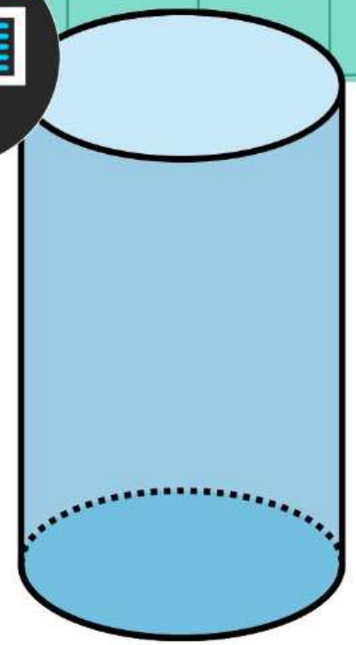
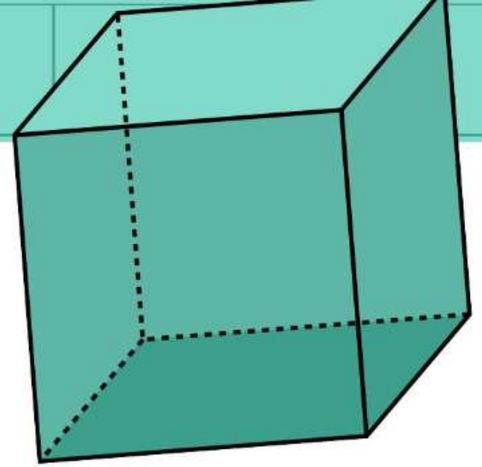
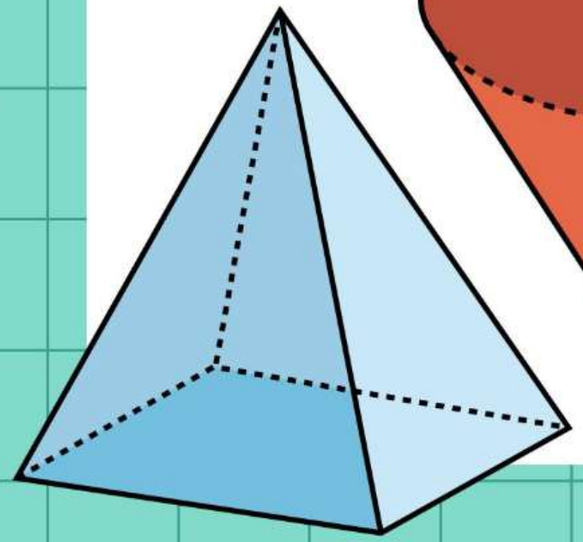
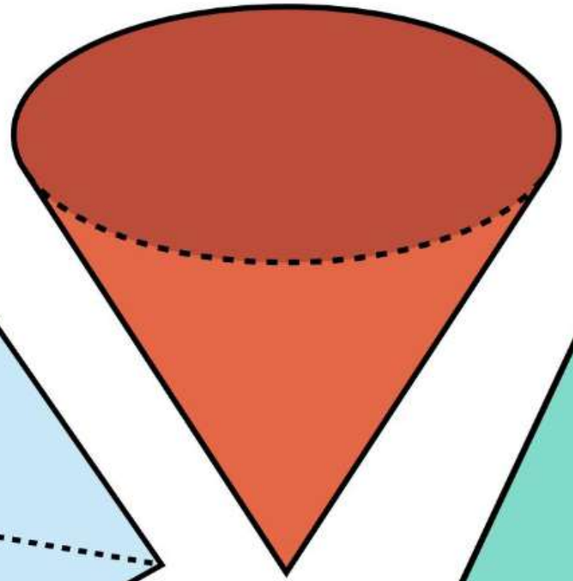
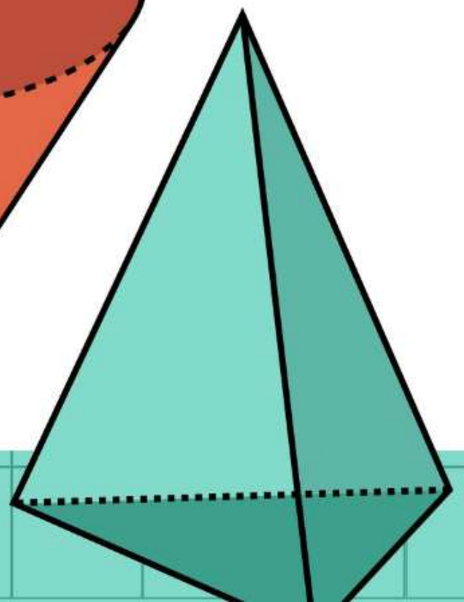
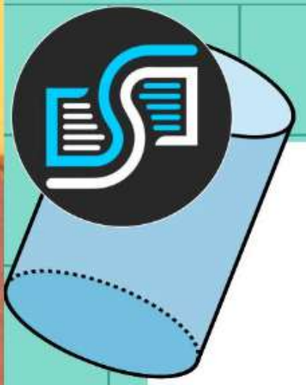



MENSURATION

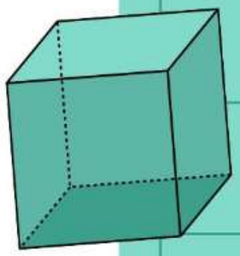
3D

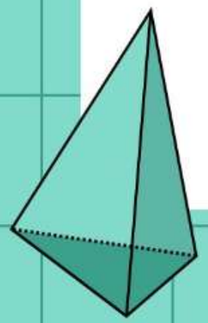
क्षेत्रमिति - 3D

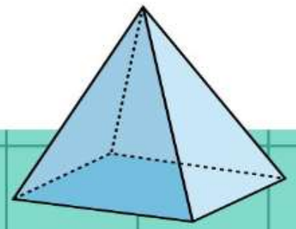




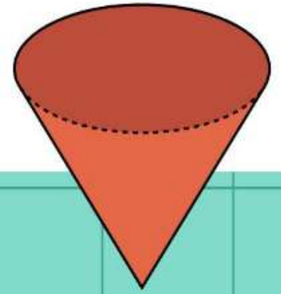


- ✓ Cube (घन)
- ✓ Cuboid (घनाभ)
- ✓ Solid cylinder (बेलन) / Hollow cylinder (खोखला बेलन)
- ✓ Sphere (ठोस गोला) / Hollow sphere (खोखला गोला) / Hemi-sphere (अर्धगोला)
- ✓ Cone (शंकु) / Cutting of cone / Frustum (छिन्नक)
- ✓ Prism (प्रिज्म)
- ✓ Pyramid (पिरामिड)









2D

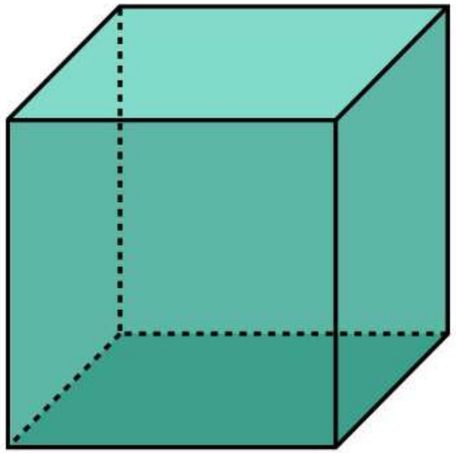
(रोटी)

3D

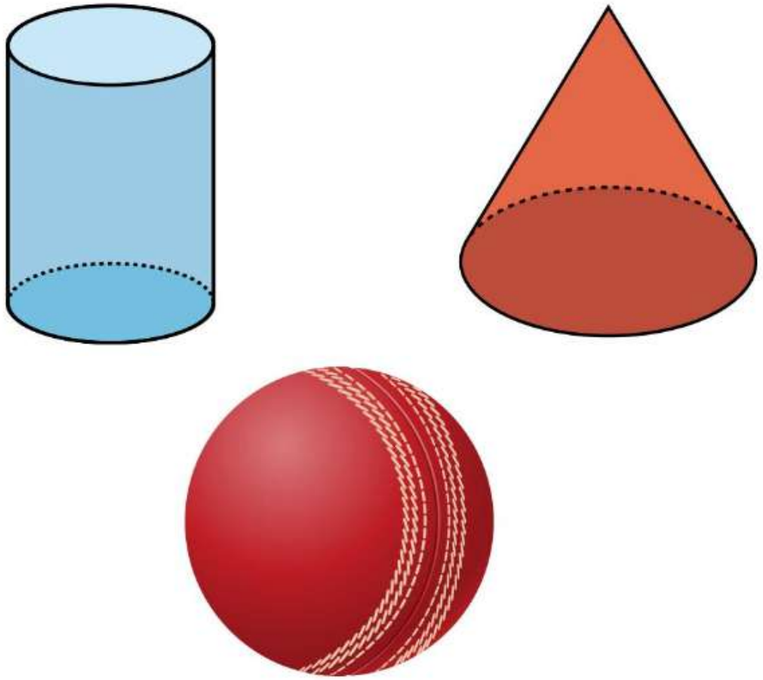
(Cricket Ball)

Surface area (सतह का क्षेत्रफल):

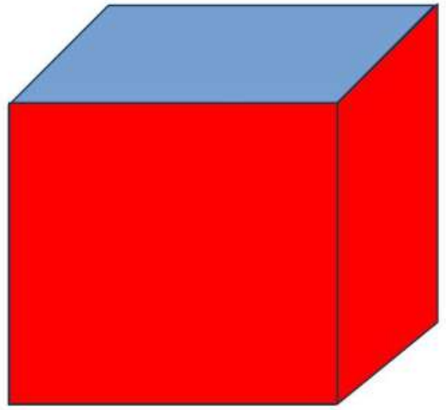
Flat (समतल)



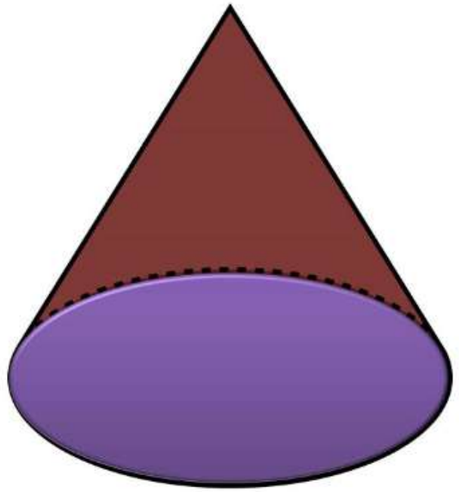
Curve (वक्र)

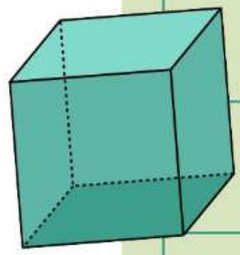


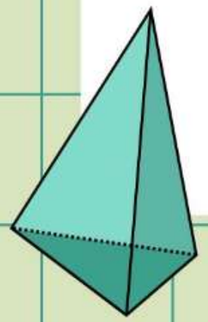
Lateral surface area:
पार्श्व पृष्ठीय क्षेत्रफल

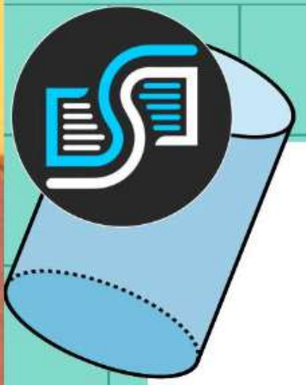


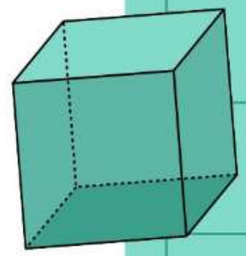
Curve surface area:
वक्र पृष्ठीय क्षेत्रफल





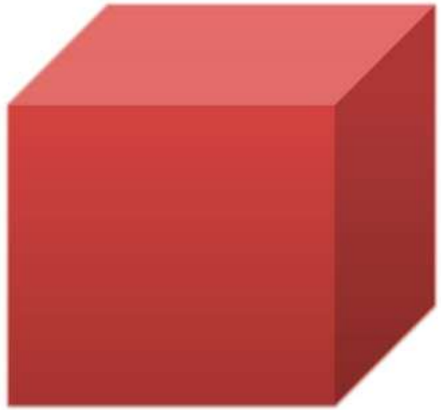


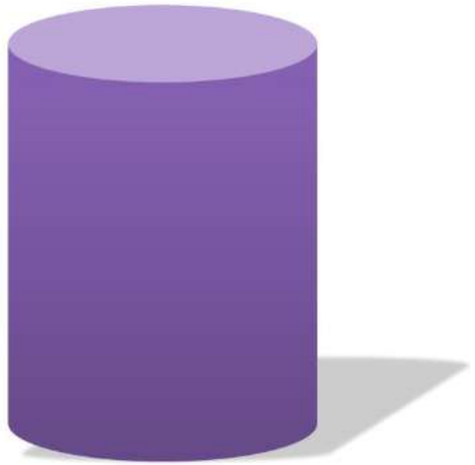


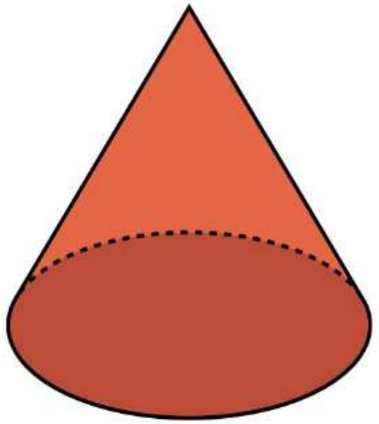


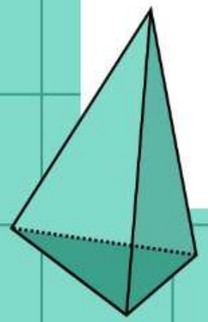
Total surface area ⇒
सम्पूर्ण पृष्ठीय क्षेत्रफल

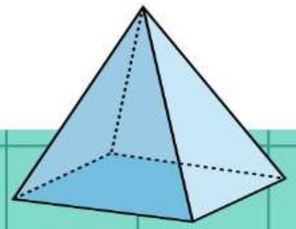
Sum of area of all surfaces

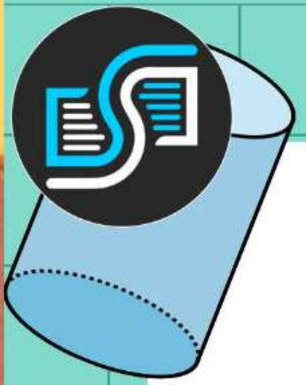






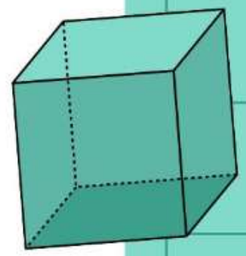


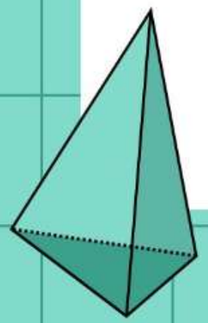


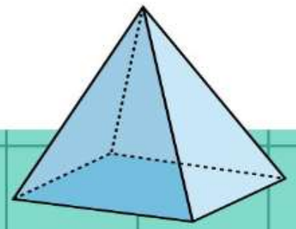


Volume = Solid के अंदर जितनी जगह होती है

आयतन







in any 3D figure

- ✓ **length** → m / cm / km × K
- ✓ **surface area** → m^2 / cm^2 / km^2 × K^2
- ✓ **volume** → m^3 / cm^3 / km^3 × K^3

