

#427766

Topic: Cuboid and Cube

If one side of a cube is 13 metres, find its volume.

Answer: 2197

Solution

Given, side of a cube 13 metres

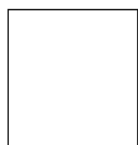
The volume of a cube = (side)<sup>3</sup>

$$= (13)^3$$

$$= 2197 m^3$$

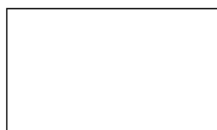
#463309

Topic: Rectangles and Squares



60m

(a)



80 m

(b)

A square and a rectangular field with measurements as given in the figure have the same perimeter. Which field has larger area?

Solution

Let the side of square field be  $a = 60m$

Let the length of rectangular field be  $l = 80m$  and breadth be  $b$  m.

Perimeter of square = Perimeter of rectangle

$$4 \times a = 2(l + b)$$

$$4 \times 60 = 2(80 + b)$$

$$b = 40$$

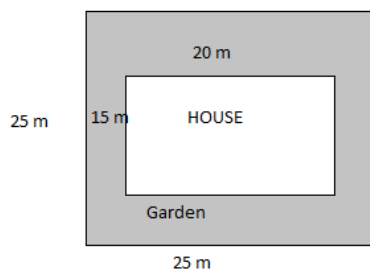
$$\text{Area of square} = 60 \times 60 = 3600 m^2$$

$$\text{Area of rectangle} = 80 \times 40 = 3200 m^2$$

So, area of square is greater than area of rectangle.

#463310

Topic: Rectangles and Squares



Mrs kaushik has a square plot with the measurement as shown in the figure. She wants to construct a house in the middle of the plot. A garden is developed around the house.

Find the total cost of developing a garden around the house at the rate of Rs 55 per sq. metre.

**Solution**

Area of remaining portion = Area of square plot – Area of house

$$= (25 \times 25) - (15 \times 20)$$

$$= 325 \text{ sq. metre}$$

$$\text{Total cost} = \text{Rs } (325 \times 55) = \text{Rs } 17,875$$

**#463318**

**Topic:** Trapezium, Parallelogram and Rhombus

A flooring tile has the shape of a parallelogram whose base is 24 cm and the corresponding height is 10 cm. How many such tiles are required to cover a floor of area 1080 sq. metre.

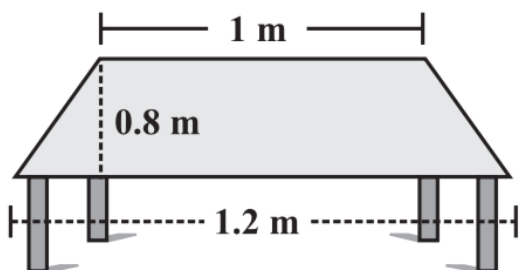
**Solution**

$$\text{Area of one tile} = 24 \times 10 = 240 \text{ cm}^2$$

$$\text{Required no. of tiles} = \frac{\text{Total Area}}{\text{Area of one tile}} = \frac{1080 \times 10000}{240} = 45000 \text{ tiles}$$

**#463320**

**Topic:** Trapezium, Parallelogram and Rhombus



The shape of the top surface of a table is trapezium. Find its area if its parallel sides are 1 m and 1.2 m and perpendicular distance between them is 0.8 m.

**Solution**

Area of trapezium

$$= \frac{1}{2} \times \text{Sum of Parallel Sides} \times \text{Distance between parallel sides}$$

$$= \frac{1}{2} \times (1 + 1.2) \times 0.8 = 0.88 \text{ sq. metres}$$

**#463321**

**Topic:** Trapezium, Parallelogram and Rhombus

The area of the trapezium is 34 sq cm and the length of one of the parallel side is 10 cm and its height is 4 cm. Find the length of the parallel side.

