
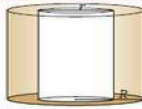


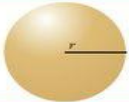
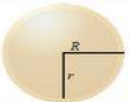

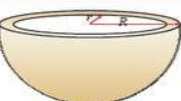
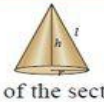
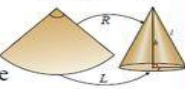


GEOMETRY & MENSURATION

Name	Figure	Perimeter	Area
Rectangle		$2(a + b)$	ab
Square		$4a$	a^2
Triangle		$a + b + c = 2s$	$1 = \frac{1}{2} \times b \times h$ $2 = \sqrt{s(s-a)(s-b)(s-c)}$
Right triangle		$b + h + d$	$\frac{1}{2}bh$
Equilateral triangle		$3a$	1. $\frac{1}{2}ah$ 2. $\frac{\sqrt{3}}{4}a^2$
Isosceles right triangle		$2a + d$	$\frac{1}{2}a^2$
Parallelogram		$2(a + b)$	ah
Rhombus		$4a$	$\frac{1}{2}d_1d_2$
Trapezium		Sum of its four sides	$\frac{1}{2}h(a + b)$
Circle		$2\pi r$	πr^2
Semicircle		$\pi r + 2r$	$\frac{1}{2}\pi r^2$
Ring (shaded region)		----	$\pi(R^2 - r^2)$
Sector of a circle		$l + 2r$ where $l = \left(\frac{\theta}{360}\right) \times 2\pi r$	$\frac{\theta}{360} \times \pi r^2$

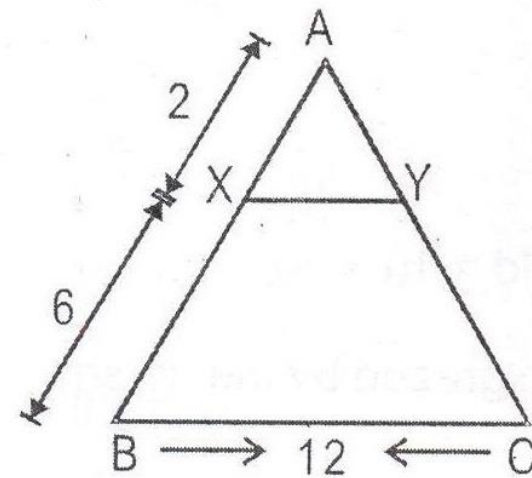
PLANE FIGURES

SOLID FIGURES

Sl. No	Name	Figure	Lateral or Curved Surface Area (sq.units)	Total Surface Area (sq.units)	Volume (cu.units)
1	Right circular cylinder		$2\pi rh$	$2\pi r(h + r)$	$\pi r^2 h$
2	Right circular hollow cylinder		$2\pi h(R + r)$	$2\pi (R + r)(R - r + h)$	$\pi R^2 h - \pi r^2 h$ $\pi h(R^2 - r^2)$ $\pi h(R + r)(R - r)$
3	Right circular cone		πrl	$\pi r(l + r)$	$\frac{1}{3}\pi r^2 h$
4	Frustum		---	---	$\frac{1}{3}\pi h(R^2 + r^2 + Rr)$
5	Sphere		$4\pi r^2$	---	$\frac{4}{3}\pi r^3$
6	Hollow sphere		---	---	$\frac{4}{3}\pi(R^3 - r^3)$
7	Hemisphere		$2\pi r^2$	$3\pi r^2$	$\frac{2}{3}\pi r^3$
8	Hollow Hemisphere		$2\pi(R^2 + r^2)$	$2\pi(R^2 + r^2) + \pi(R^2 - r^2)$	$\frac{2}{3}\pi(R^3 - r^3)$
9	Cone	 <div>$l = \sqrt{h^2 + r^2}$ $h = \sqrt{l^2 - r^2}$ $r = \sqrt{l^2 - h^2}$</div> <div></div> <div>CSA of a cone = Area of the sector $\pi rl = \frac{\theta}{360} \times \pi r^2$ Length of the sector = Base circumference of the cone</div>	10. Volume of water flows out through a pipe = {Cross section area \times Speed \times Time } 11. No. of new solids obtained by recasting = $\frac{\text{Volume of the solid which is melted}}{\text{volume of one solid which is made}}$		
12	Conversions	1 m ³ = 1000 litres , 1 d.m ³ = 1 litre , 1000 cm ³ = 1 litre , 1000 litres = 1 kl			

PROBLEM I

In the given figure $XY \parallel BC$. Find the length of XY .