आयतन (Capacity)

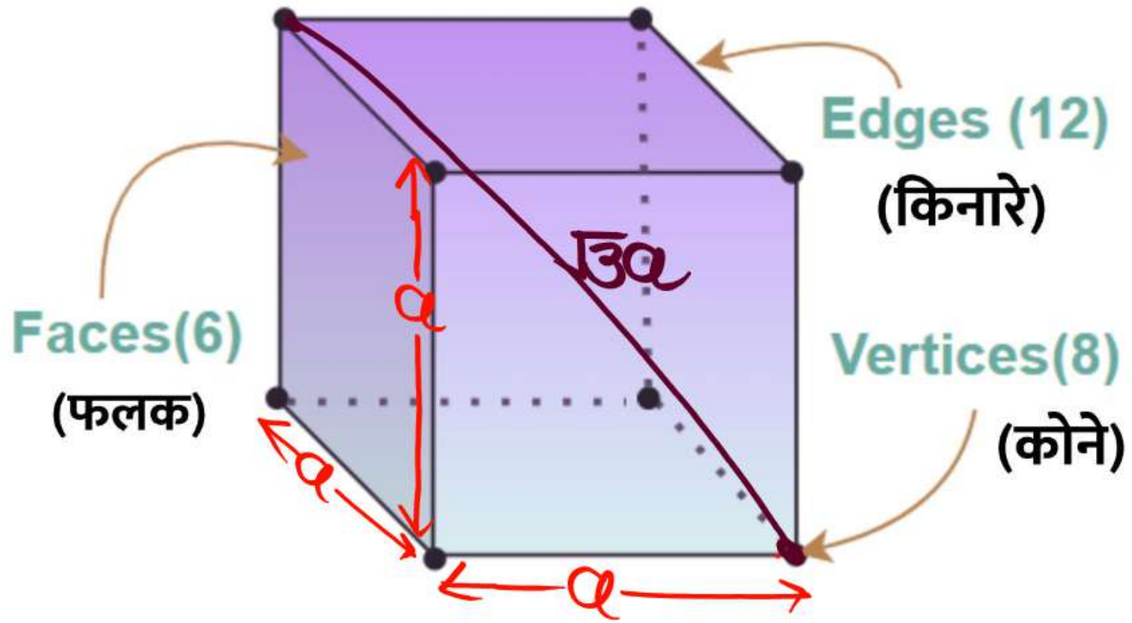
धारिता

For Any 3D figure

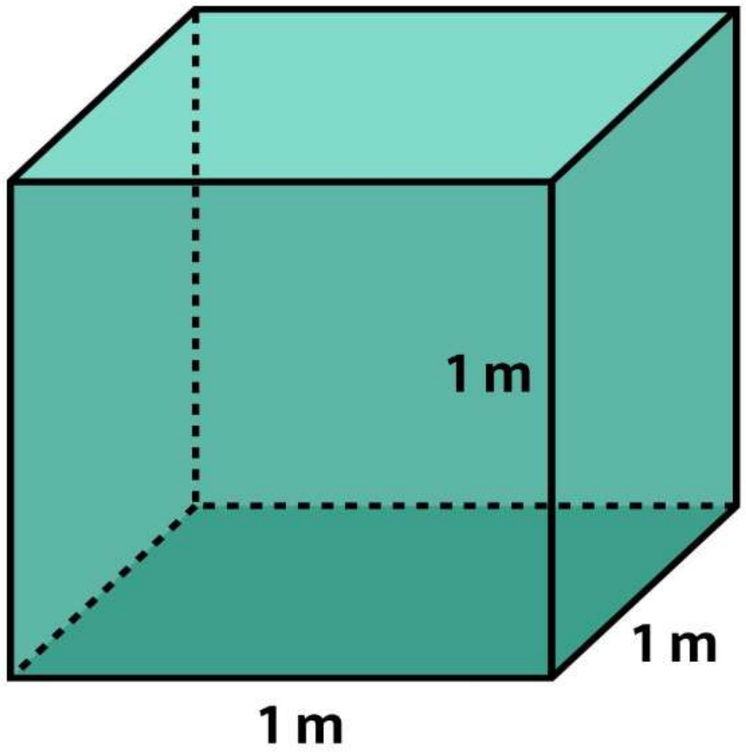
Dimension	T.S.A	Volume
Cm	Cm^2	Cm^3
$\times 2$	$\times 2^2$	$\times 2^3$
$\times 3$	$\times 9$	$\times 27$

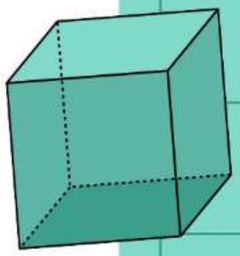
Cube (घन)

- Each face is a square. (वर्ग)



- Total surface area = $6a^2$ (TSA)
- Lateral surface area = $4a^2$ (LSA)
- Cube का विकर्ण = $\sqrt{3}a$ (Diagonal)
- Volume / आयतन = a^3





$$V = 1\ m \times 1\ m \times 1\ m = 1m^3$$

$$1\ m^3 = 1000\ \text{litre}$$

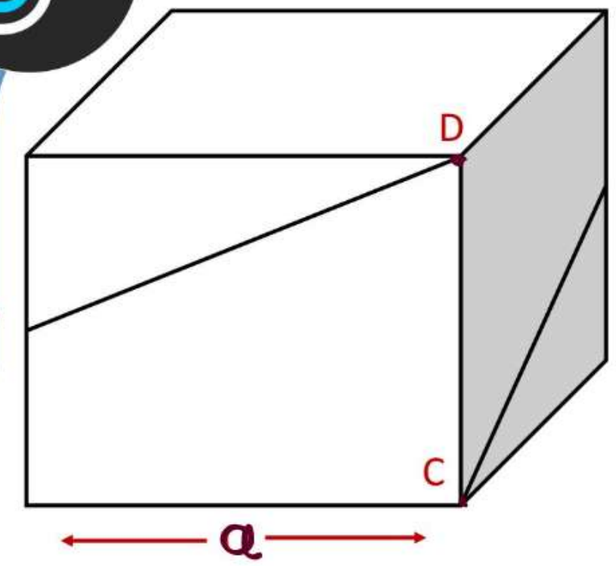
$$1\ L = \frac{1}{1000}\ m^3 = 10^{-3} m^3$$

$$1\ L = 10^{-3}\ m^3 \Rightarrow 1000\ cm^3$$

$$1\ m = 100\ cm = 10^2\ cm$$

पिघलाने पर volume same रहेगा.

QUESTION:- 1



A string when wound on the exterior four walls of a cube of side a cm starting at point C. and ending at point D. Find the length of string in cm.

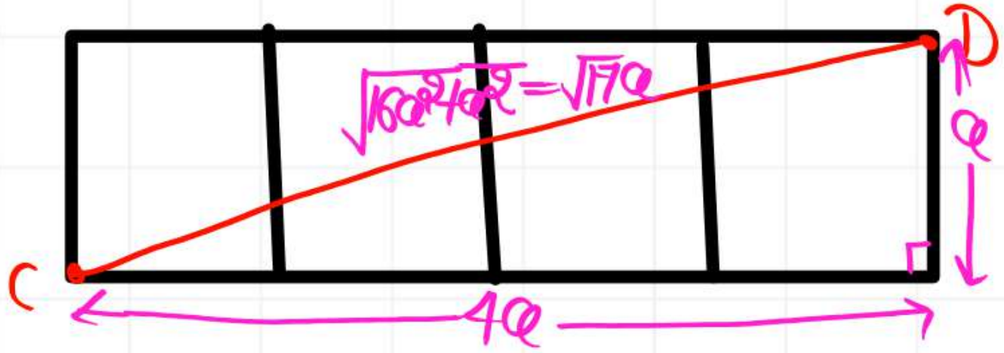
एक डोरी को a cm भुजा वाले एक क्यूब की बाहरी चार दीवारों पर पॉइंट C से शुरू करके पॉइंट D पर खत्म करते हुए लपेटा जाता है। डोरी की लंबाई cm में ज्ञात कीजिए।

(a) $\sqrt{19}a$

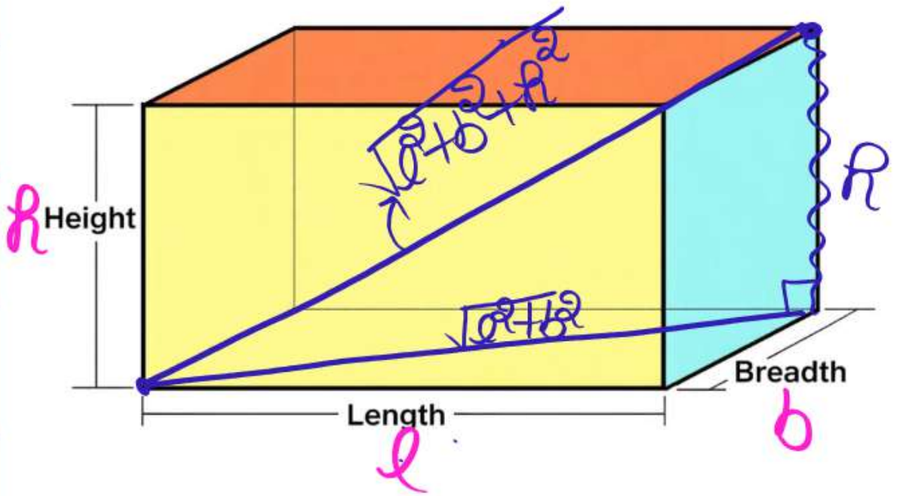
(b) $\sqrt{26}a$

(c) $\sqrt{17}a$

(d) $\sqrt{13}a$



Cuboid (घनाभ):



Each face of cuboid is a rectangle.

Diagonal 'd' = $\sqrt{l^2 + b^2 + h^2}$

Volume = Area of base × height

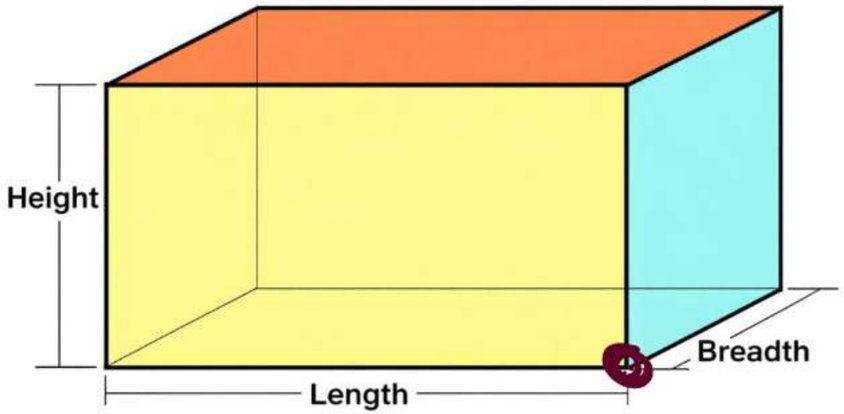
$$V = l \times b \times h$$

Adjacent faces (संयुग्मी फलक) → lb, bh, hl

T.S.A = $2(lb + bh + hl)$

(L.S.A) पार्श्वीय पृष्ठीय का क्षेत्रफल या चारो दीवारों का क्षेत्रफल

$= 2(l + b) \cdot h$



If, area of three adjacent faces of a cuboid are **x, y, z** respectively

तो ,

V (आयतन) = $\sqrt{xyz}$

x = lb ✗

y = bh ✗

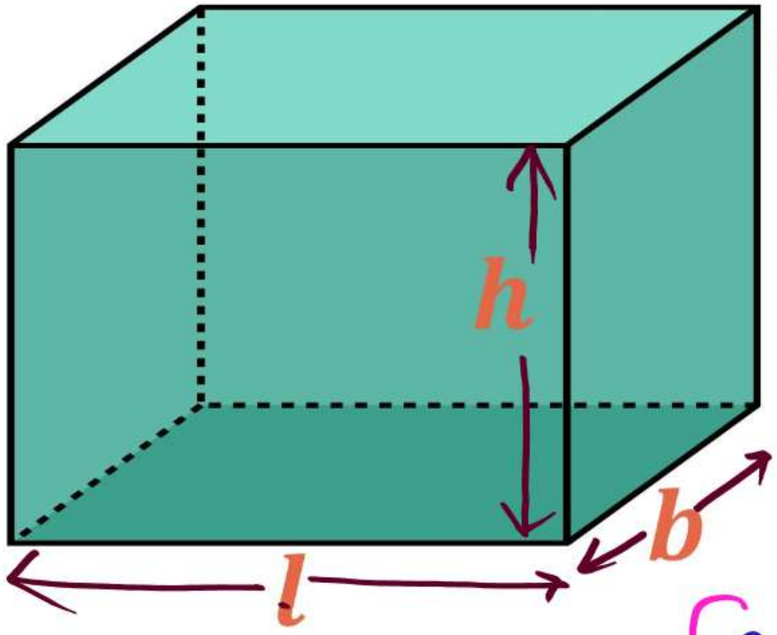
z = hl

$$xyz = l^2b^2h^2$$

$$\sqrt{xyz} = lbh$$

↓

V



Dimensions $\rightarrow l, b, h$

$$(l + b + h)^2 = l^2 + b^2 + h^2 + 2(lb + bh + hl)$$

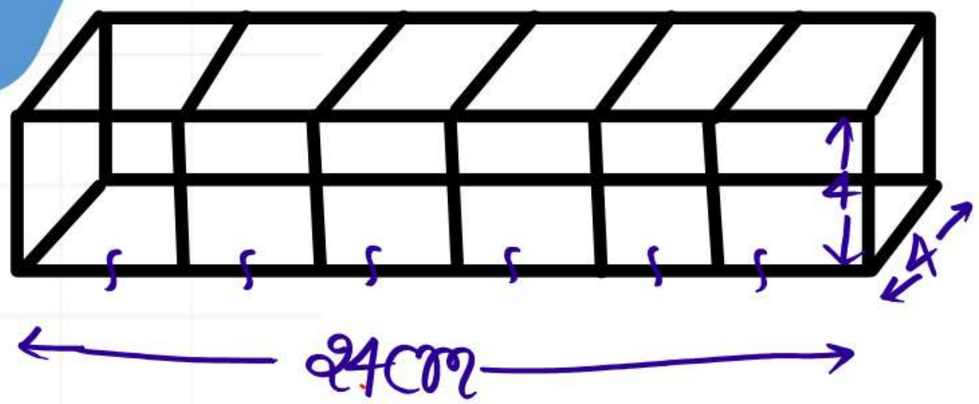
$$(\text{dimensions का } Sum)^2 = (\text{diagonal})^2 + \text{T.S.A}$$

{ l+b+h ✓
T.S.A ✓
diagonal ✓ }

QUESTION:- 2

6 cubes, each of edge 4 cm, are joined end to end. What is the total surface area of the resulting cuboid?