**Solution**

Area of Trapezium

$$= \frac{1}{2} \times \text{Sum of Parallel Sides} \times \text{Distance between parallel sides}$$

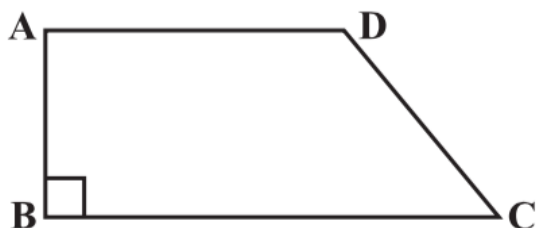
$$\Rightarrow 34 = \frac{1}{2} \times (10 + x) \times 4$$

$$\Rightarrow x = 7$$

Length of other parallel side of trapezium is 7 cm

**#463322**

**Topic:** Trapezium, Parallelogram and Rhombus



Length of the fence of a trapezium shaped field  $ABCD$  is 120 m. If  $BC = 48$  m,  $CD = 17$  m and  $AD = 40$  m, find the area of this field.

Side  $AB$  is perpendicular to the parallel sides  $AD$  and  $BC$ .

#### Solution

Length of fence of trapezium  $ABCD = AB + 17 + 48 + 40$

$$\Rightarrow 120 = 105 + AB$$

$$\Rightarrow AB = 15 \text{ m}$$

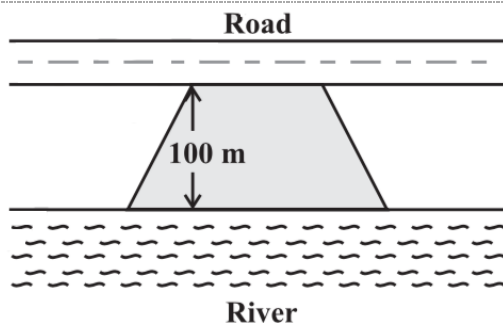
Area of trapezium

$$= \frac{1}{2} \times \text{Sum of Parallel sides} \times \text{Distance between Parallel sides}$$

$$= \frac{1}{2} [(40 + 48) \times 15] = 660 \text{ sq. metres}$$

#463583

Topic: Trapezium, Parallelogram and Rhombus



Mohan wants to buy a trapezium shaped field. Its sides along the river is parallel to and twice the sides along the road. If the area of this field is 10500 sq metre and the perpendicular distance between the two parallel sides is 100 m , find the length of the side along the river.

#### Solution

$$\text{Area of trapezium} = \frac{1}{2} \times [(l + 2l)/100] = 10500$$

$$\Rightarrow 3l = 210$$

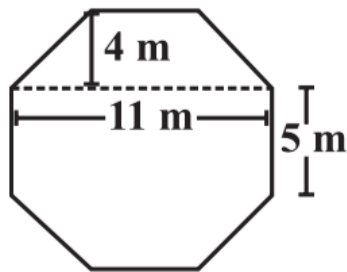
$$\Rightarrow l = 70m$$

Length of field along the road =  $70m$

Length of the field along the river =  $2 \times 70 = 140m$

#463589

Topic: Polygons



Top surface of a raised platform is in the shape of a rectangular octagon as shown in the figure. Find the area of the octagon surface.

**Solution**

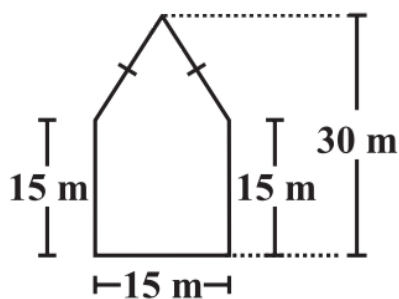
Area of rectangle =  $11 \times 5 = 55$  sq. metre

Area of trapezium =  $\frac{1}{2} \times 4 \times 16 = 32$  sq. metre

Total area =  $2 \times 32 + 55 = 119$  sq. metre

**#463637**

**Topic:** Polygons



**Jyoti's diagram**



**Kavita's diagram**

There is a pentagonal shaped park as shown in figure. For finding its area jyoti and kavita divided it into two different ways. Find the area of the park using both the ways.

**Solution**

Jyoti's way

Area of pentagon =  $2 \times \frac{1}{2} \times (15 + 30) \times \frac{15}{2} = 337.5$  sq. metre

Kavita's way

Area of pentagon =  $\left( \frac{1}{2} \times 15 \times 15 \right) + (15 \times 15) = 337.5$  sq. metre

**#463643**

**Topic:** Trapezium, Parallelogram and Rhombus

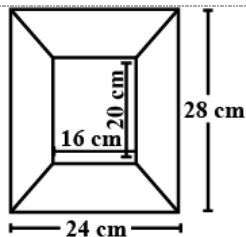


Diagram of the adjacent picture frame has outer dimensions =  $24 \text{ cm} \times 28 \text{ cm}$  and inner dimensions  $16 \text{ cm} \times 20 \text{ cm}$ . Find the area of each section of the frame, if the width of each section is same.

