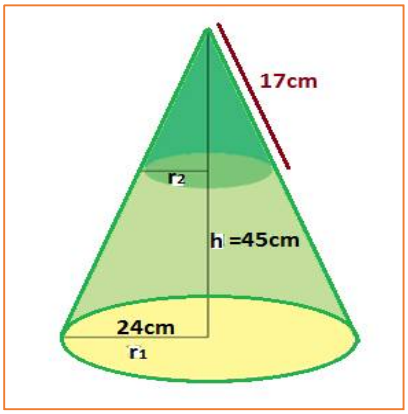
$\Rightarrow \frac{AD}{AB} = \frac{AE}{AC}$

$\Rightarrow \frac{AD}{45} = \frac{17}{51}$

$\Rightarrow AD = \frac{17x45}{51}$

$\Rightarrow AD = 15cm$

$\therefore$ h = 45 -15 = 30cm

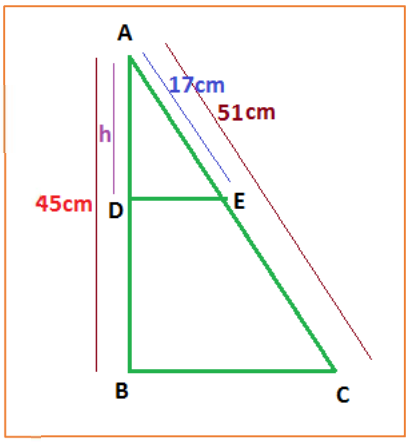


$r_2 = \sqrt{17^2 - 15^2}$

$r_2 = \sqrt{289 - 225}$

$r_2 = \sqrt{64}$

$r_2 = 8cm$



volumeV $= \frac{1}{3} x \frac{22}{7} x\, 30(24^2 + 8^2 + 24x8)$

volumeV $= \frac{1}{3} x \frac{22}{7} x\, 30(576 + 64 + 192)$

volumeV $= \frac{22}{21} x\, 30x832$

volumeV $= 26148.57cm^3$

4. A vessel is in the form of a frustum of a cone. Its radius at one end is 8 cm and the height is 14 cm. If its volume is $\frac{5676}{3}\ cm^3$, find the radius of the other end

volume $= \frac{1}{3} x \frac{22}{7} x\, h(r_1^2 + r_2^2 + r_1 r_2)$

$\frac{5676}{3} = \frac{1}{3} x\, 22\, x\, 14(8^2 + r_2^2 + 8r_2)$

$\frac{5676}{3} = \frac{1}{3} x \frac{22}{7} x\, 14(8^2 + r_2^2 + 8r_2)$

$\frac{5676}{3} = \frac{1}{3} x\, 22\, x\, 2(64 + r_2^2 + 8r_2)$

$5676 = 44(64 + r_2^2 + 8r_2)$

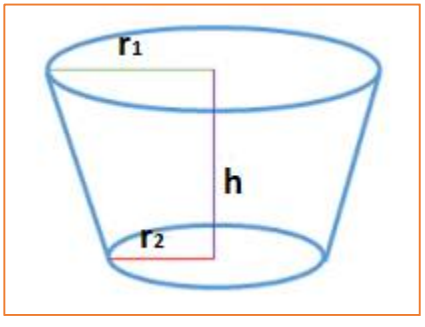
$\frac{5676}{44} = (64 + r_2^2 + 8r_2)$

$129 = 64 + r_2^2 + 8r_2$

$r_2^2 + 8r_2 = 65$

$r_2^2 + 13r_2 - 5r_2 - 65 = 0$

$r_2\,(r_2 + 13) - 5(r_2 + 13) = 0$



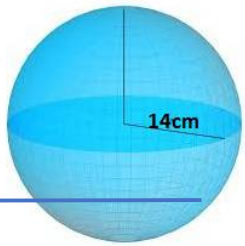
$(r_2 + 13)(r_2 - 5) = 0$

$\Rightarrow r_2 - 5 = 0$

$\Rightarrow r_2 = 5\text{cm}$

EXERCISE 15.4

1. Find the surface area of a sphere of radius 14 cm.



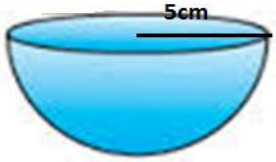
surface area of a sphere = $A = 4\pi r^2$