6 घन जिसके, प्रत्येक किनारे 4 सेमी, अंत से अंत तक जोड़े जाते हैं। परिणामी घनाभ का कुल क्षेत्रफल क्या है?



(a) 416cm²

(b) 496cm²

(c) 576cm²

(d) 208cm²

$T.S.A = 2(96+16+96)$

$= 2 \times 208$

$= 416 cm^2$

QUESTION:- 3

A cuboid of dimensions 50 cm, 150 cm, 175 cm can be divided into how many identical largest cubes?

50 cm, 150 cm, 175 cm विमाओं वाले एक घनाभ को एक जैसे कितने विशालतम घनों में विभाजित किया जा सकता है?

(a) 75
(b) 84
(c) 85
(d) 90

$2 \times 6 \times 7$

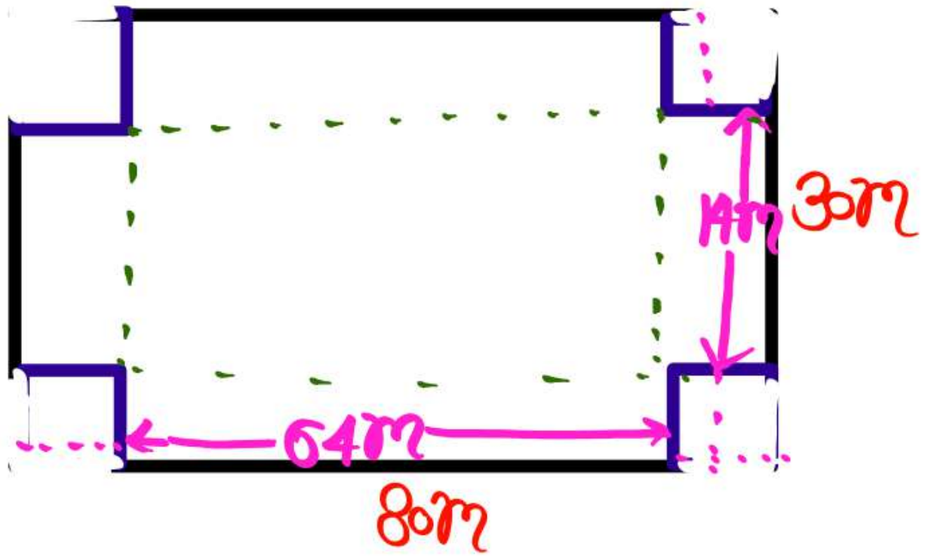
$\frac{50 \times 150 \times 175}{25 \times 25 \times 25}$

Cube of side $= HCF(50, 150, 175) = 25cm$

Ex.–

A rectangular sheet of metal 80 m × 30 m. Equal squares of 8 m are removed from all four corners and the remaining sheet is folded to form an open rectangular box. find the volume of box ?

धातु की आयताकार शीट 80 m × 30 m है। सभी चार कोनों से 8 m के समान वर्ग काट लिए जाते हैं और शेष शीट को एक खुले आयताकार बॉक्स बनाने के लिए मोड़ दिया जाता है।आयतन ज्ञात कीजिए ?



- Length = 80 m – (2 × 8) m = 64 m
- Breadth = 30 m – (2 × 8) m = 14 m
- Height = 8 m

Volume of Box

= L × B × H

= 64 × 14 × 8

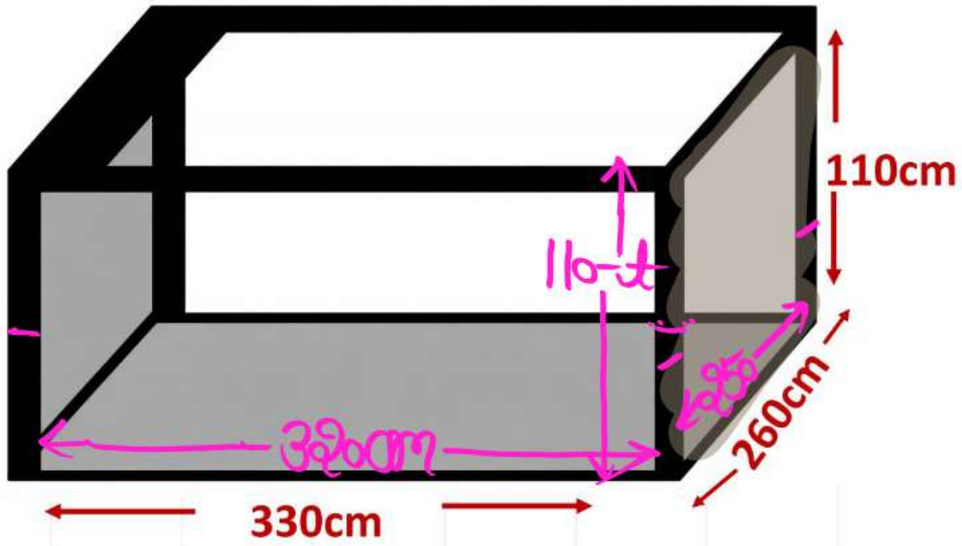
= 7168 m^3

QUESTION:- 4

$8360 \times 1000 = 320 \times 260 \times (110 - t)$

$104.5 = 110 - t$

$t = 5.5\text{cm}$



An open water tank has 8360 litres of capacity. It is made up of a material and the thickness of material for all four walls is5 cm. Find the thickness of material in the bottom of that tank. The dimension of water tank is 3.3m × 2.6m × 1.1m.

एक खुला पानी के टैंक की क्षमता 8360ltr है, यह ऐसे धातु से बना है जिसकी चारो दीवारों की मोटाई 5 cm है, तब इस टैंक के फर्श की मोटाई क्या होगी, यदि टैंक की माप 3.3m x 2.6m x 1.1m.है।

$1\text{ltr} = 1000\text{cm}^3$

(a) 4.5 cm

(b) 5.5cm

(c) 6.5 cm

(d) 7.5 cm

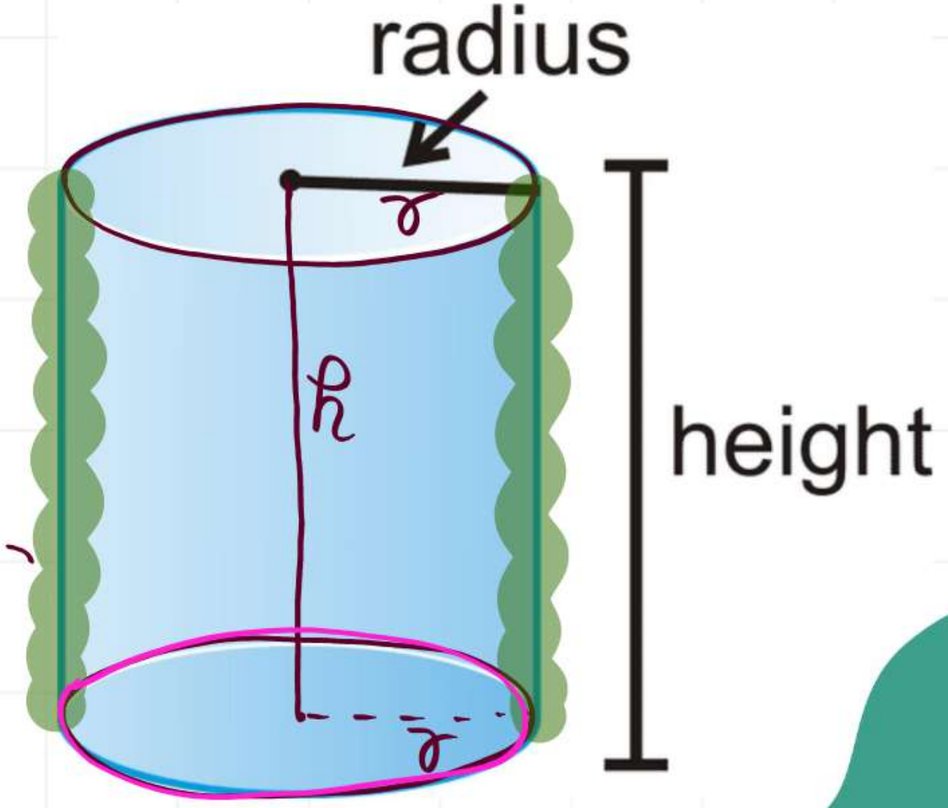
Right circular cylinder (लम्ब वृत्तीय बेलन)

C.S.A / वक्र पृष्ठ का क्षेत्रफल = $2\pi rh$

T.S.A/ सम्पूर्ण पृष्ठ का क्षेत्रफल =
CSA + Area of 2 circular bases

$$T.S.A = 2\pi rh + 2\pi r^2$$

$$T.S.A = 2\pi r(h + r)$$



$$\frac{\text{C.S.A}}{\text{T.S.A}} = \frac{2\pi rh}{2\pi r(h+r)}$$

$$\boxed{\frac{\text{C.S.A}}{\text{T.S.A}} = \frac{h}{h+r}}$$

केलन का

आयतन

Volume = area of base × height

$$\boxed{V = \pi r^2 h}$$

$$V = \frac{1}{2} \cdot 2\pi rh \times r$$

V.V.V imp

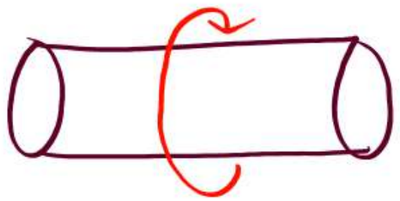
$$\boxed{V = \frac{1}{2} \times \text{C.S.A} \times r}$$

QUESTION:- 5

A field roller, in the shape of a cylinder, has a diameter of 1 m and length of $1\frac{1}{4}$m. if the speed at which the roller rolls is 14 revolutions per minute, then the maximum area (in m^2) that it can roll in 1 hour is:

$2 \times \frac{22}{7} \times \frac{1}{2} \times \frac{5}{4} \times 14 \times 60 m^2$

$= 3300 m^2$



एक सिलिंडर के आकार के फील्ड रोलर का डायमीटर 1 और लंबाई $1\frac{1}{4}$m है। अगर रोलर के घूमने की स्पीड 14 चक्कर प्रति मिनट है, तो 1 घंटे में यह ज़्यादा से ज़्यादा कितना एरिया (m^2 में) रोल कर सकता है:

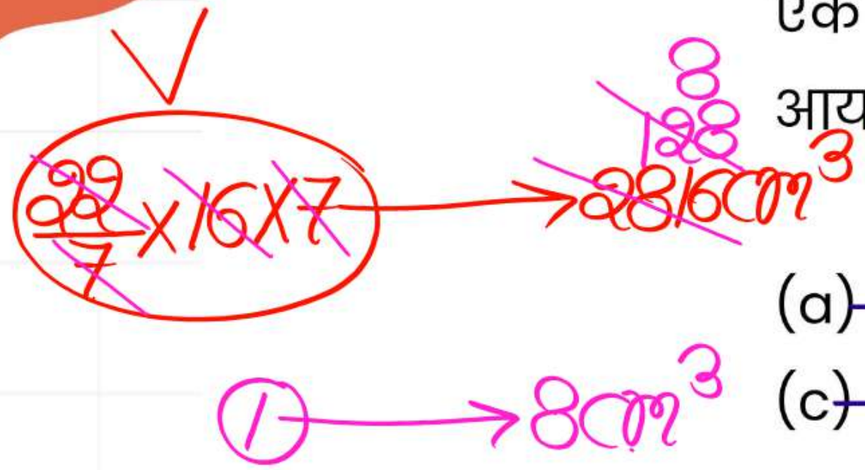
$r = \frac{1}{2}, l = \frac{5}{4}$

(a) 3560
(b) 3300
(c) 3600
(d) 3960

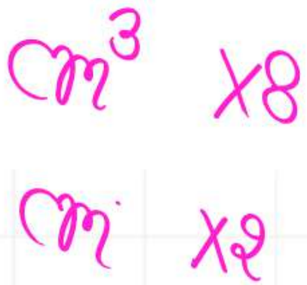
QUESTION:- 9

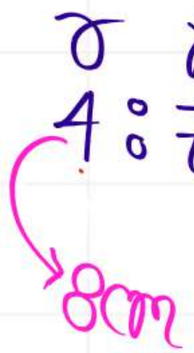
The radius and height of a cylinder are in the ratio 4:7 and its volume is 2816 cm3. Find its radius. (Take π = 22/7)

एक सिलेंडर की त्रिज्या और ऊँचाई का अनुपात 4:7 है और उसका आयतन 2816 cm^3 है। उसकी त्रिज्या ज्ञात कीजिए। (π = 22/7 लें)

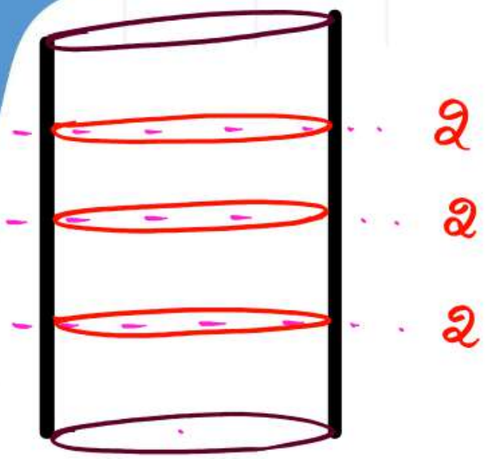


(a) ~~7cm~~
(b) ~~6cm~~
(c) ~~5cm~~
(d) 8cm





QUESTION:- 6



A right circular cylinder of radius 9 cm and height 16 cm, is cut into four equal parts by 3 cuts parallel to base. What is % increase in total surface area?

एक 9 cm त्रिज्या और 16 cm ऊँचाई वाले लंब वृत्तीय बेलन को आधार के समानांतर 3 कट लगाकर चार बराबर भागों में काटा जाता है। कुल पृष्ठीय क्षेत्रफल में कितने प्रतिशत की वृद्धि होगी?

(a) 72%
(b) 108%
(c) 144%
(d) 96%

बढ़ जायेगा → $+6\pi r^2$

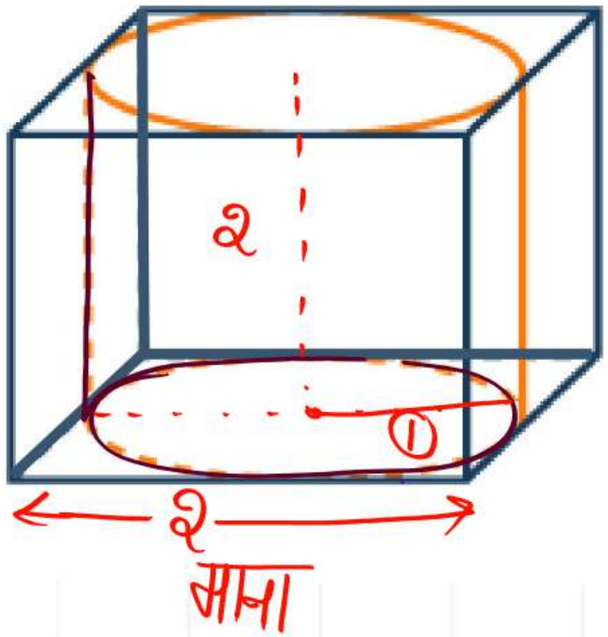
T.S.A → $2\pi r(R+r)$

$= \frac{+3r}{R+r} = \frac{+27}{25} \times 100\%$

QUESTION:- 7

A cylinder of maximum volume is cut out of a solid wooden cube? How many solid is wasted in this process (in %)?