**Solution**

$$IB = BJ = CK = CL = DM = DN = AO = AP$$

$$IL = IB + BC + CL$$

$$IB = CL = 4 \text{ cm}$$

$$IB = BJ = CK = CL = DM = DN = AO = AP = 4 \text{ cm}$$

$$\text{Area of section } BEFC = \text{Area of section } DGHA$$

$$= \left( \frac{1}{2} \times (20 + 28) \times 4 \right) = 96 \text{ sq cm}$$

#463710

Topic: Cylinder

A closed cylindrical tank of radius 7 m and height 3 m is made from a sheet of metal. How much sheet of metal is required?

**Solution**

Given, radius  $r = 7 \text{ m}$ , height  $= 3 \text{ m}$

We need to find total surface area of cylinder  $= 2\pi r(r + h)$

$$= 2 \times \frac{22}{7} \times 7(7 + 3) = 440 \text{ sq meter}$$

So, 440 sq m sheet of metal is required.

#463711

Topic: Cylinder

The lateral surface area of a hollow cylinder is  $4224 \text{ cm}^2$ . It is cut along its height and formed a rectangular sheet of width 33 cm. Find the perimeter of rectangular sheet?

**Solution**

Area of cylinder = area of rectangular sheet

$$\Rightarrow 4224 = 33 \times l$$

$$\Rightarrow l = 128 \text{ cm}$$

$$\text{Perimeter of rectangular sheet} = 2[128 + 33] = 322 \text{ cm}$$

#463712

Topic: Cylinder



A road roller takes 750 complete revolutions to move once over to level a road. Find the area of the road if the diameter of a road roller is 84 cm and length is 1 m.

**Solution**

$$\text{Area of road covered in 1 revolution} = 2\pi rl = 2 \times \frac{22}{7} \times 42 \times 1 = \frac{264}{100} \text{ sq m}$$

$$\text{Area of road covered in 750 revolution} = 750 \times \left( \frac{264}{100} \right) = 1980 \text{ sq m}$$

#463714

Topic: Cylinder



Given a cylindrical tank, in which situation will you find surface area and in which situation volume.

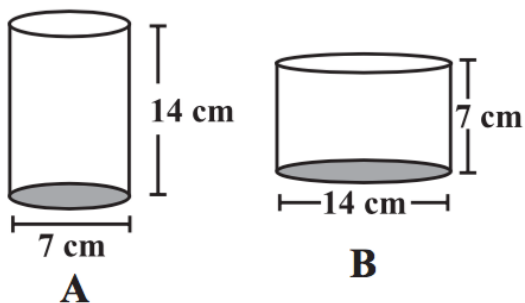
- (a) To find how much it can hold.
- (b) Number of cement bags required to plaster it.
- (c) To find the number of smaller tanks that can be filled with water from it.

#### Solution

- (a) In this case, we will find the volume
- (b) In this case, we will find the surface area
- (c) In this case, we will find the volume.

#463715

Topic: Cylinder



Diameter of cylinder *A* is 7 cm, and the height is 14 cm. Diameter of cylinder *B* is 14 cm and height is 7 cm. Without doing any calculations can you suggest whose volume is greater? Verify it by finding the volume of both the cylinders. Check whether the cylinder with greater volume also has greater surface area?

#### Solution

$$\text{Volume of cylinder } A = \left( \frac{22}{7} \times \frac{7}{2} \times \frac{7}{2} \times 14 \right) = 539 \text{ cubic cm}$$

$$\text{Volume of cylinder } B = \left( \frac{22}{7} \times 7 \times 7 \times 7 \right) = 1078 \text{ cubic cm}$$

volume of cylinder *B* is greater

$$\text{Surface area of cylinder } A = \left( 2 \times \frac{22}{7} \times \frac{7}{2} \times \frac{7}{2} + 14 \right) = 385 \text{ sq cm}$$

$$\text{Surface area of cylinder } B = \left( 2 \times \frac{22}{7} \times 7 \times (7 + 7) \right) = 616 \text{ sq cm}$$

Surface area of cylinder *B* is also greater than the surface area of cylinder *A*.