$A = 4x\ \frac{22}{7}x\ 14^2$

$A = 4x\ 22\ x\ 2\ x\ 14$

$A = 2464cm^2$

2. Find the TSA of a hemisphere of radius 5 cm.



TSA of a hemisphere $A = 3\pi r^2$

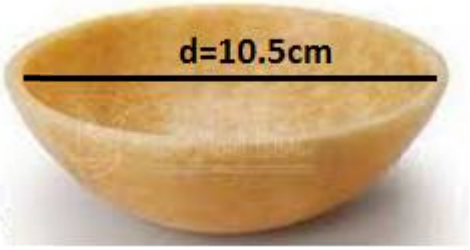
$A = 3x\ \frac{22}{7}x\ 5^2$

$A = 3x\ \frac{22}{7}x\ 25$

$A = 235.71\text{cm}^2$

3. A hemispherical bowl made of wood has inner diameter of 10.5 cm. Find the cost of painting it on the inside at the rate of 12 per 100 sq. cm?

To find the cost of painting inside the bowl, we have to calculate the curved surface area.



the curved surface area $A = 2\pi r^2$

$A = 2x\ \frac{22}{7}x\ 5.25^2$

$A = 2x\ \frac{22}{7}x\ 27.5625$

$A = 173.25cm^2$

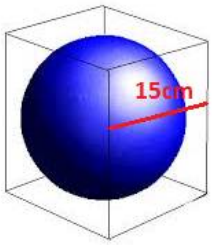
The cost of painting it on the inside at the rate of 12 per 100sq.cm

$= \frac{173.25\ x\ 12}{100}$

$= \frac{173.25\ x\ 12}{100}$

= Rs 20.79

4. Calculate the surface area of the largest sphere that can be cut out of a cube of side15 cm.



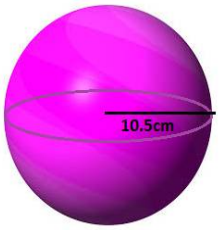
$A = 4\pi r^2$

$A = 4x\ \frac{22}{7}x7.5^2$ [$\because$ r $= \frac{d}{2} = \frac{Side}{2} = 7.5$]