एक ठोस लकड़ी के क्यूब में से ज़्यादा से ज़्यादा वॉल्यूम वाला एक सिलेंडर काटा जाता है? इस प्रोसेस में कितना ठोस हिस्सा बर्बाद होता है (प्रतिशत में)?



waste → $\left(1-\frac{\pi}{4}\right)\times 100\%$

$\approx 21.5\%$

(a) 26.31%

(b) 21.42% ✓

(c) 24.67%

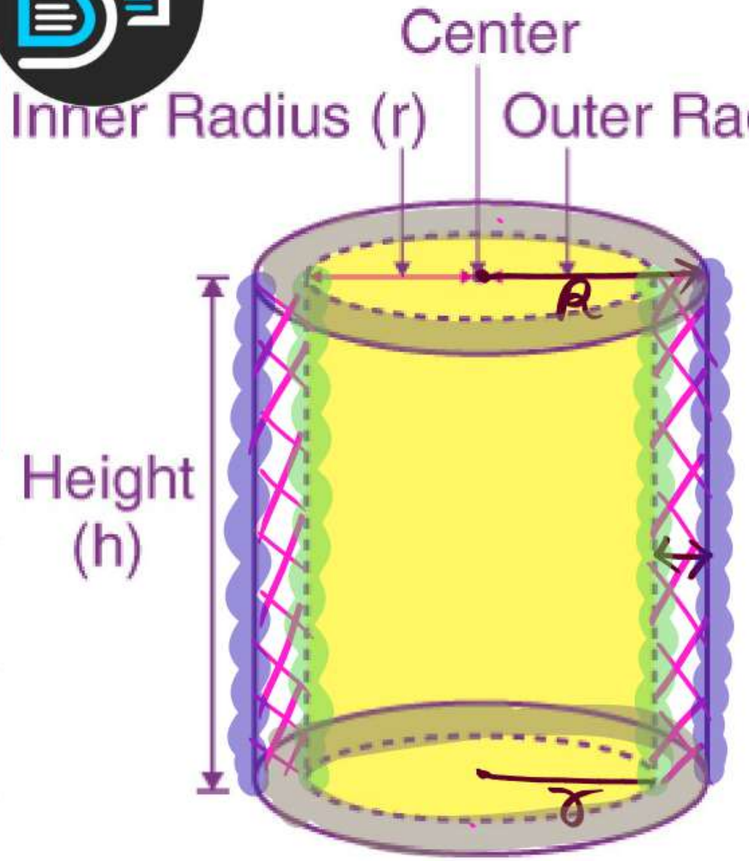
(d) 20.56%

$V \rightarrow$ cube : cylinder

$2^3 : \pi 1^2 \times 2$

$4 : 3.14$

Hollow cylinder (खोखला बेलन)

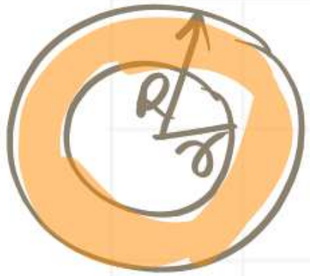


मोटाई (Thickness) = R − r

Metal का volume $= \pi R^2 h - \pi r^2 h$

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

$$V = \pi(R + r)(R - r)\,h$$



T.S.A $= 2\pi Rh + 2\pi rh + 2\pi(R^2 - r^2)$

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

$$\text{T.S.A} = 2\pi(R + r)\,(h + R - r)$$

Inner radius = r

Outer radius = R

Height = h

QUESTION:- 8

$\pi 3^2 \times 6 = \pi(5^2 - 3^2) \cdot R$

$\frac{27}{8} = \frac{5}{16} = R$

A well with inner radius 3 m, is dug 6 m deep. The soil taken out of it has been spread evenly all around it to a width of 2 m to form an embankment. The height (in m) of the embankment is:

3 मीटर अंदरूनी रेडियस वाला एक कुआँ 6 मीटर गहरा खोदा गया है। इसमें से निकाली गई मिट्टी को इसके चारों ओर 2 मीटर चौड़ाई में समान रूप से फैलाकर एक तटबंध बनाया गया है। तटबंध की ऊँचाई (मीटर में) है:

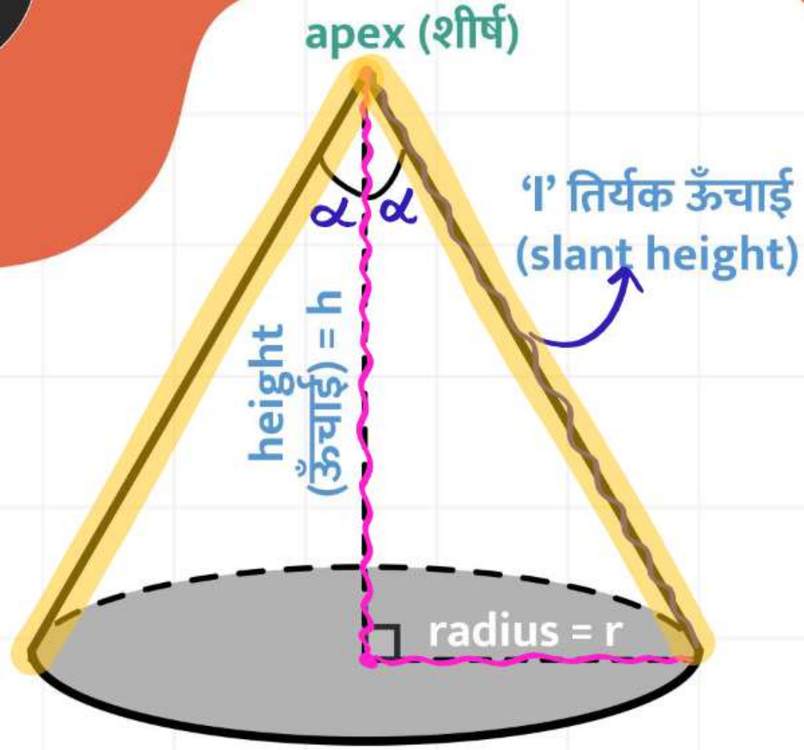
(a) $4\frac{1}{2}$

(b) $4\frac{1}{4}$

(c) $3\frac{1}{4}$

(d) $3\frac{3}{8}$ ✓

Cone (शंकु)



α = semi-vertical angle (अर्धशीर्ष कोण)

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

- volume $= \frac{1}{3}\pi r^2 h$
- Curved Surface Area (C.S.A) $= \pi r l$
- Total Surface Area

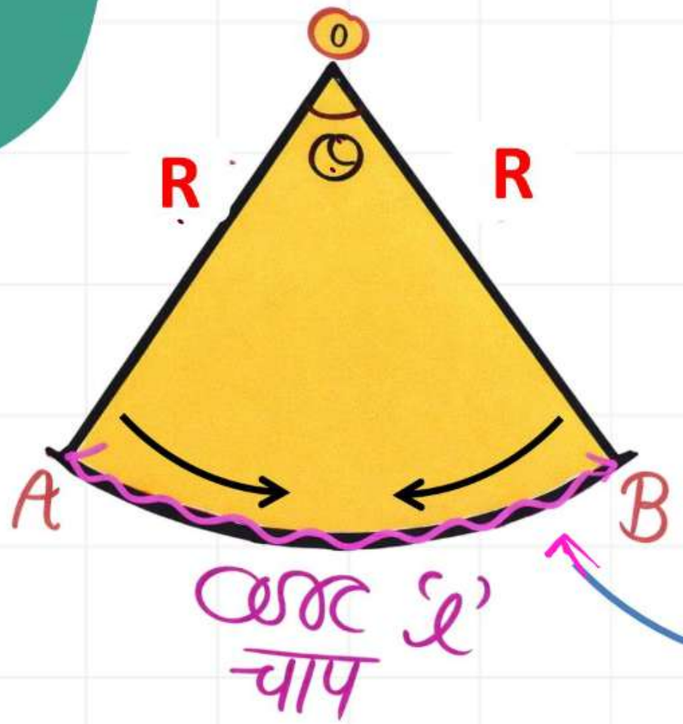
T.S.A = C.S.A + area of circular base

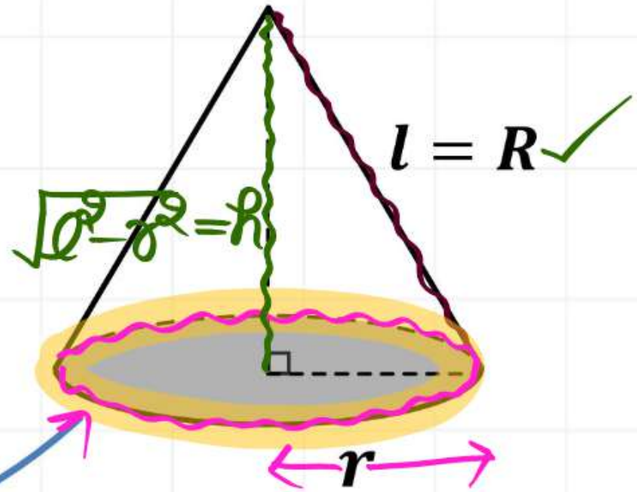
$$\text{T.S.A} = \pi r l + \pi r^2$$

$$\text{T.S.A} = \pi r(l + r)$$

Cone from a sector :

Sector का area = Cone का C.S.A ✓





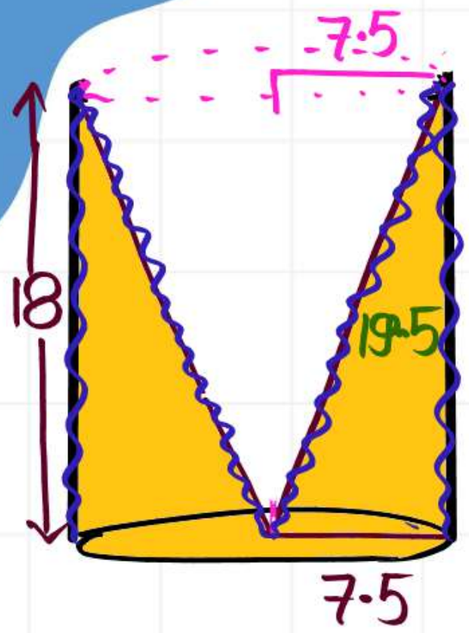
$$=$$

$$2\pi r = 2\pi R \times \frac{\theta}{360^\circ}$$

Slant Height of cone
=
Radius of Sector

$$r = R \times \frac{\theta}{360^\circ}$$

QUESTION:- 10



From a solid cylindrical wooden block of height 18 cm and radius 7.5 cm, a conical cavity of the same height and same radius is taken out. What is total surface area (in cm^2) of the remaining solid?

18 cm ऊंचाई और 7.5 cm त्रिज्या वाले एक ठोस बेलनाकार लकड़ी के ब्लॉक से, उसी ऊंचाई और उसी त्रिज्या वाली एक शंक्वाकार गुहा निकाली जाती है। बची हुई ठोस वस्तु का कुल पृष्ठीय क्षेत्रफल (cm^2 में) क्या है?

$2\pi 7.5 \times 18 + \pi 7.5 \times 19.5 + \pi 7.5^2$

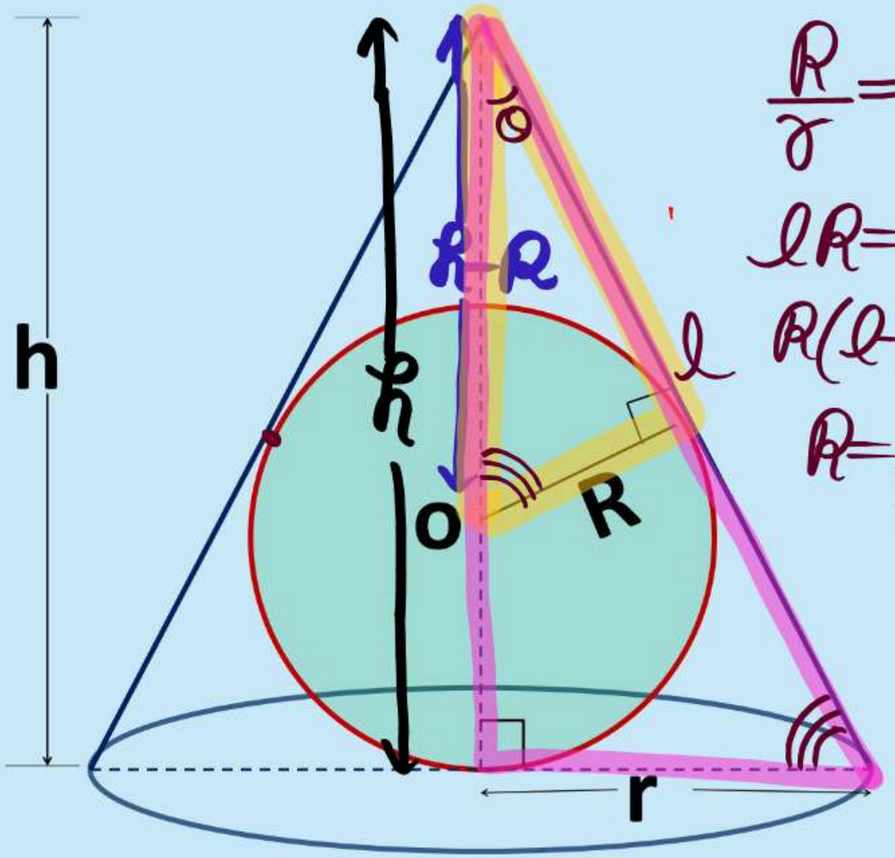
$= 7.5\pi(36 + 19.5 + 7.5)$

$= 7.5\pi \times 63 = 472.5\,cm^2$

(a) 326.25π
(b) $416.25\,\pi$
(c) $472.5\,\pi$ ✓
(d) $270\,\pi$

एक शंकु के अंदर एक अधिकतम आकार का गोला

"A sphere of maximum size inside a cone"