(1) 4

(2) 1

(3) 3 ✓

(4) 2

PROBLEM 2

Perimeter of a \triangle with integer sides is equal to 15. How many such triangles are possible?

- a. 7 ✓
- b. 6
- c. 8
- d. 5

PROBLEM 3

Area of a Rhombus of perimeter 56 cm is 100 sq. cms. Find the sum of the lengths of its diagonals

- a. 33.40
- b. 34.40 ✓
- c. 32.30
- d. 31.20

PROBLEM 4

A wire when bent in the shape of a square has its side as 22 cm. If the wire is made into a circle, find the difference of the areas of the circle and the square in sq.cm.

- A. 148 sq. cm.
- B. 156 sq. cm.
- C. 132 sq. cm. ✓
- D. 124 sq. cm.

PROBLEM 5

A rectangular park 60 m long and 40 m wide has two concrete crossroads running in the middle of the park and rest of the park has been used as a lawn. If the area of the lawn is 2109 sq m, then what is the width of the road?

- A. 2.91 m
- B. 3 m ✓
- C. 5.82 m
- D. None of these

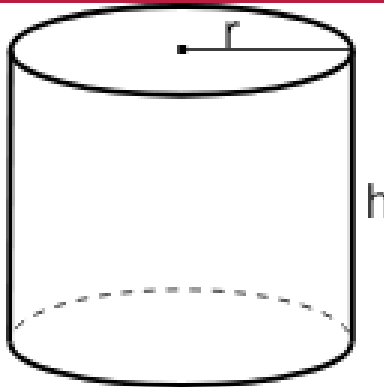
PROBLEM 6

- I. A spherical watermelon of radius 4 cm is divided into eight equal parts by cutting it in halves along the same axis. Find
 - i. Surface area of one such piece? 24π
 - ii. Total Surface Area? $8 \times 24 \pi$
 - iii. Percentage increase in surface area? 200%



PROBLEM 7

$$V = h \cdot \pi \cdot r^2$$



If the radius of the cylinder increases by 50%, then what is the increasing percentage in its volume?

A. 100%

B. 125% ✓

C. 150%

D. 225%

PROBLEM 8

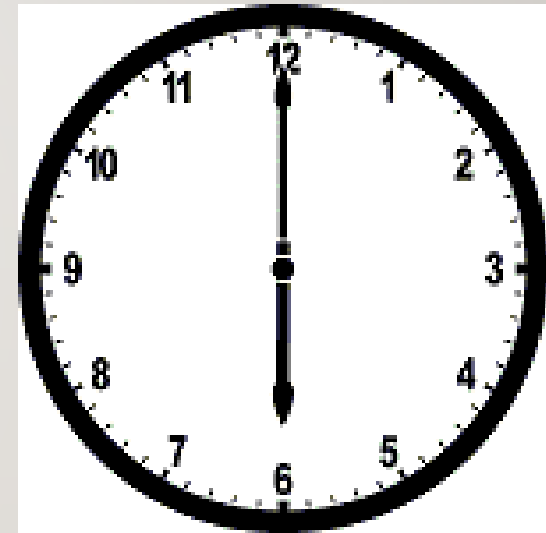
What is the total distance covered by the short and long hands of a clock in 5 days, if their lengths are 6 cm and 8 cm respectively?

A. 1020 π

B. 2040 π ✓

C. 960 π

D. 1200 π



PROBLEM 9

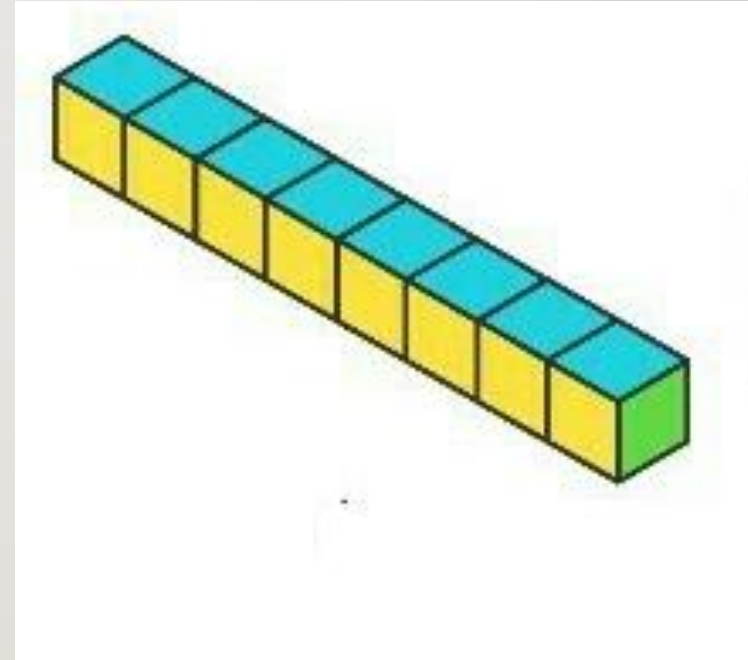
Eight identical cubes of 7 cm are joined end to end to form a big cuboid. Find the total surface area?