$A = 4x\ \frac{22}{7}x56.25$

$A = 707.14cm^2$

5. Find the volume of a sphere whose radius is 10.5 cm.



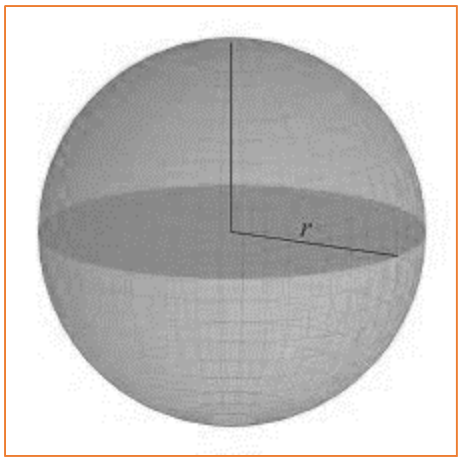
$V = \frac{4}{3}\pi r^3$

$V = \frac{4}{3}x\ \frac{22}{7}x\ 10.5^3$

$V = \frac{4}{3}x\ \frac{22}{7}x\ 1157.625$

$V = 4851cm^3$

6. Find the volume of a sphere whose surface area is 154 cm^2.



$A = 4\pi r^2$

$154 = 4x\ \frac{22}{7}x\ r^2$

$r^2 = \frac{7x154}{88}$

$r^2 = 12.25$

$r = 3.5cm$

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

$V = \frac{4}{3}x\ \frac{22}{7}x\ 3.5^3$

$V = \frac{4}{3}x\ \frac{22}{7}x\ 48.875$

$V = 179.66cm^3$

7. The volume of a solid hemisphere is $1152\pi cm^3$. Find its curved surface area.

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

$\frac{2}{3} \text{x } \pi \text{x } r^3 = 1152\pi$

$\frac{2}{3} r^3 = 1152$

$r^3 = \frac{1152 \text{x} 3}{2}$

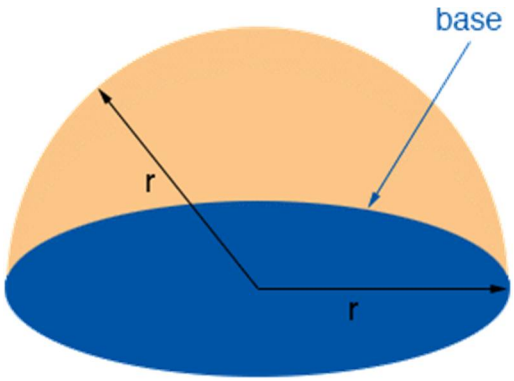
$r^3 = 1728$

$r = 12cm$

$A = 2\pi r^2$

$A = 2 \text{ x } \frac{22}{7} \text{x } 12^2$

$A = 905.14cm^2$



8. A capsule of medicine is in the shape of a sphere of diameter 3.5 mm. How much medicine is needed to fill this capsule?

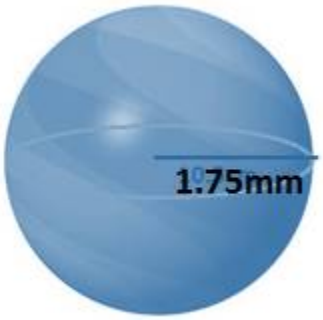
$V = \frac{4}{3}\pi r^3$

$V = \frac{4}{3} \text{x } \frac{22}{7} \text{x } 1.75^3$

$V = \frac{4}{3} \text{x } \frac{22}{7} \text{x } 5.35$

$V = \frac{4}{3} \text{x } \frac{22}{7} \text{x } 5.359$

$V = 22.45cm^3$



9. A right circular metallic cone of height 20 cm and base radius 5 cm is melted and recast into a sphere. Find the radius of the sphere.

Volume of Sphere = Volume of Cone

$\frac{4}{3}\pi r^3 = \frac{1}{3}\pi r^2 h$

$4r = h$

$4r = 20$

$r = \frac{20}{4}$

$r = 5cm$

10. The diameter of a metallic sphere is 18 cm. It is melted and drawn into a wire having diameter of cross section 0.4 cm. Find the length of the wire.

$\frac{4}{3}\pi r^3 = \pi r^2 h$

$\frac{4}{3} \times 9^3 = (0.2)^2 h$

$\frac{4}{3} \times 729 = 0.04h$

$0.16h = 972$

$h = \frac{972}{0.04}$ = 24300cm

h =243m

EXERCISE 15.5

1. A petrol tank is in the shape of a cylinder with hemispheres of same radius attached to both ends. If the total length of the tank is 6m and the radius is 1m, what is the capacity of the tank in litres?

Volume of Tank =

2x Volume of hemisphere +Volume of cylinder

$V = \frac{4}{3}\pi r^3 + \pi r^2 h$

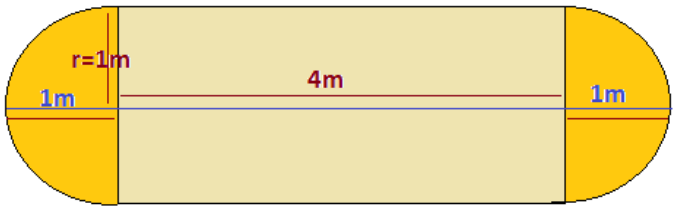
$= \pi[\frac{4}{3} \times 1^3 + 1^2 \times 4]$

$= \pi[\frac{4}{3} + 4]$

$= \frac{22}{7} \times \frac{16}{3}$

$= 16.7619m^3$

$= 16761.9l$



2. A rocket is in the shape of a cylinder with a cone attached to one end and a hemisphere attached to the other. All of them are of the same radius of 1.5m. The total length of the rocket is

7m and height of the cone is 2m. Calculate the volume of the rocket.