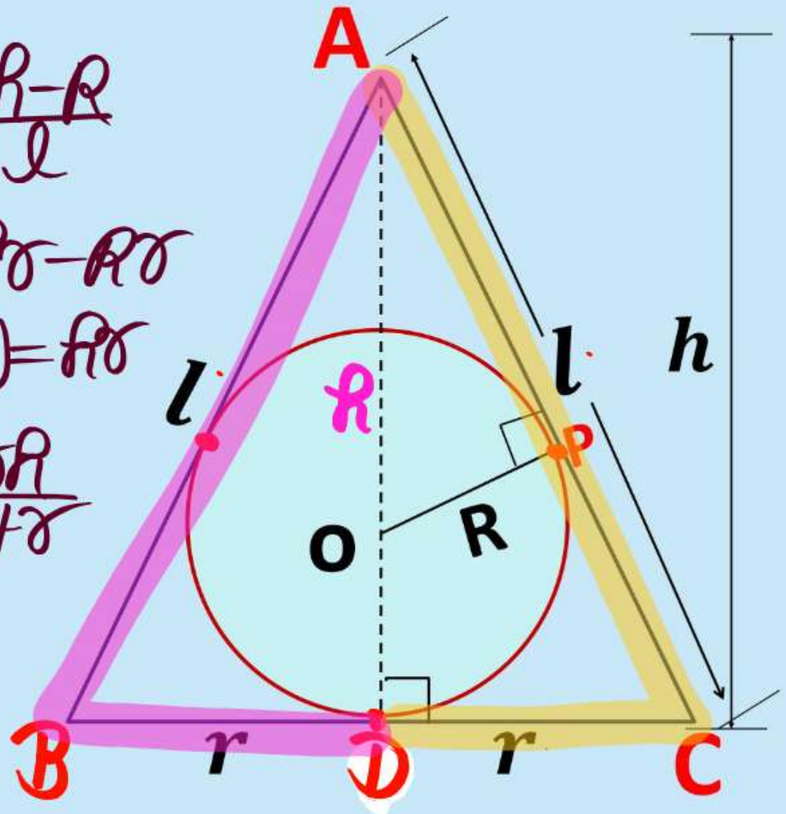


$$\frac{R}{r} = \frac{h-R}{l}$$

$$lR = hr - Rr$$

$$R(l+r) = hr$$

$$R = \frac{hr}{l+r}$$



$$R = \frac{\Delta}{S}$$

$$R = \frac{\frac{1}{2} \times 2r \times h}{(l+r)}$$

$$R = \frac{rh}{r+l}$$

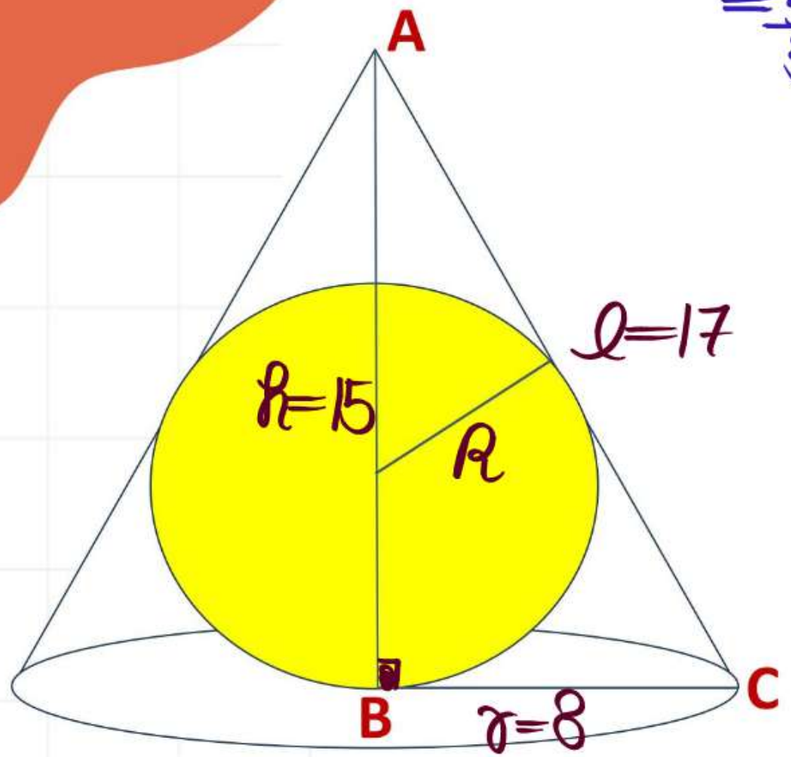
QUESTION:- 11

$\frac{r}{R} = \frac{8}{\frac{15\times8}{17}} = \frac{25}{15}$

$= \frac{5}{3}$

Radius of base of a hollow cone is 8 cm and its height is 15 cm. A sphere of largest radius is put inside the cone. What is the ratio of radius of base of cone to the radius of sphere?

एक खोखले शंकु के आधार की त्रिज्या 8 cm है और उसकी ऊँचाई 15 cm है। शंकु के अंदर सबसे बड़ी त्रिज्या का एक गोला रखा गया है। शंकु के आधार की त्रिज्या और गोले की त्रिज्या का अनुपात क्या है?



(a) 5:3 ✓

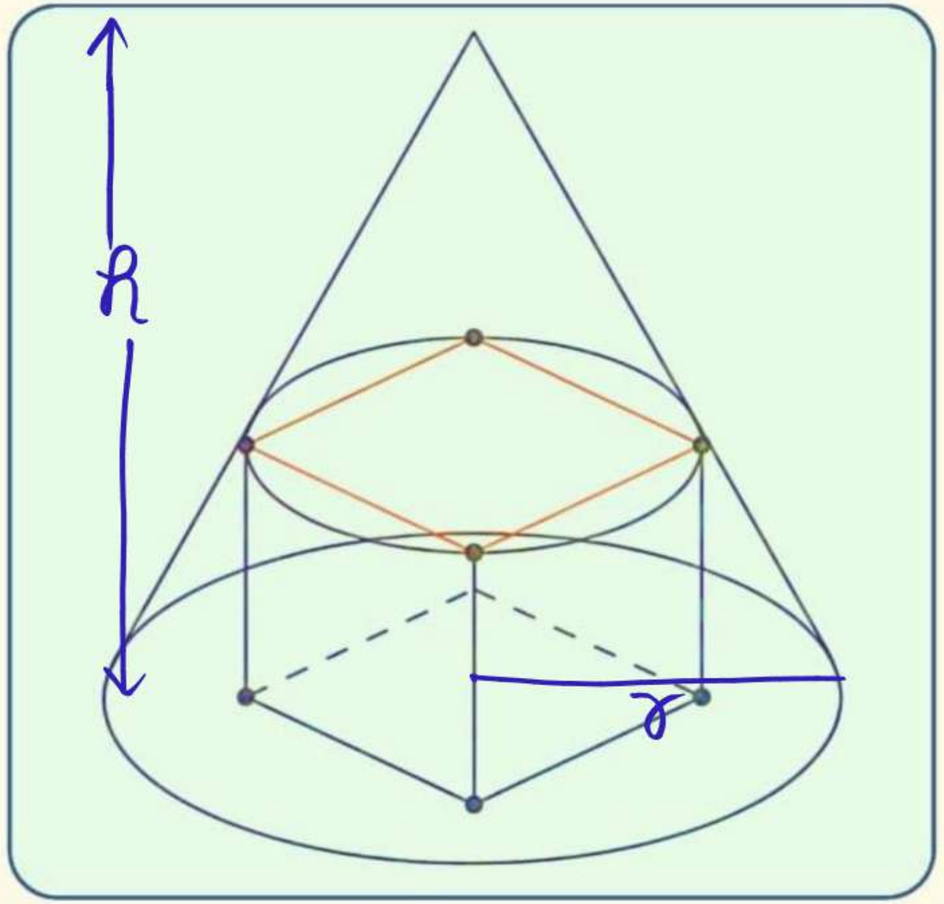
(b) 4:1

(c) 2:1

(d) 7:9

When a cube of maximum volume is cut from a cone

जब एक शंकु से अधिकतम आयतन का घन काटा जाता है



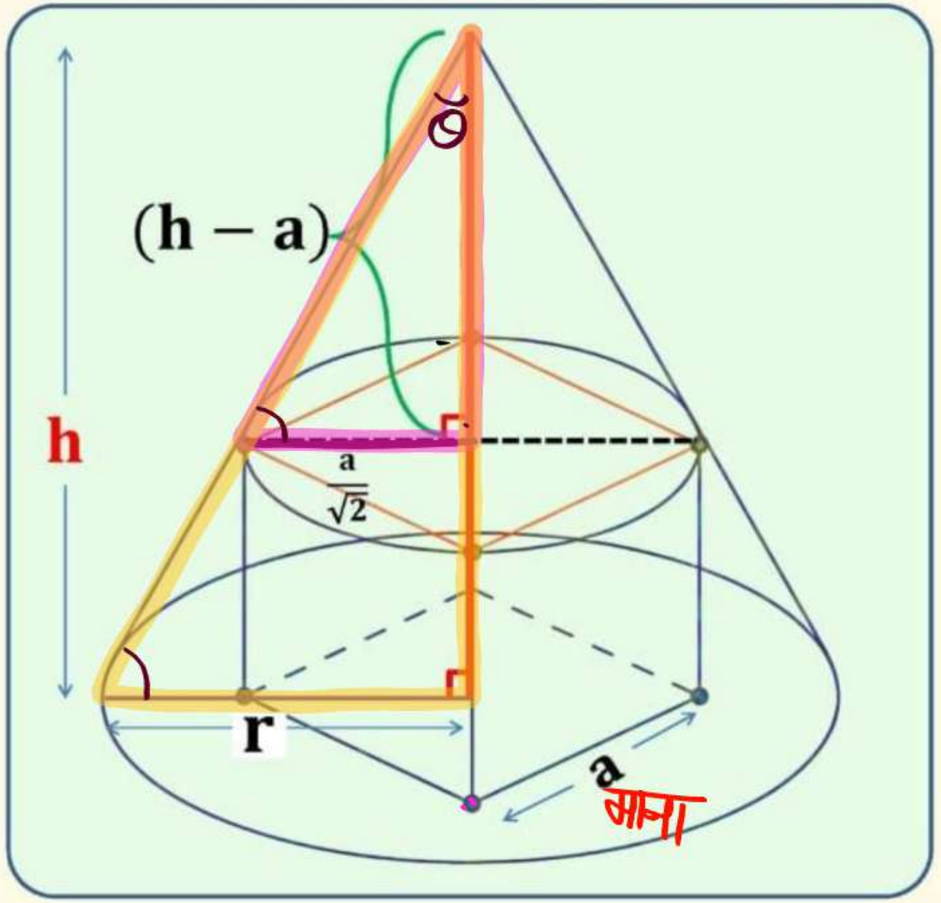
If a cube of max. volume or size inside a cone of radius 'r' and height 'h'

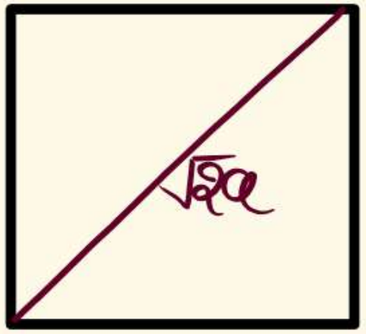
यदि त्रिज्या 'r' और ऊँचाई 'h' वाले शंकु के भीतर अधिकतम आयतन या आकार का घन रखा जाए,

Then, घन की भुजा (a) = $\frac{\sqrt{2}rh}{\sqrt{2}r+h}$

When a cube of maximum volume is cut from a cone

जब एक शंकु से अधिकतम आयतन का घन काटा जाता है





$$\frac{h-a}{h}=\frac{\frac{a}{\sqrt{2}}}{r}$$

$$\frac{h-a}{h}=\frac{a}{\sqrt{2}r}$$

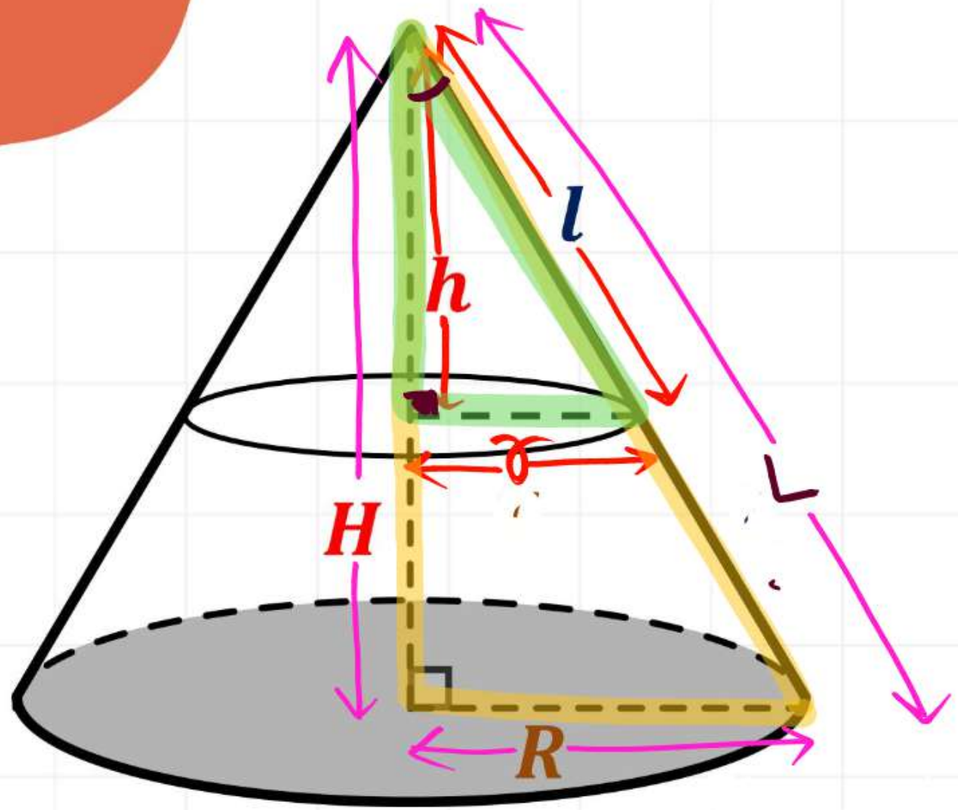
$$\sqrt{2}rh-\sqrt{2}ra=ah$$

$$a(h+\sqrt{2}r)=\sqrt{2}rh$$

घन की भुजा (a) = $\frac{\sqrt{2}rh}{\sqrt{2}r+h}$

Cutting of cone

$$\frac{r}{R} = \frac{h}{H} = \frac{l}{L}$$ cm



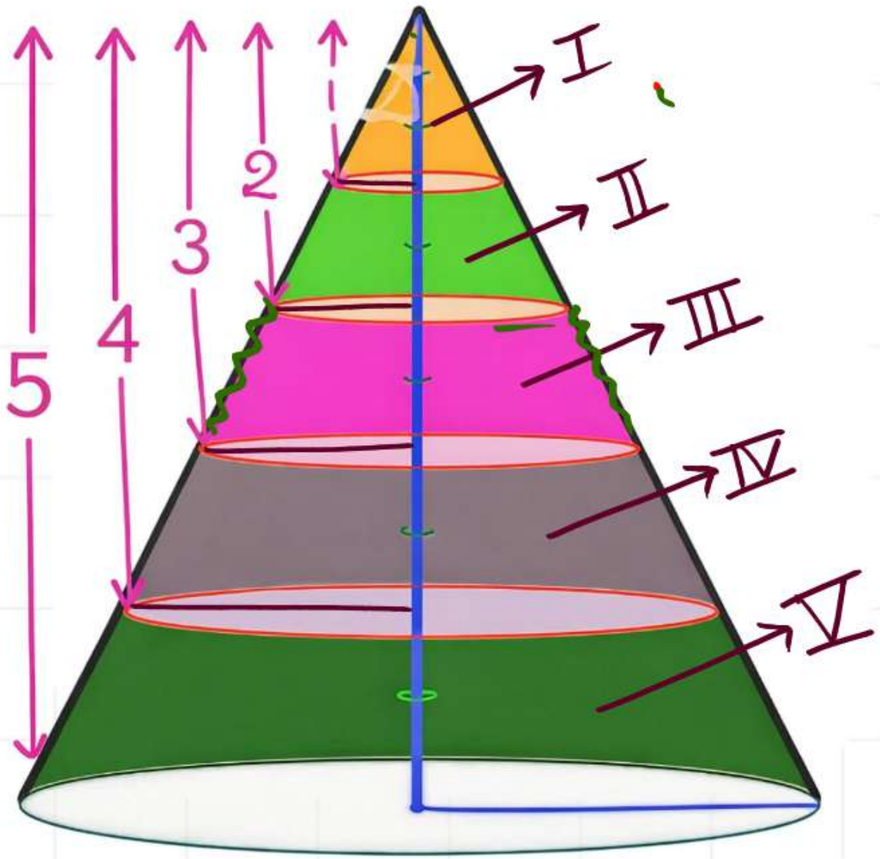
cut parallel to base

$$\frac{\text{छोटे cone की C.S.A}}{\text{बड़े cone की C.S.A}} \text{ cm}^2$$

$$= \left(\frac{r}{R}\right)^2 = \left(\frac{h}{H}\right)^2 = \left(\frac{l}{L}\right)^2$$