A. 1176 cm

B. 1344 cm

C. 1666 cm 👍

D. 1726 cm



PROBLEM 10



How much amount to be spent for purchasing 5m wide sheet to make a conical tent, the radius of the base is 7m and height is 24m (if each 5m wide sheet costs 50 rupees)?

A. 2750

B. 11000

C. 5500 🧐

D. 6000

PROBLEM 11

A Cylinder, a Hemi-sphere and a Cone stand on the same base and have the same heights.

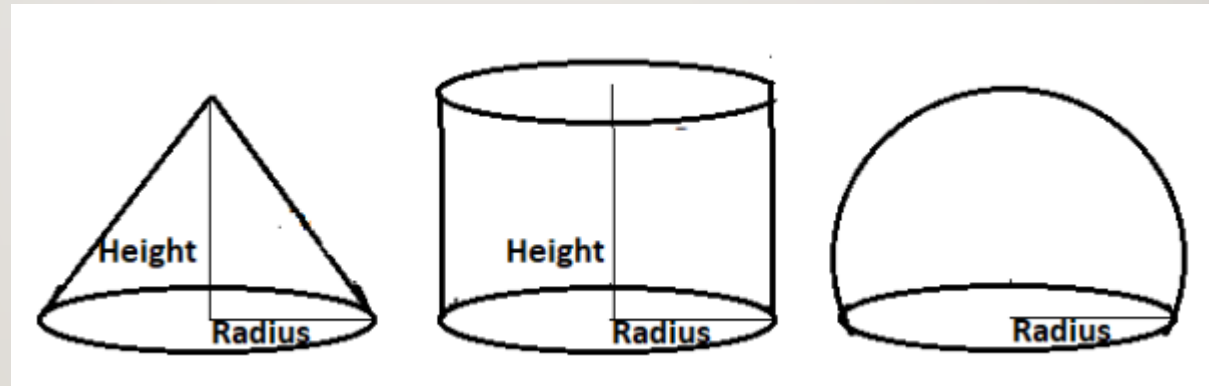
The ratio of their volumes is

A. $3:2:1$ ✓

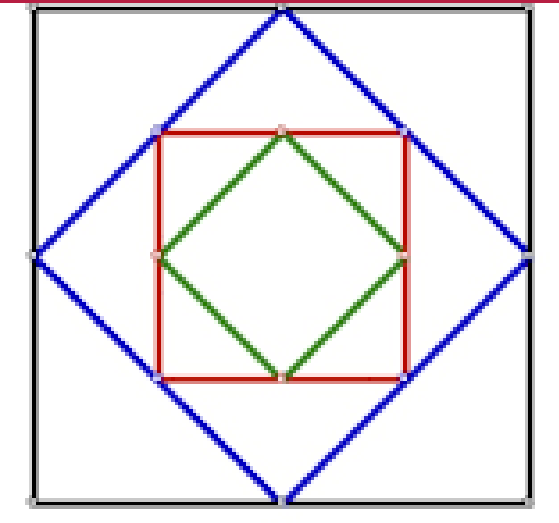
B. $\sqrt{2}:\sqrt{2}:1$

C. $\sqrt{2}:3:1$

D. None of the above



PROBLEM 12



ABCD is a square drawn inside a square PQRS of sides 8 cm by joining midpoints of the sides PQ, QR, RS, SP. Another square is drawn inside ABCD similarly. This process is repeated infinite number of times. Find the area of sum of all the squares?