#463718

Topic: Cylinder

Find the height of the cylinder whose volume is 1.54 m and diameter of the base is 140 cm ?

**Solution**

$$\text{Radius of base of cylinder} = \frac{140}{2} = 70 \text{ cm} = 0.70 \text{ m}$$

$$\text{Volume of cylinder} = \frac{22}{7} \times 0.70 \times 0.70 \times h = 1.54$$

$$\therefore h = \frac{(1.54 \times 100)}{(22 \times 7)} \text{ m} = 1 \text{ m}$$

So, height of cylinder is 1 m

#463719

Topic: Cylinder



A milk tank is in the form of cylinder whose radius is 1.5 m and length is 7 m. Find the quantity of milk in litres that can be stored in the tank?

**Solution**

$$\text{Volume of cylinder} = \left( \frac{22}{7} \times 1.5 \times 1.5 \times 7 \right) = 49.5 \text{ cu. m}$$

$$\text{Required quantity} = 49.5 \times 1000 = 49500 \text{ l}$$

#463745

Topic: Rectangles and Squares

In a stack there are 5 books each of thickness 20mm and 5 paper sheets each of thickness 0.016 mm. What is the total thickness of the stack?

**Solution**

$$\text{Thickness of 5 books} = 5 \times 20 = 100 \text{ mm}$$

$$\text{Thickness of 5 paper sheets} = 5 \times 0.016 = 0.080 \text{ mm}$$

$$\begin{aligned} \text{Total thickness of stack} &= 100 + 0.080 = 100.08 \text{ mm} \\ &= 1.0008 \times 10^2 \end{aligned}$$

#464114

Topic: Cuboid and Cube

A plastic box 1.5 m long, 1.25 m wide and 65 cm deep is to be made. It is opened at the top. Ignoring the thickness of the plastic sheet,

(i) determine the area of the sheet

(ii) the cost of sheet for it, if a sheet measuring 1 m<sup>2</sup> costs Rs.20.

**Solution**

Length of box = 1.5 m, Breadth = 1.25 m, Height = 0.65 m

(i) Area of sheet required =  $2lh + 2bh + lb$  [Box is open]

$$= [2 \times 1.5 \times 0.65 + 2 \times 1.25 \times 0.65 + 1.5 \times 1.25] \text{ m}^2$$

$$= (1.95 + 1.625 + 1.875) \text{ m}^2 = 5.45 \text{ m}^2$$

ii) Cost of sheet per  $\text{m}^2$  area = Rs. 20

Cost of sheet of  $5.45 \text{ m}^2$  area = Rs.  $5.45 \times 20$

$$= \text{Rs. } 109$$

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#### #464116

Topic: Cuboid and Cube

The length, breadth and height of a room are 5m, 4m and 3 m respectively. Find the cost of white washing the walls of the room and the ceiling at the rate of 7.50 per  $\text{m}^2$ .

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#### Solution

$$L = 5 \text{ m}, B = 4 \text{ m}, H = 3 \text{ m}$$

Area to be white washed = Area of walls + Area of ceiling of room.

$$= 2lh + 2bh + lb$$

$$= [2 \times 5 \times 3 + 2 \times 4 \times 3 + 5 \times 4] \text{ m}^2$$

$$= 74 \text{ m}^2$$

Cost of white washing per  $\text{m}^2$  area = Rs. 7.50

Cost of white washing  $74 \text{ m}^2$  area =  $74 \times 7.50$

$$= \text{Rs. } 555$$

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#### #464117

Topic: Cuboid and Cube

The floor of a rectangular hall has a perimeter 250 m. If the cost of painting the four walls at the rate of 10 per  $\text{m}^2$  is 15000, find the height of the hall (in meters).

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#### Solution

Area of 4 walls =  $2lh + 2bh$

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

Perimeter of floor of wall =  $2l + 2b$

$$2(l + b) = 250 \text{ m}$$

$$\therefore \text{Area of 4 walls} = 2(l + b)h$$

$$= 250h \text{ m}^2$$

Cost of painting per  $\text{m}^2$  area = Rs. 10

Cost of painting  $250h \text{ m}^2$  area = Rs.  $(250h \times 10)$

$$= \text{Rs. } 2500h$$

Painting cost of walls = Rs. 15000

$$2500h = 15000$$

$$h = \frac{15000}{2500}$$

$$h = 6 \text{ m}$$

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#### #464123

Topic: Cuboid and Cube

A small indoor greenhouse (herbarium) is made entirely of glass panes (including base) held together with tape. It is 30 cm long, 25 cm wide and 25 cm high.