$$\frac{\text{छोटे cone का volume}}{\text{बड़े cone का volume}} \text{ cm}^3$$

$$= \left(\frac{r}{R}\right)^3 = \left(\frac{h}{H}\right)^3 = \left(\frac{l}{L}\right)^3$$



4 parallel cuts at equal height

The CSA of five cones =

$$1^2 : 2^2 : 3^2 : 4^2 : 5^2$$

Five parts का C.S.A.

$$1^2 : (2^2 - 1^2) : (3^2 - 2^2) : (4^2 - 3^2) : (5^2 - 4^2)$$

$$= 1 : 3 : 5 : 7 : 9$$

The Volume of five cones =

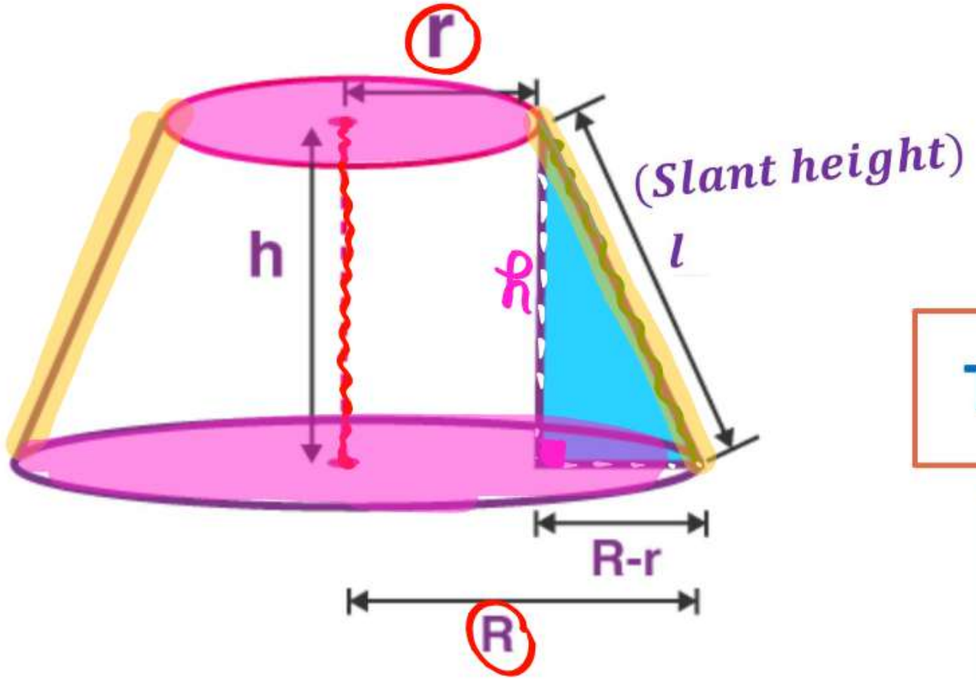
$$1^3 : 2^3 : 3^3 : 4^3 : 5^3$$

Five parts का volume ratio

$$1^3 : (2^3 - 1^3) : (3^3 - 2^3) : (4^3 - 3^3) : (5^3 - 4^3)$$

$$= 1 : 7 : 19 : 37 : 61$$

Frustum of a cone :



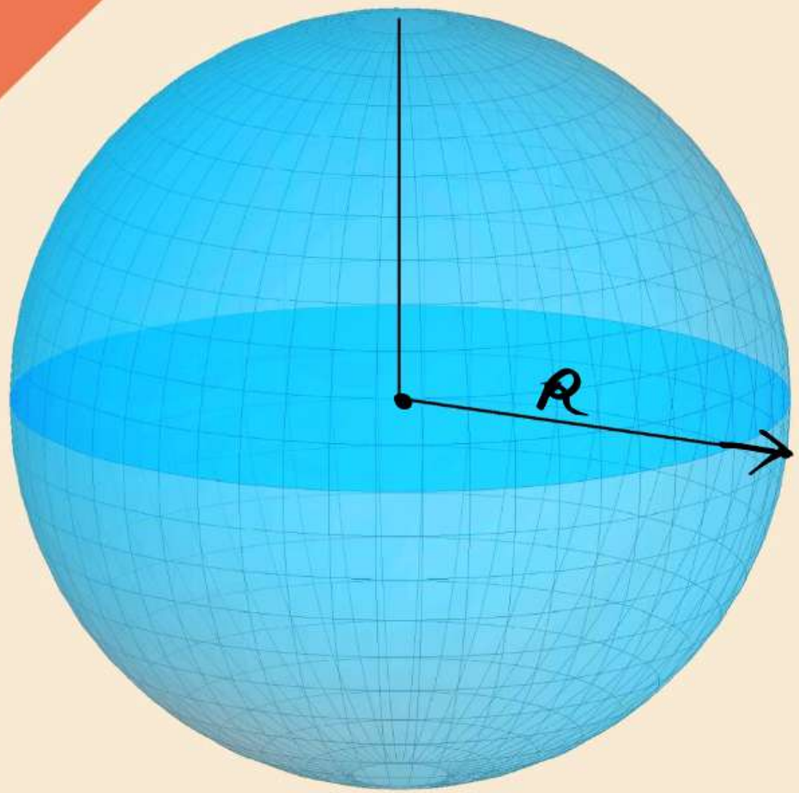
$$l = \sqrt{h^2 + (R - r)^2}$$

$$\text{C.S.A} = \pi(r + R)\, l$$

$$\text{T.S.A} = \pi(r + R)\, l + \pi(r^2 + R^2)$$

$$V = \frac{1}{3}\pi\left(r^2 + R^2 + rR\right) \cdot h$$

Sphere / ठोस गोला :



$$C.S.A = T.S.A = 4\pi R^2$$

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

- $C.S.A \propto R^2$ ✓
- $V \propto R^3$ ✓

Trick :

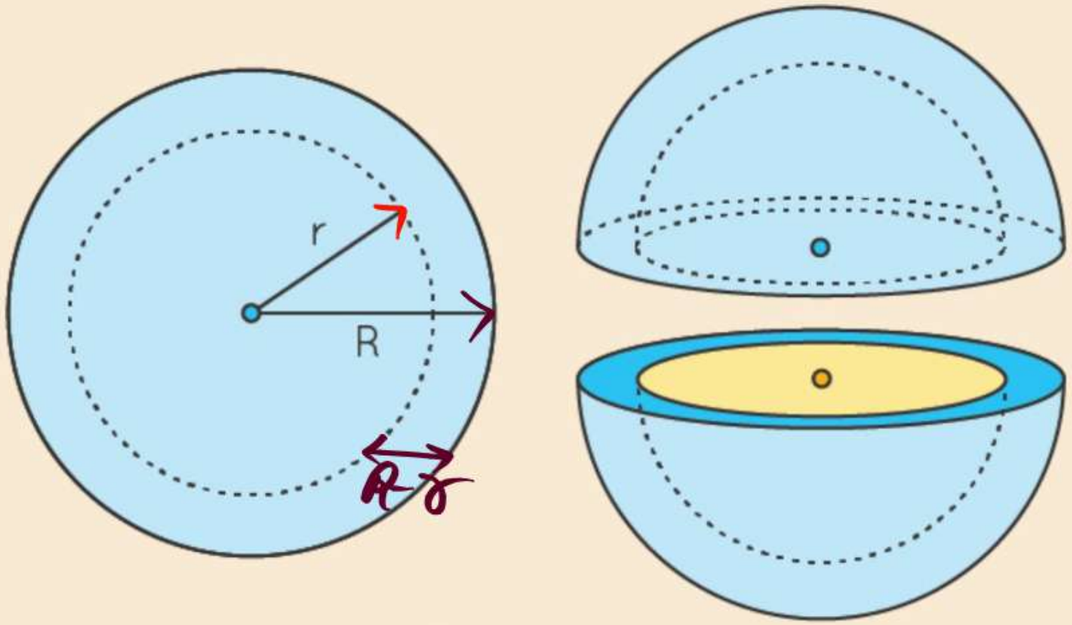
$$3^3 + 4^3 + 5^3 = 6^3$$
$$1^3 + 6^3 + 8^3 = 9^3$$

↓

$$21^3 + 28^3 + 35^3 = ?$$

खोखला गोला

Hollow Sphere :



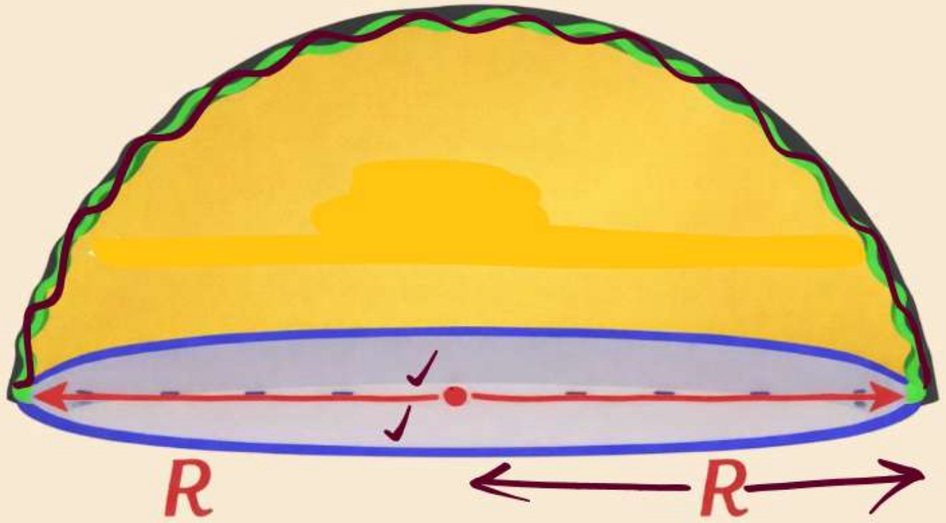
- **Outer radius = R**
- **Inner radius = r**

Metal का volume

$$= \frac{4}{3}\pi R^3 - \frac{4}{3}\pi r^3$$

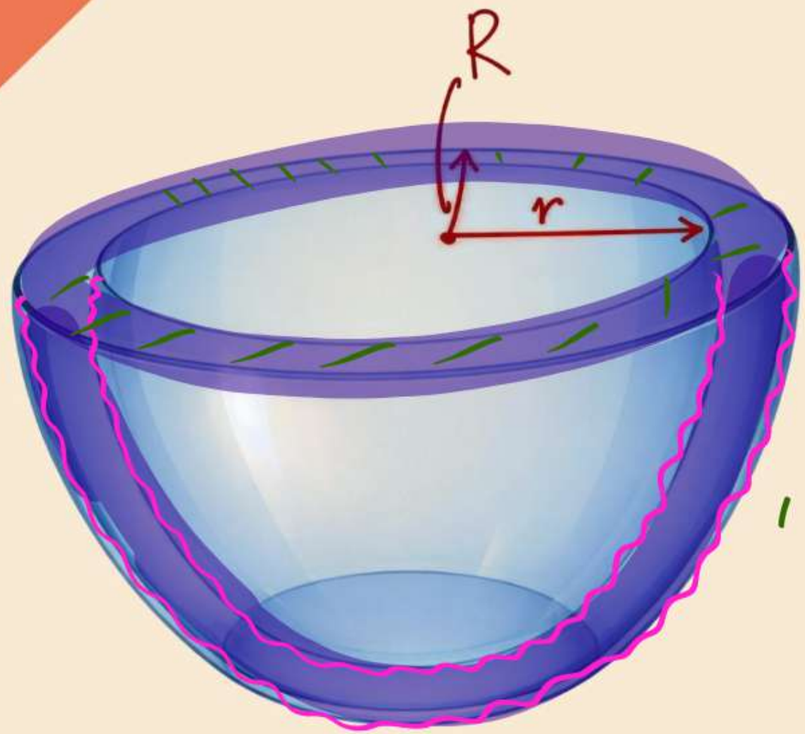
$$= \frac{4}{3}\pi\left(R^3 - r^3\right)$$

Solid Hemi-sphere (ठोस अर्धगोला):



- $V = \frac{2}{3}\pi R^3$
- $C.S.A = 2\pi R^2$
- $T.S.A = 2\pi R^2 + \pi R^2 = 3\pi R^2$

Hemi-spherical bowl / अर्धगोलाकार कटोरा :