- A. 256 cm²
- B. 196 cm²
- C. 132 cm²
- D. 128 cm² ✓

PROBLEM 13

A right circular cone of height 12 cm is divided into three parts by cutting the cone by two planes parallel to the base at a height of 3 cm & 7 cm from the base, respectively. Find the ratio of $V_1 : V_2 : V_3 = ?$

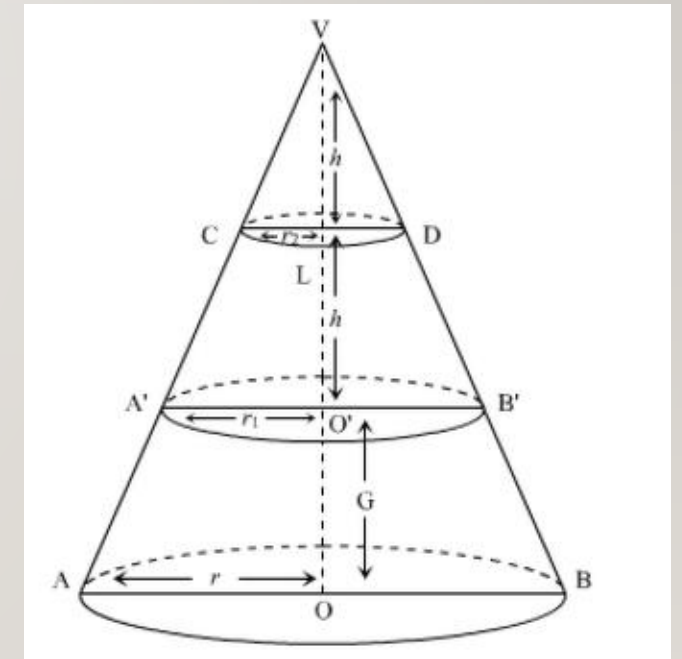
A. 125 : 729 : 1728

B. 125 : 604 : 999



C. 27 : 343 : 1728

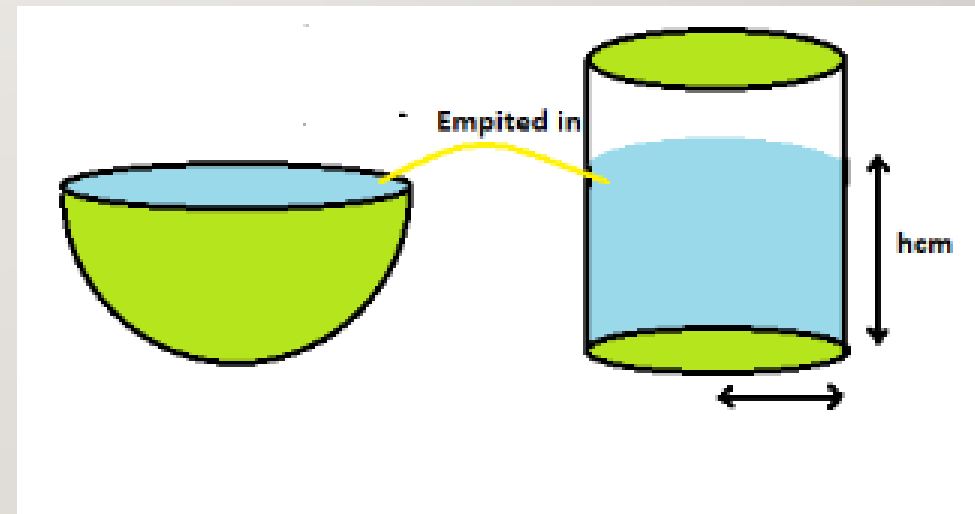
D. None of these



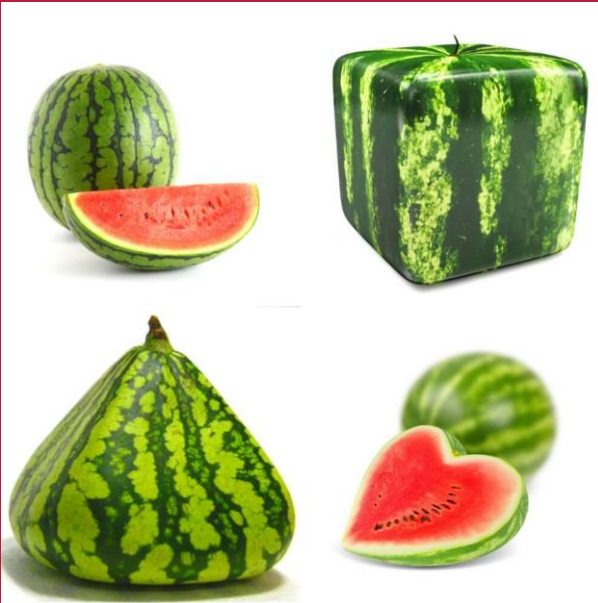
PROBLEM 14

A hemispherical bowl is filled with hot water to the brim. The contents of the bowl are transferred into a cylindrical vessel whose radius is 50% more than its height. If diameter of the bowl is the same as that of the vessel, the volume of the hot water in the cylindrical vessel is