Volume of Rocket =

Volume of hemisphere + Volume of Cone + Volume of cylinder

$V= \frac{2}{3}\pi r^3 + \frac{1}{3}\pi r^2 H + \pi r^2 h$

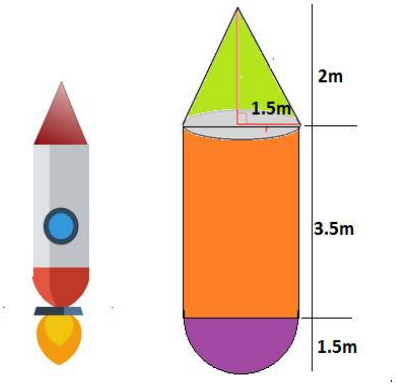
$V= \pi r^2[\frac{2}{3}r + \frac{1}{3}h + h]$

$V= \frac{22}{7}$ x $(1.5)^2[\frac{2}{3}$x1.5 + $\frac{1}{3}$x2 + 3.5]

$V= \frac{22}{7}$ x 2.25[1 + 0.6666 + 3.5]

$V= \frac{22}{7}$ x 2.25[5.1666]

$V= 36.56m^3$



3. A cup is in the form of a hemisphere surmounted by a cylinder. The height of the cylindrical portion is 8 cm and the total height of the cup is 11.5cm. Find the TSA of the cup.

the TSA of the cup

= CSA of Cylinder + CSA of hemisphere

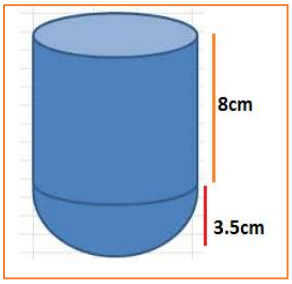
A = $2\pi rh + 2\pi r^2$

A = $2\pi r[h + r]$

A = 2x$\frac{22}{7}$ x 3.5[8 + 3.5]

A = 2x$\frac{22}{7}$ x 3.5x11.5

A = $253cm^2$



4. A storage tank consists of a circular cylinder with a hemisphere adjoined on either ends. The external diameter of the cylinder is 1.4m and length is 8m, find the cost of painting it on the outside at the rate of 10 per m^2.?

CSA of tank

= 2x CSA of hemisphere + CSA of cylinder

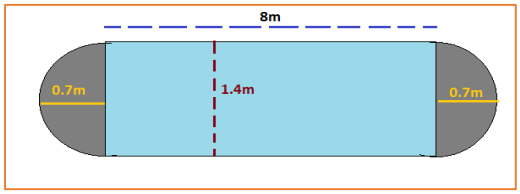
=2x$2\pi r^2 + 2\pi rh$

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

$=2x\frac{22}{7}$ x 0.7[2x0.7 + 8]

$=2x\frac{22}{7}$ x 1.4x8.7Tank

$=41.36m^2$



the cost of painting it on the outside at the rate of 10 per m^2

$=41.36m^2$x 10

=Rs413.6

5. A wooden toy is in the form of a cone surmounted on a hemisphere. The diameter of the base of the cone is 16 cm and its height is 15 cm. Find the cost of painting the toy at 7 per 100 cm^2?