(i) What is the area of the glass?

(ii) How much of tape is needed for all the 12 edges?

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#### Solution



(i) Total S.A of green house =  $2(lb + bh + lb)$

$$2(30 \times 25 + 30 \times 25 + 25 \times 25) \\ = 4250 \text{ cm}^2$$

(ii) For 12 edges: Total length =  $4 \times l + 4b + 4h$

$$4(30 + 25 + 25) \\ = 320 \text{ cm}$$

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**#464175**

**Topic:** Cuboid and Cube

A match box measures 4 cm  $\times$  2.5 cm  $\times$  1.5 cm. What will be the volume of a packet containing 12 such boxes?

**Solution**

$$l = 4, b = 2.5, h = 1.5$$

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

$$= 4 \times 2.5 \times 1.5 \text{ cm}^3$$

$$= 15 \text{ cm}^3$$

$$\text{Volume of 12 matchboxes} = 12 \times 15 \text{ cm}^3$$

$$= 180 \text{ cm}^3$$

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**#464177**

**Topic:** Cuboid and Cube

A cuboidal water tank is 6 m long, 5 m wide and 4.5 m deep. How many litres of water can it hold?

**Solution**

$$\text{Volume of tank} = l \times b \times h$$

$$l = 6 \text{ m}, b = 5 \text{ m}, h = 4.5 \text{ m}$$

$$V = 6.5 \times 5 \times 4.5 = 135 \text{ m}^3$$

$$\text{Amount of water hold by } 1 \text{ m}^3 \text{ volume} = 1000 \text{ l}$$

$$\text{Amount of water hold by } 135 \text{ m}^3 \text{ volume} = 135 \times 1000$$

$$= 135000 \text{ l}$$

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**#464178**

**Topic:** Cuboid and Cube

A cuboidal vessel in 10 m long and 8 m wide. How high must it be made to hold 380 cubic metres of a liquid?

**Solution**

$$l = 10 \text{ m}, b = 8 \text{ m}$$

Let height of a cuboidal vessel be  $h$

$$V = l \times b \times h = 10 \times 8 \times h$$

$$= 380 \text{ m}^3$$

$$h = \frac{380}{80} \text{ m}^3 = 4.75 \text{ m}^3$$

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**#464180**

**Topic:** Cuboid and Cube

Find the cost of digging a cuboidal pit 8 m long, 6 m broad and 3 m deep at the rate of 30 per  $\text{m}^3$ .

**Solution**

$$l = 8 \text{ m}, b = 6 \text{ m}, h = 3 \text{ m}$$

$$\text{Volume} = l \times b \times h = (8 \times 6 \times 2) \text{ m}^3 = 144 \text{ m}^3$$

$$\text{Cost of digging per m}^3 \text{ volume} = \text{Rs.} 30$$

$$\text{Cost of digging per } 144 \text{ m}^3 \text{ volume} = \text{Rs.} 144 \times 30$$

$$= \text{Rs. } 4320$$

#464182

Topic: Cuboid and Cube

The capacity of a cuboidal tank is 50000 litres of water. Find the breadth of the tank, if its length and depth are respectively 2.5 m and 10 m

**Solution**

Let breadth( $b$ ) =  $x$  m

$$l = 2.5 \text{ m}, h = 10 \text{ m}$$

$$V = l \times b \times h = (2.5 \times x \times 10) \text{ m}^3$$

$$= 25x \text{ m}^3$$

$$\text{Capacity of a tank} = 25x \text{ m}^3 = 50000 \text{ litres}$$

$$\Rightarrow 25x \text{ m}^3 = 50 \text{ m}^3$$

$$\Rightarrow x = 2$$

$$\text{Hence, } b = 2 \text{ m.}$$

#464183

Topic: Cuboid and Cube

A village, having a population of 4000, requires 150 litres of water per head per day. It has a tank measuring 20 m  $\times$  15 m  $\times$  6 m. For how many days will the water of this tank last?