- **Internal radius = r**
- **External radius = R**

Thickness = R − r

Metal का volume

$$= \frac{2}{3}\pi\left(R^3 - r^3\right)$$

Bowl का T.S.A

$$= 2\pi R^2 + 2\pi r^2 + \left[\pi R^2 - \pi r^2\right]$$

$$= 3\pi R^2 + \pi r^2$$

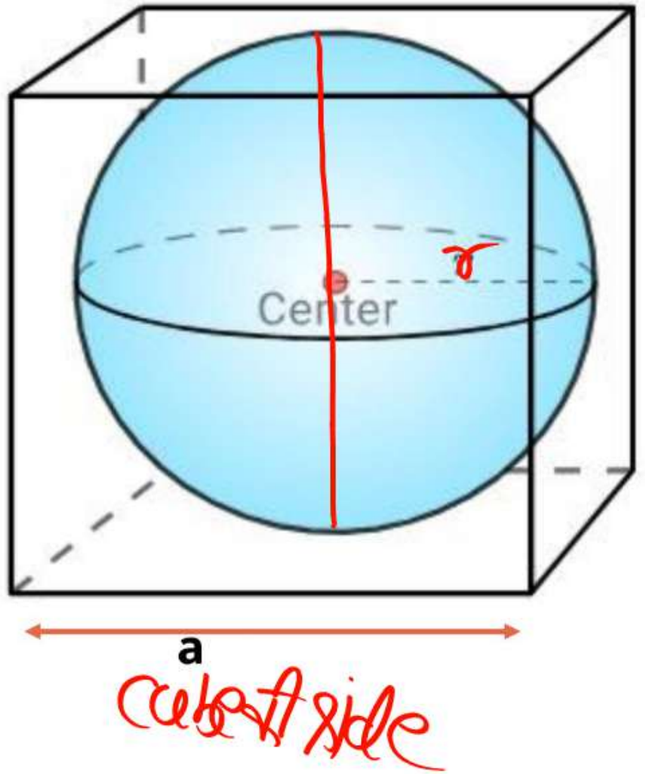
$$\text{T.S.A} = \pi\left(3R^2 + r^2\right)$$

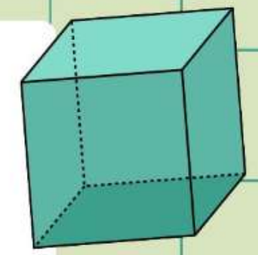
- **A maximum size sphere inside a cube**

  (एक घन के अंदर अधिकतम आकार का गोला)

- **Diameter of Sphere = Side of Cube = a**

$\therefore$ **Radius r = $\frac{a}{2}$**





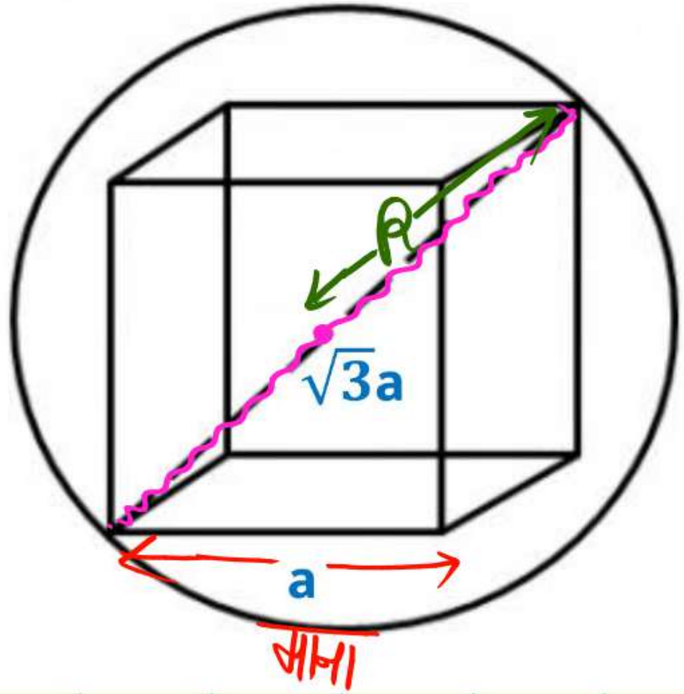
- **A maximum size cube inside a sphere**

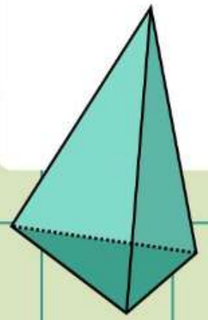
  (एक गोले के अंदर अधिकतम आकार का घन)

- **Diameter of Sphere =** Diagonal **of Cube**

$$2R = \sqrt{3}a$$

$$R = \frac{\sqrt{3}a}{2}$$





Cube inside and outside of sphere

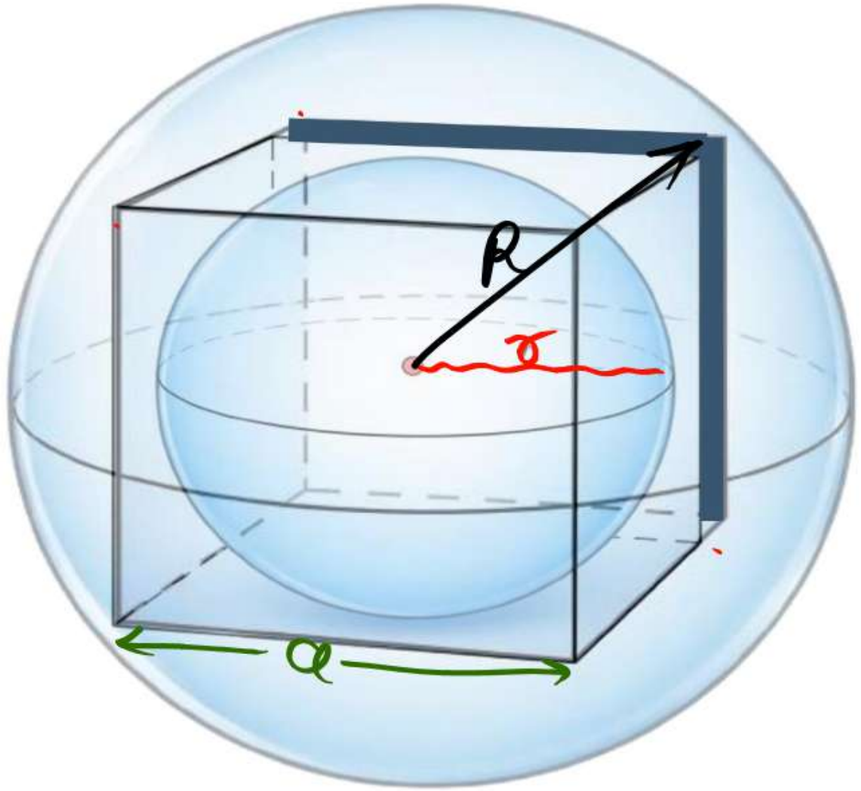
$$r = \frac{a}{2}$$

$$R = \frac{\sqrt{3}a}{2}$$

$$\boxed{\frac{r}{R} = \frac{1}{\sqrt{3}}}$$

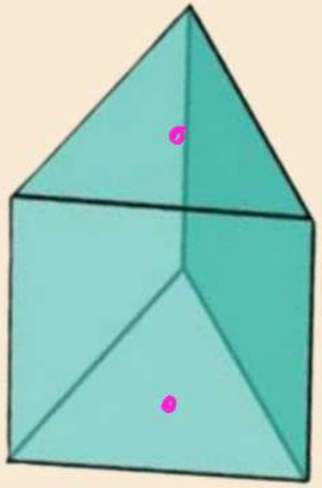
$V \propto R^3$

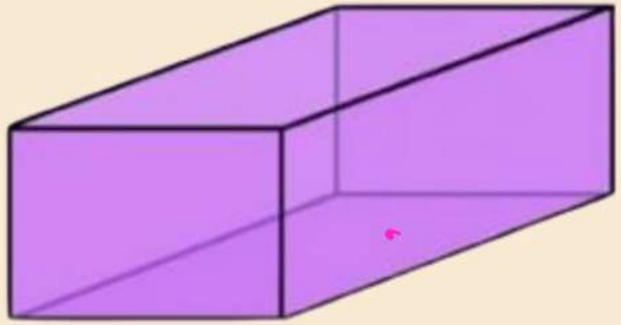
$$\frac{Volume\ of\ sphere\ inscribed}{volume of\ sphere\ circumscribed} = \left(\frac{1}{\sqrt{3}}\right)^3 = \frac{1}{3\sqrt{3}}$$

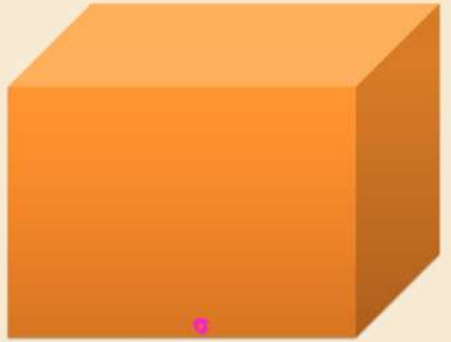


PRISM (प्रिज्म)

- A prism is a 3 dimensional figure with identical ends, flat faces and same cross section all along its height.
- प्रिज्म एक त्रि-आयामी आकृति है जिसके सिरे समान होते हैं, फलक समतल होते हैं तथा पूरी लम्बाई में समान अनुप्रस्थ काट होता है।
- Surface of Prism is lateral not curved
- प्रिज्म की सतह वक्रिय न होकर पार्श्वीय होती है।
- Base and Top of prism is same.
- प्रिज्म का आधार और शीर्ष समान है।







Triangular

- 5 faces (2 triangular and 3 rectangular)
- 9 edges
- 6 vertices

Rectangular

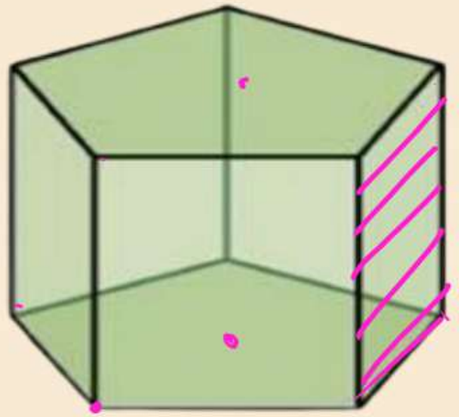
- 6 faces (all rectangular)
- 12 edges
- 8 vertices

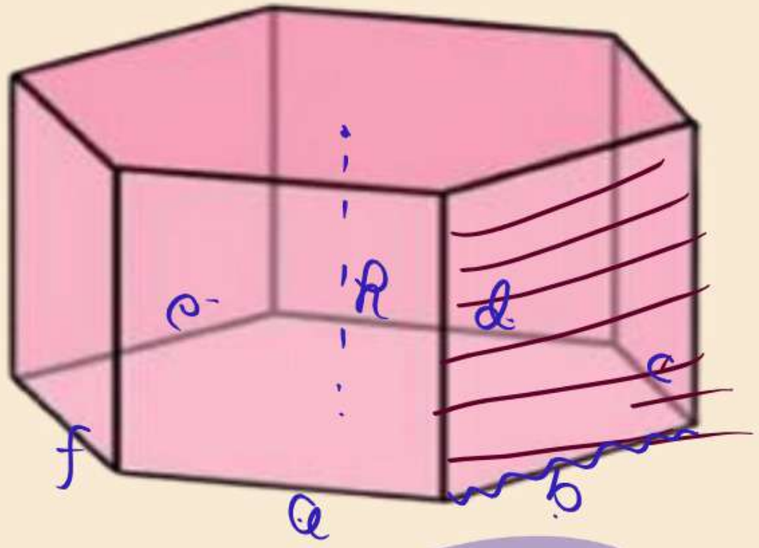
Square

- 6 faces (2 squares and 4 rectangular)
- 12 edges
- 8 vertices

Pentagonal

- 7 faces (2 pentagonal and 5 rectangular)
- 15 edges
- 10 vertices





Hexagonal

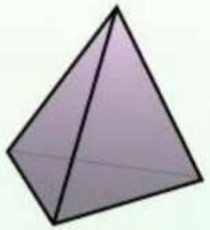
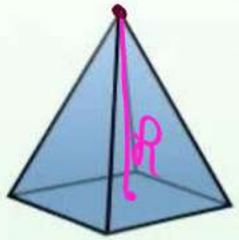
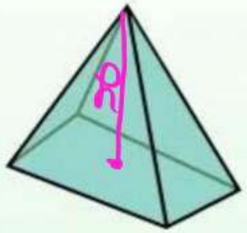
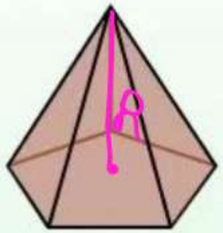
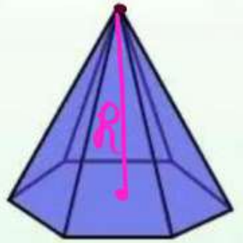
- 8 faces (2 hexagonal and 6 rectangular)
- 18 edges
- 12 vertices

Formula for Prism

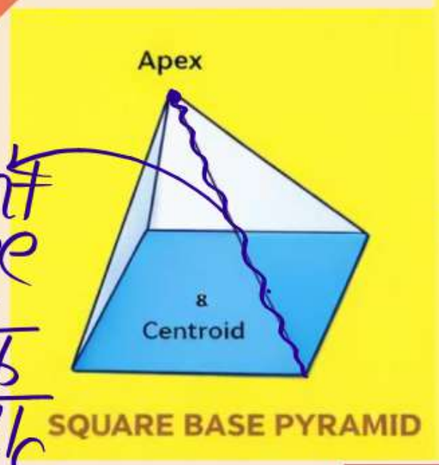
- **Volume** = area of base × height
- **L.S.A.** = Perimeter of base × height
  (आधार की परिमाप × ऊँचाई)
- **T.S.A.** = L.S.A. + area of 2 bases

PYRAMID

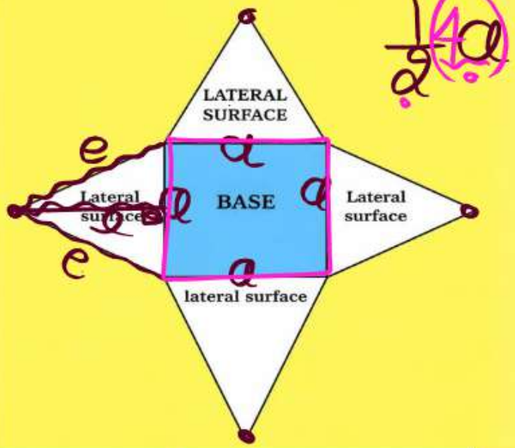
- The lateral surface of pyramid is flat./ पिरामिड की पार्श्व सतह समतल है।
- Top most point of pyramid is a single point and base is 2D figure./ पिरामिड का सबसे ऊपरी बिंदु एक बिंदु है और आधार 2D आकृति है।

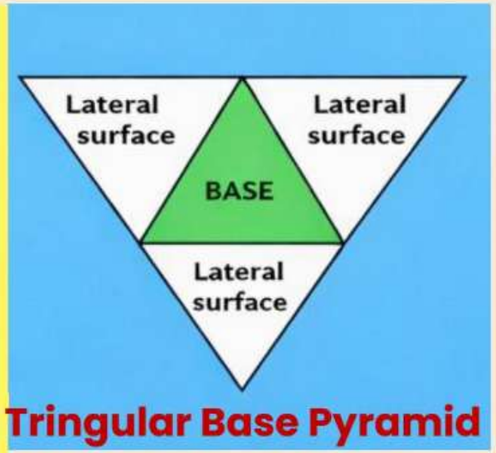
Triangular	Square	Rectangular	Pentagonal	Hexagonal
				