CSA of Toy

= CSA of hemisphere + CSA of cone

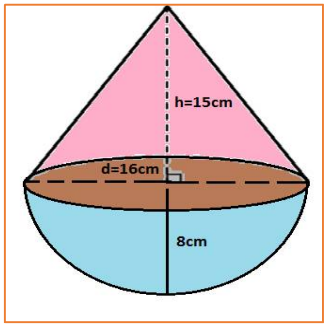
$= 2\pi r^2 + \pi rl$

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

$= \frac{22}{7}$ x 8[16 + 17] $[\, l = \sqrt{h^2 + r^2}]$

$= \frac{22}{7}$ x 8x33 $[\, l = \sqrt{15^2 + 8^2} = \sqrt{289}]$

$= 829.71cm^2$ [l = 17cm]



the cost of painting the toy at 7 per 100 cm^2

$= \frac{829.71}{100} cm^2$x 7

= Rs 58.08

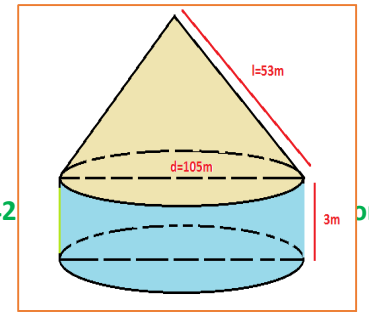
6. A circus tent is cylindrical upto a height of 3m and concial above it. If the diameter of the base is 105 m and the slant height of the conical part is 53m, find the total cost of canvas used to make the tent if the cost of the canvas per sqm is 10?

Canvas needed to make circus tent

= CSA of Cylinder shape + CSA of Conical shape

$= 2\pi rh + \pi rl$

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



$= \frac{22}{7}$ x 52.5[2x3 + 53]

$= \frac{22}{7}$ x 52.5[6 + 53]

$= \frac{22}{7}$ x 52.5[59]

$= 9735m^2$

The total cost of canvas used to make the tent if

the cost of the canvas per sqm is 10

$= 9735m^2$ x 10

= 97,350 ರೂ

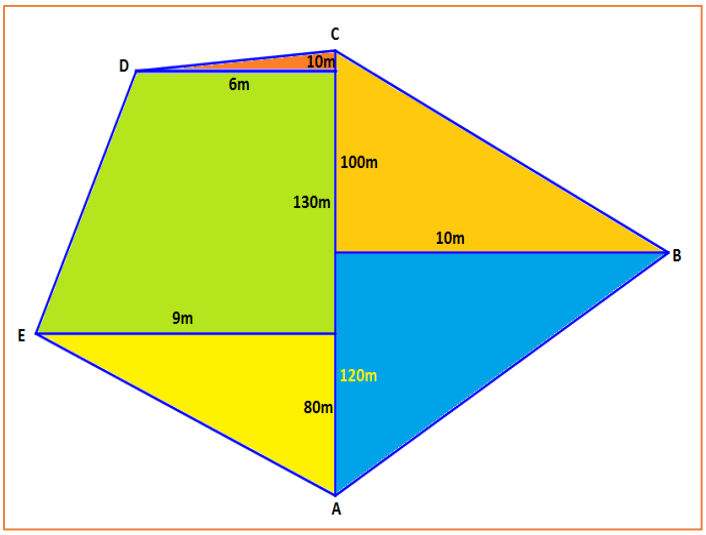
EXERCISE 15.6

1. Draw a plan and calculate the area of a level ground using the information given below.

	To C (in mtrs)	
To D120 To E 180	220 210 120 80	To B 200
	From A	

Scale 1cm = 20 m ⇒ 1m = $\frac{1}{20}$cm

1. 80m = 80x$\frac{1}{20}$ = 4cm
2. 120m = 120x$\frac{1}{20}$ = 6cm
3. 180m = 180x$\frac{1}{20}$ = 9cm
4. 200m = 200x$\frac{1}{20}$ = 10m
5. 210m = 210x$\frac{1}{20}$ = 10.5cm
6. 220m = 220x$\frac{1}{20}$ = 11cm