**Solution**

$$\text{Capacity of tank} = l \times b \times h = (20 \times 15 \times 6) \text{ m}^3$$

$$= 1800 \text{ m}^3$$

$$= 1800000 \text{ litre}$$

$$\text{Consumption of water in 1 day} = 4000 \times 150 \text{ litres}$$

$$= 600000 \text{ litres}$$

$$\text{Water of this tank will last for} = \frac{1800000}{600000}$$

$$= 3 \text{ days}$$

#464184

Topic: Cuboid and Cube

A godown measures 40 m  $\times$  25 m  $\times$  15 m. Find the maximum of wooden crates each measuring 1.5 m  $\times$  1.25 m  $\times$  0.5 that can be stored in the godown.

**Solution**

$$\text{Volume of godown} = l \times b \times h = 40 \times 25 \times 10 \text{ m}^3$$

$$= 15000 \text{ m}^3$$

$$\text{Volume of 1 wooden crate} = 1.5 \times 1.25 \times 0.5$$

$$= 0.9375 \text{ m}^3$$

$$\text{No. of wooden crate stored in godown}$$

$$\frac{10000}{0.93750}$$

$$= 10693.75$$

$$= 10693$$

$$\therefore 10693 \text{ crates can be proved}$$

#464187

Topic: Cylinder

The circumference of the base of a cylindrical vessel is 132 cm and its height is 25cm. How many litres of water can it hold?

**Solution**

Let radius =  $x$

Given,  $h = 25\text{cm}$ , Circumference = 132cm

$$2\pi r = 132$$

$$r = \frac{132 \times 7}{2 \times 22}$$

$$r = 21\text{cm}$$

$$\text{Volume} = \pi r^2 h = \frac{22}{7} \times (21)^2 \times 25$$

$$= 34650\text{cm}^3$$

$$= 34.65 \text{ litres}$$

#464190

Topic: Cylinder

A soft drink is available in two packs-

(i) a tin can with a rectangular base of length 5 cm and width 4 cm, having a height of 15 cm

(ii) a plastic cylinder with circular base of diameter 7 cm and height 10 cm.

Which container has greater capacity and by how much?

**Solution**

Length = 5cm [Tin can]

Breadth = 4cm

Height = 15cm

$$\text{Capacity volume} = l \times b \times h = 5 \times 4 \times 15$$

$$= 300\text{cm}^3$$

$$\text{Radius of cylinder} = \frac{7}{2} = 3.5 \text{ cm, } H = 10\text{cm}$$

$$\text{Capacity} = \pi R^2 H = \left( \frac{22}{7} \times (3.5)^2 \times 10 \right) \text{cm}^3$$

$$\text{Cylinder has more capacity by} = (385 - 300)\text{cm}^3$$

$$= 85\text{cm}^3$$

#464192

Topic: Cylinder

If the lateral surface area of a cylinder is 94.2 cm<sup>2</sup> and its height is 5 cm, then find

(i) radius of its base and

(ii) its volume

**Solution**

Given,  $h = 5\text{cm}$

Let radius =  $r$

$$(i) \text{ Curved Surface Area} = 94.2\text{cm}^2 = 2\pi rh$$

$$94.2 \text{ cm}^2 = 2 \times 3.14 \times r \times 5\text{cm}$$

$$r = 3\text{cm}$$

$$(ii) \text{ Volume of cylinder} = \pi r^2 h = 3.14 \times 3 \times 3 \times 5$$

$$= 141.2\text{cm}^3$$

#464193

Topic: Cylinder

If costs 2200 to paint the inner curved surface of a cylindrical vessel 10 m deep. If the cost of painting is at the rate of 20 per m<sup>2</sup>, find

- (i) inner curved surface area of the vessel,
- (ii) radius of the base and
- (iii) capacity of the vessel.

**Solution**

(i) Cost of painting 1m<sup>2</sup> area = Rs.20

Rs.20 is cost painting 1 m<sup>2</sup> area

$$\text{Rs.2200 is cost of painting} = \frac{2200}{20} m^2$$

= 110m<sup>2</sup> area

(ii) Let radius =  $r$ ,  $h = 10\text{m}$ ,  $SA = 2\pi rh = 110$

$$r = \frac{110 \times 7}{22 \times 2 \times 10} = \frac{7}{4} = 1.75 \text{ m}$$

(iii) Volume of vessel  $= \pi r^2 h = \frac{22}{7} \times 1.75 \times 1.75 \times 10$

$$= 96.25 \text{ m}^3$$

96250 litres

#464195

Topic: Cylinder

The capacity of a closed cylindrical vessel of height 1 m is 15.4 litres. How many square metres of metal sheet would be needed to make it?