- A. 60% of the cylindrical vessel
- B. 80% of the cylindrical vessel
- C. 100% of the cylindrical vessel ✓
- D. None of the above



PROBLEM 15



A customer wants to buy water-melon for making juice, for which the skin of the water-melon must be peeled off, and therefore is a waste. Which shape should the customer buy?

A. Hemi-sphere

B. Cuboid

C. Cylinder

D. Normal spherical



PROBLEM 16

A child was asked to consume half the ice cream which is in the shape of an inverted right-circular cone. Instead, the child ate half to its height. How much is part left for the child's father?

A. 50%

B. 37.5%


C. 25 %

D. 12.5%




PROBLEM 17

In a shower 10 cm of rain falls, what will be the volume of water that falls on 1 hectare area of ground?

- A. 500 m³
- B. 650 m³
- C. 1000 m³ 
- D. 750 m³
- E. 800 cm³

PROBLEM 18

Find the number of bricks, each measuring 25 cm * 12.5 cm * 7.5 cm, required to construct a wall 12 m long, 5 m high, and 0.25 m thick, while the sand and cement mixture occupies 5% of the total volume of the wall?

- A. 6080 
- B. 3040
- C. 1520
- D. 12160
- E. 9200

PROBLEM 19

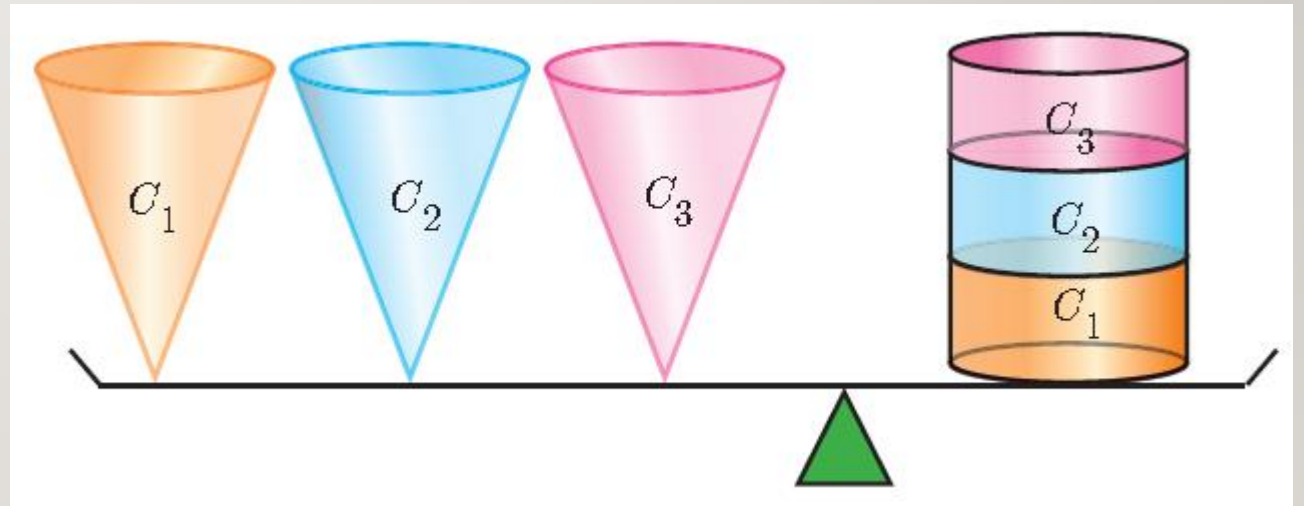
A solid metallic cylinder of base radius 6 cm and height 15 cm is melted to make n solid cones of height 5 cm and base radius 2 cm. Find the value of n .