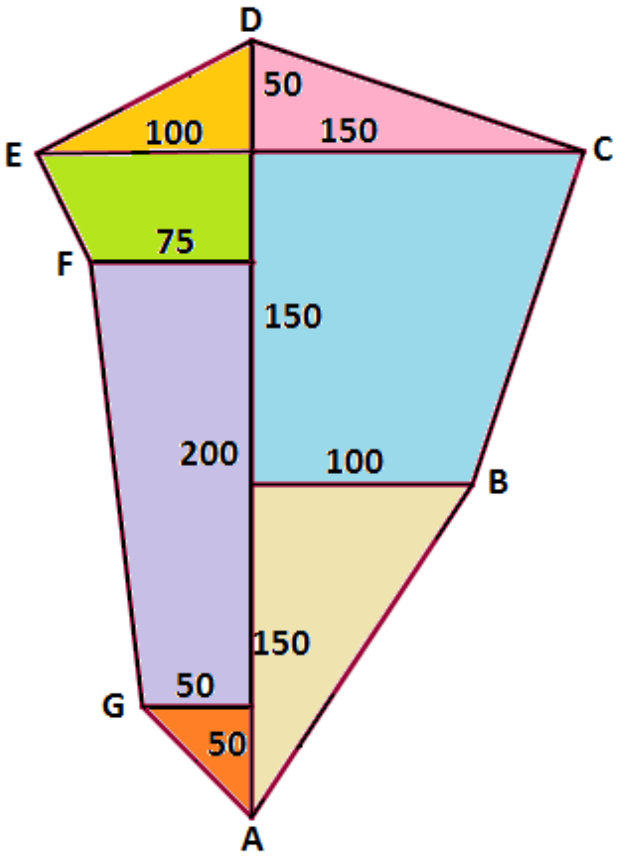


2. Plan out and find the area of the field from the data given from the Surveyor's field book.

	To C (In mtrs)	
To D 100 To C 75 To E 50	350 300 250 150 50	To F150 To G 100
	From A	

Scale1cm = 50 m $\Rightarrow$ 1m = $\frac{1}{50}$cm

1. 50m = 50x$\frac{1}{50}$ = 1cm
2. 75m = 75x$\frac{1}{50}$ = 1.5cm
3. 100m = 100x$\frac{1}{50}$ = 2cm
4. 150m = 150x$\frac{1}{50}$ = 3m
5. 250m = 250x$\frac{1}{50}$ = 5cm
6. 300m = 300x$\frac{1}{50}$ = 6cm
7. 350m = 350x$\frac{1}{50}$ = 7cm



3. Sketch a rough plan and calculate the area of the field ABCDEFG from the following data

.

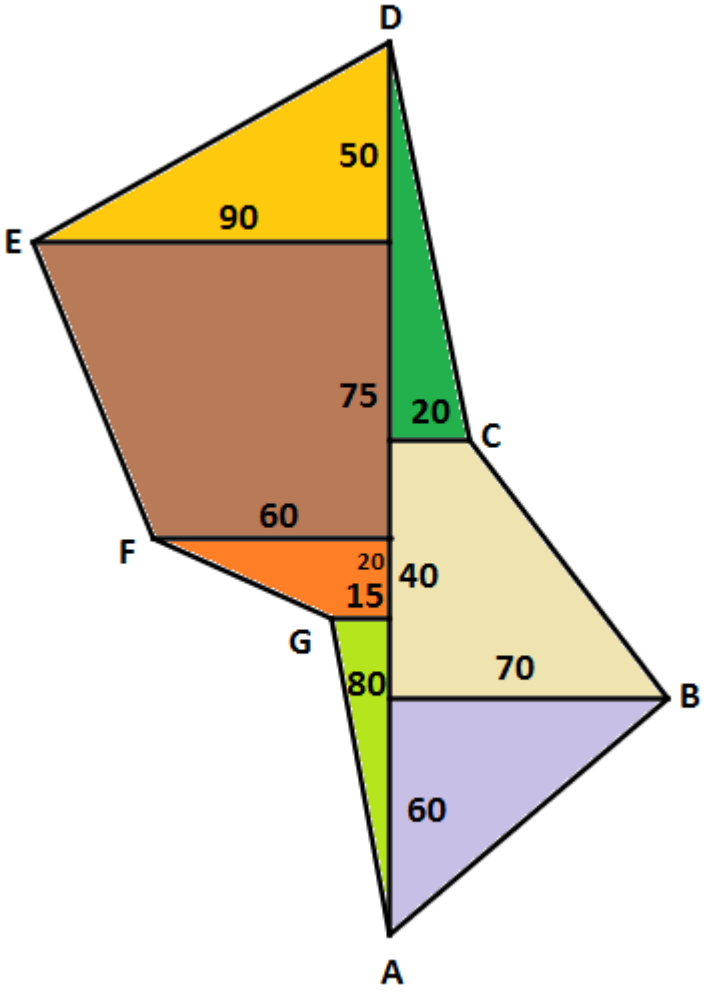
	To D(In mtrs)	
To E 90	225 175	
	125	To C 20
To F 60	100	
To G 15	80	
	60	To B 70
	From A	