**Solution**

Given,  $h = 1\text{m}$ ,  $V = 15.4\text{l} = 0.0154 \text{ m}^3$

Let radius =  $r$

$$0.0154 = \pi r^2 h = \frac{22}{7} \times r^2 \times 1, r = 0.07\text{m}$$

Total Surface Area =  $2\pi r^2 + 2\pi rh$

$$= 2 \times 227 \times 0.07(0.07H)$$

$$= 0.44 \times 1.074 \text{ m}^2$$

$$= 0.4708 \text{ m}^2$$

#464196

Topic: Cylinder

A lead pencil consists of a cylinder of wood with a solid cylinder of graphite filled in the interior. The diameter of at the pencil is 7 mm and the diameter of the graphite is 1 mm. If the length of the pencil is 14 cm, find the volume of the wood and that of the graphite.

**Solution**

$$\text{Radius of pencil} = \frac{7}{2} \text{ mm} = 3.5 \text{ mm}$$

$$0.35 \text{ cm} = r_p$$

$$h = 14 \text{ cm, radius of graphite} = \frac{1}{2} \text{ mm}$$

$$= 0.05 \text{ cm}$$

$$\text{Volume of wood in pencil} = \pi(r_p^2 - r_g^2)h$$

$$\frac{22}{7} [(0.35)^2 - (0.05)^2 \times 14]$$

$$= \frac{22}{7} (0.1225 - 0.0025) \times 14$$

$$= 44 \times 0.12 = 5.28 \text{ cm}^3$$

$$\text{Volume of a graphite} = \pi r_g^2 h$$

$$= \frac{22}{7} \times (0.05)^2 \times 14 \text{ cm}^3$$

$$= 44 \times 0.0025 \text{ cm}^3$$

$$= 0.11 \text{ cm}^3$$

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**#464197****Topic:** Cylinder

A patient in a hospital is given soup daily in a cylindrical bowl of diameter 7 cm. If the bowl is filled with soup to a height of 4 cm, how much soup the hospital has the prepare daily to serve 250 patients.

**Solution**

$$\text{Radius} = \frac{7}{2} \text{ cm, height of bowl} = 4 \text{ cm (soup land)}$$
$$= \frac{7}{2} = 3.5$$

$$\text{Volume of soup} = \pi r^2 h$$

$$= \frac{22}{7} \times 3.5 \times 3.5 \times 4$$

$$= 154 \text{ cm}^3$$

$$\text{Volume of soup given to 250 patients} = 250 \times 154$$

$$= 38500 \text{ cm}^3$$

$$= \frac{38500}{1000} \text{ l}$$

$$= 38.5 \text{ l}$$

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**#464200****Topic:** Cylinder

Find the volume of the right circular cone with

(i) radius 6 cm, height 7 cm.

(ii) radius 3.5 cm, height 12 cm

**Solution**

(i) radius = 6 cm,  $h = 7$  cm

$$\begin{aligned}\text{Volume} &= \frac{1}{3} \pi r^2 h = \frac{1}{3} \times \frac{22}{7} \times 6 \times 6 \times 7 \\ &= 44 \times 6 = 264 \text{ cm}^3\end{aligned}$$

(ii)  $r = 3.5$  cm,  $h = 12$

$$\begin{aligned}\text{Vol} &= \frac{1}{3} \pi r^2 h = \frac{1}{3} \times \frac{22}{7} \times 3.5 \times 3.5 \times 12 \\ &= 154 \text{ cm}^3\end{aligned}$$

---

**#464203**

**Topic:** Cylinder

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.