A. 81 👍

B. 63

C. 72

D. 96



PROBLEM 20

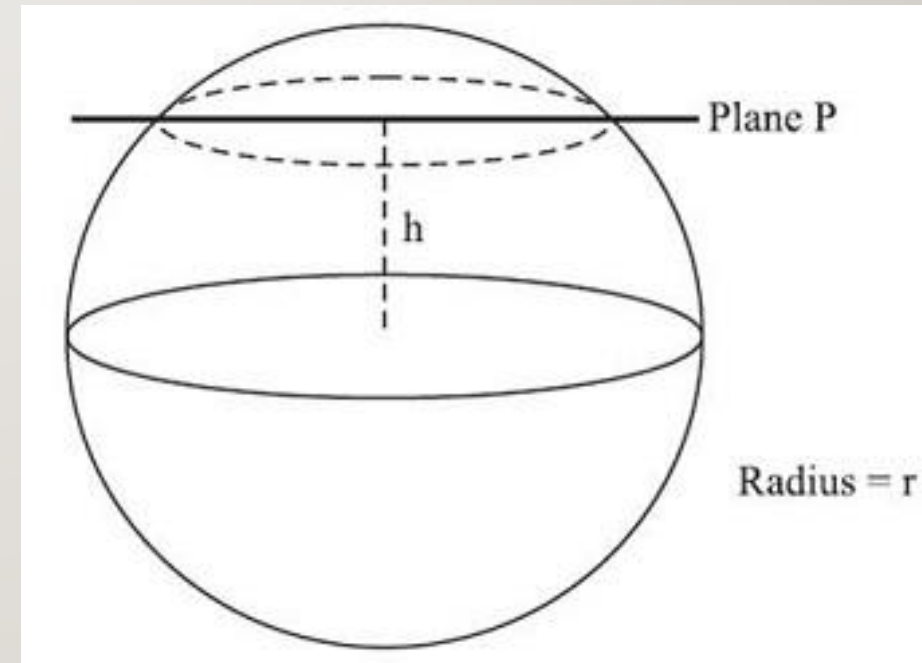
A sphere of radius r is cut by a plane at a distance h from its center, thereby breaking this sphere into two different pieces. The cumulative surface area of these two pieces is 25% more than that of the sphere. Find h .

A. $r/\sqrt{2}$ 🧐

B. $r/\sqrt{3}$


C. $r/\sqrt{5}$

D. $r/\sqrt{6}$



PROBLEM 21

Three pipes are made of different shapes. The cross-sections of the pipes are an equilateral triangle, a hexagon and a circle. The perimeter of each of these cross-sections is equal. The flow through the pipes is proportional to the area of cross section. If it takes 8 minutes for the triangular pipe to fill up the tank, what will be the difference in the time taken by the hexagonal and circular pipes?

- A. 45 seconds
- B. 1 minute
- C. 0.5 minutes 
- D. 7.9 minutes

PROBLEM 22

Three tennis balls are put in each cylindrical can and they are packed in a carton box. Each can have a radius of 7 cm and height of 30 cm. Dimension of the box is $l = 76$ cm, $b = 46$ cm, $h = 45$ cm. What is the maximum number of balls that can fit in the box?

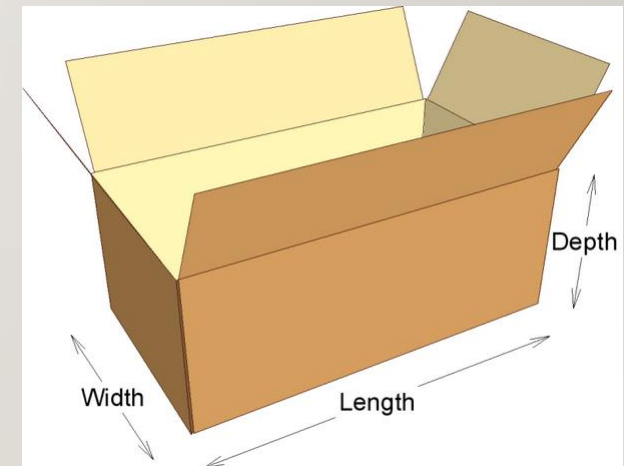
A. 45

B. 51

C. 66



D. 63



PROBLEM 23

Suppose you tie a rope tightly around the Earth's equator. You add an extra 10 meter to the length. All around the Earth the rope is raised up uniformly as high as is possible to make it tight again. Is it possible for an ant, or flea, or a rabbit or even a man squeeze underneath it?



Thank You

NARAYAN

CIR