4 faces 4 Vertices 6 Edges	5 faces 5 Vertices 8 Edges	5 faces 5 Vertices 8 Edges	6 faces 6 Vertices 10 Edges	7 faces 7 Vertices 12 Edges

Structure of Pyramid

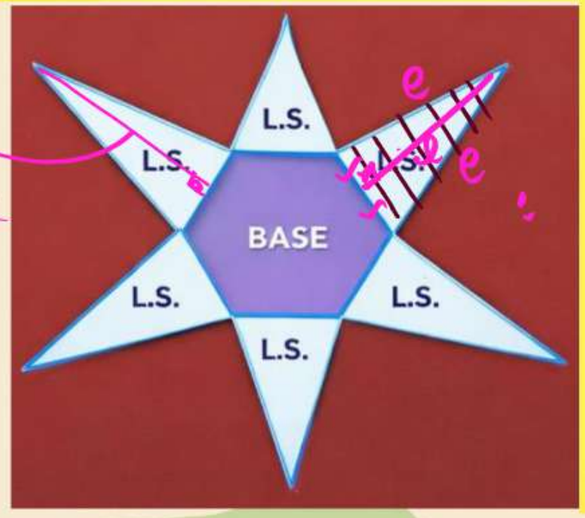


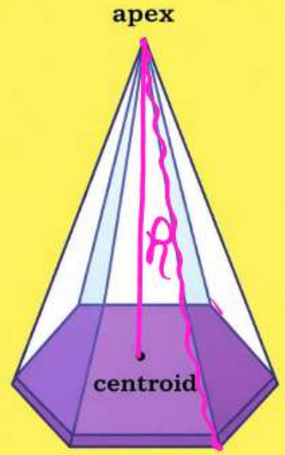
SQUARE BASE PYRAMID





Tringular Base Pyramid





HEXAGONAL BASE PYRAMID

Formula for pyramid

- **If pyramid has a regular base.**

- **पार्श्व सतह का क्षेत्रफल / Lateral Surface Area**

  $= \frac{1}{2} \times$ ***Perimeter of base*** $\times$ ***slant height***

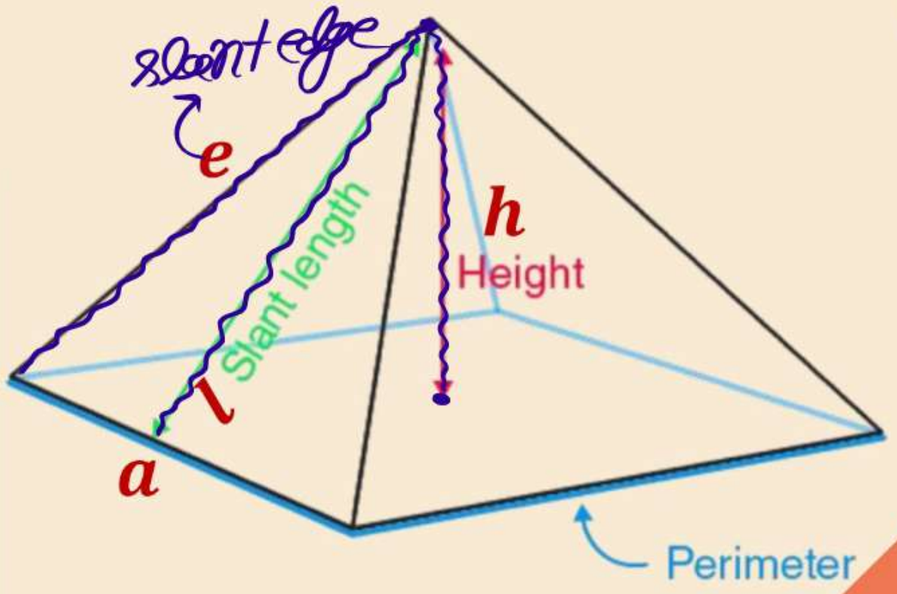
- $= \frac{1}{2} \times$ आधार का परिमाप $\times$ तिर्यक ऊँचाई

- **कुल सतह का क्षेत्रफल / Total Surface Area**

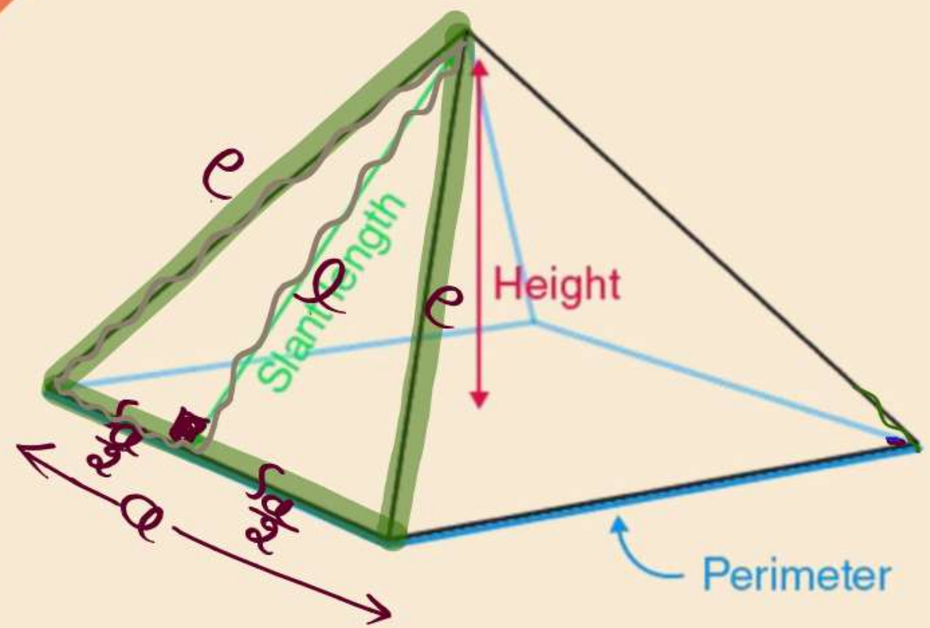
  $=$ ***L.S.A.*** $+$ ***area of base***

- = पार्श्व सतह का क्षेत्रफल + आधार का क्षेत्रफल

- **Volume** $= \frac{1}{3} \times$ ***area of base*** $\times$ ***height***



SQUARE BASED PYRAMID

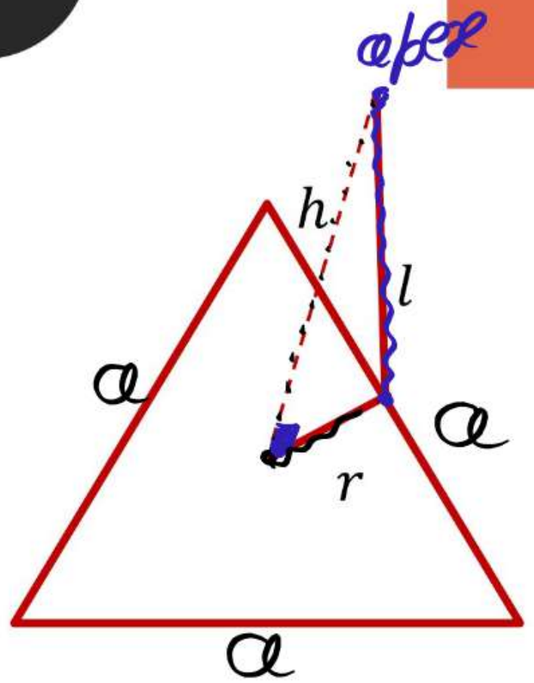


$$l^2 = h^2 + \left(\frac{a}{2}\right)^2$$

$$e^2 = h^2 + \left(\frac{a}{\sqrt{2}}\right)^2$$

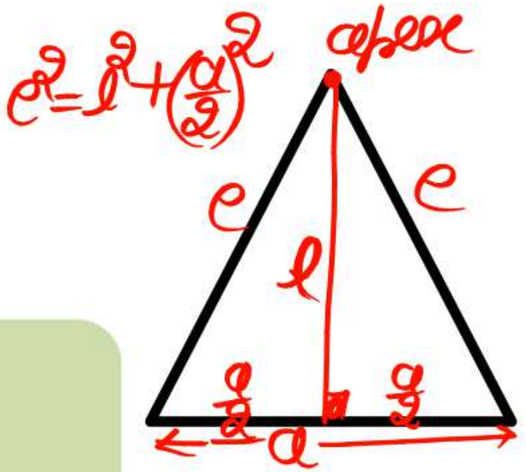
$$e^2 = l^2 + \left(\frac{a}{2}\right)^2$$

Equilateral Base Pyramid
समबाहु आधार पिरामिड



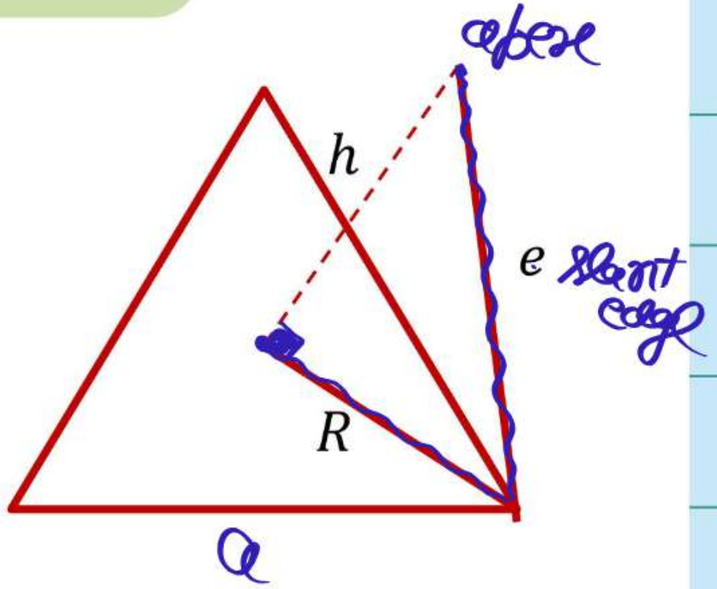
$$r = \frac{a}{2\sqrt{3}}$$

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

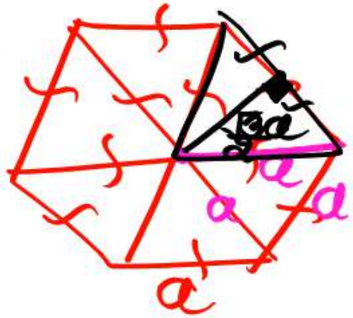


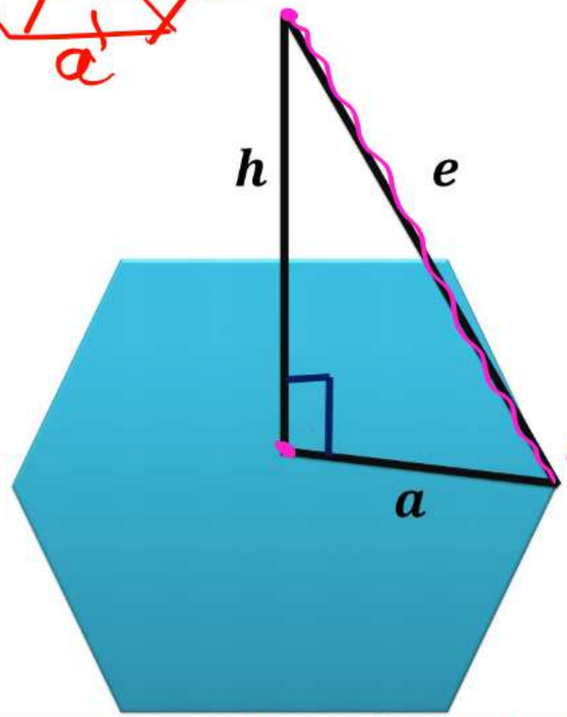
$$R = \frac{a}{\sqrt{3}}$$

$$e^2 = h^2 + R^2$$



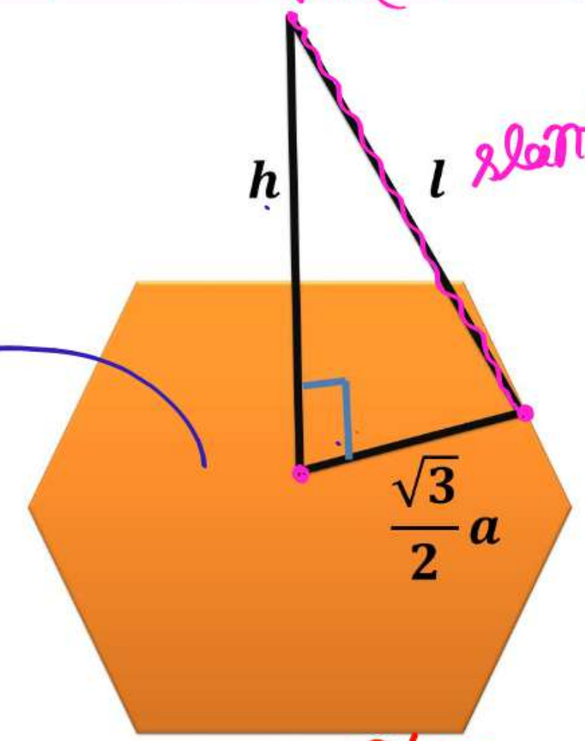
Regular Hexagonal Pyramid





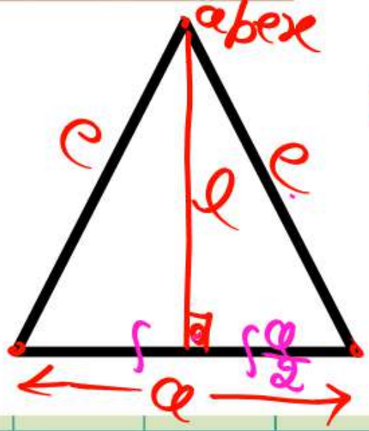
$$l^2 = h^2 + \left(\frac{\sqrt{3}}{2}a\right)^2$$

$$e^2 = h^2 + a^2$$

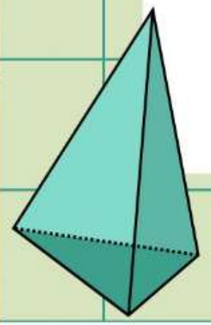


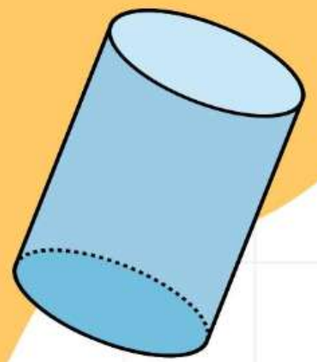
apex

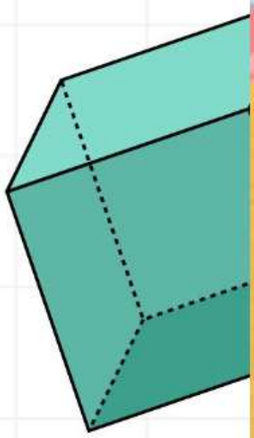
slant height



$e^2 = l^2 + (\frac{a}{2})^2$







THANK YOU