Scale 1cm = 20 m ⇒ 1m = $\frac{1}{20}$cm

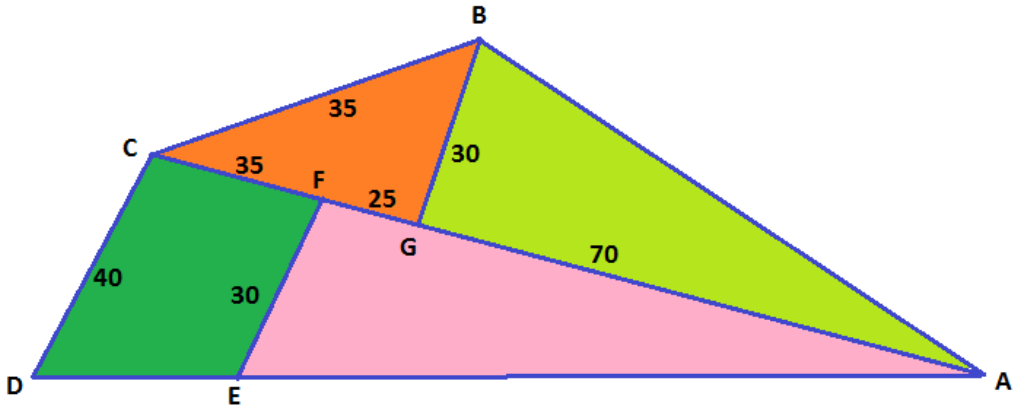
1. 15m = 15x$\frac{1}{20}$ = 0.75cm

2. 20m = 20x$\frac{1}{20}$ = 1cm

3. 60m = $60 \times \frac{1}{20}$ = 3cm
4. 70m = $70 \times \frac{1}{20}$ = 3.5cm
5. 80m = $80 \times \frac{1}{20}$ = 4m
6. 90m = $90 \times \frac{1}{20}$ = 4.5cm
7. 100m = $100 \times \frac{1}{20}$ = 5cm
8. 125m = $125 \times \frac{1}{20}$ = 6.25cm
9. 175m = $175 \times \frac{1}{20}$ = 8.75cm
10. 225m = $225 \times \frac{1}{20}$ = 11.25cm



4. Calculate the area of the field shown in the diagram below:
[Measurements are in metre]



1. Area of the Field =The area of the ΔABG + The area of the ΔBGC + The area of the trapezium CDEF+The area of the ΔAEF

1. The area of the ΔABG = $\frac{1}{2}$x 70x30 [∵The area of Δ= $\frac{1}{2}$bh]
   The area of the ΔABG =1050 sq.units
2. The area of the ΔBGC = $\frac{1}{2}$x 60x30
   The area of the ΔBGC = 900 sq.units
3. The area of the trapezium CDEF = $\frac{1}{2}$x 35[40+30][∵area of the trapezium = $\frac{1}{2}$H(a+b)]
   $Area$ = 1225 sq.units
4. The area of the ΔAEF =$\frac{1}{2}$x 95x30
   The area of the ΔAEF =1425 sq.units

∴ Area of the Field =1050 + 900 + 1225 + 1425 sq.units
∴ **Area of the field =4600 sq.units**