**Solution**

$$\begin{aligned}\text{(i) } r = 7, l &= 25 \text{ cm, } h = \sqrt{l^2 - r^2} \\ &= \sqrt{25^2 - 7^2} = \sqrt{576}\end{aligned}$$

$$h = 24$$

$$\begin{aligned}V &= \frac{1}{3} \pi r^2 h = \frac{1}{3} \times \frac{22}{7} \times 7 \times 24 \\ &= 154 \times 8 = 1232 \text{ cm}^3 \\ &= 1.232 \text{ litres}\end{aligned}$$

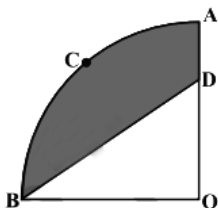
$$\begin{aligned}\text{(ii) } h &= 12 \text{ cm, } l = 13 \text{ cm, } r = \sqrt{l^2 - h^2} \\ \sqrt{13^2 - 12^2} &= \sqrt{25} = 5\end{aligned}$$

$$\begin{aligned}\text{Vol} &= \frac{1}{3} \pi r^2 h = \frac{1}{3} \times \frac{22}{7} \times 5 \times 5 \times 12 \\ &= \frac{2200}{7} \text{ cm}^3 = \frac{2200}{7 \times 1000} \text{ litres} \\ &= \frac{11}{35} \text{ litres}\end{aligned}$$

---

**#465243**

**Topic:** Circles and Ring



In Fig.,  $OACB$  is a quadrant of a circle with centre  $O$  and radius  $3.5$  cm. If  $OD = 2$  cm, find the area of the

(i) quadrant  $OACB$ , (ii) Shaded region

**Solution**

(i)

$$\text{Area of quadrant } OACB = \frac{\text{Area of Circle}}{4} = \frac{1}{4} \times \frac{22}{7} \times 3.5 \times 3.5 = 9.625 \text{ cm}^2$$

(ii)

Area of shaded region = Area of Quadrant - Area of  $\triangle BDO$

$$= 9.625 - \left( \frac{1}{2} \times 3.5 \times 2 \right)$$

$$= 6.125 \text{ cm}^2$$

#470524

Topic: Circles and Ring



Fig. depicts an archery target marked with its five scoring regions from the centre outwards as Gold, Red, Blue, Black and White. The diameter of the region representing Gold score is  $21 \text{ cm}$  and each of the other bands is  $10.5 \text{ cm}$  wide. Find the area of each of the five scoring regions

**Solution**

Let  $r_1$ ,  $r_2$ ,  $r_3$ ,  $r_4$  and  $r_5$  be the radii of the gold, red, blue, black and white regions, respectively.

#### Gold region

$$d_1 = 2r_1 = 21\text{cm}$$

$$\therefore r_1 = \frac{21}{2} \text{ cm}$$

$$A_1 = \pi r_1^2 = \pi \left(\frac{21}{2}\right)^2 = \frac{441\pi}{4} \text{ cm}^2$$

$$A(\text{Gold region}) = 346.5 \text{ cm}^2$$

#### Red region

$$r_2 = r_1 + 10.5 = \frac{21}{2} + \frac{21}{2} = 21\text{cm}$$

$$A_2 = \pi r_2^2 = \pi (21)^2 = 1386 \text{ cm}^2$$

$$A(\text{Red region}) = A_2 - A_1 = 1039.5 \text{ cm}^2$$

#### Blue region

$$r_3 = r_2 + 10.5 = 21 + \frac{21}{2} = \frac{63}{2} \text{ cm}$$

$$A_3 = \pi r_3^2 = \pi \left(\frac{63}{2}\right)^2 = 3118.5 \text{ cm}^2$$

$$A(\text{Blue region}) = A_3 - A_2 = 1732.5 \text{ cm}^2$$

#### Black region

$$r_4 = r_3 + 10.5 = \frac{63}{2} + \frac{21}{2} = 42\text{cm}$$

$$A_4 = \pi r_4^2 = \pi (42)^2 = 5544 \text{ cm}^2$$

$$A(\text{Black region}) = A_4 - A_3 = 2425.5 \text{ cm}^2$$

#### White region

$$r_5 = r_4 + 10.5 = 42 + \frac{21}{2} = \frac{105}{2} \text{ cm}$$

$$A_5 = \pi r_5^2 = \pi \left(\frac{105}{2}\right)^2 = 8662.5 \text{ cm}^2$$

$$A(\text{White region}) = A_5 - A_4 = 3118.5 \text{ cm}^2$$

---

#470525

Topic: Circles and Ring



The wheels of a car are of diameter  $80\text{ cm}$  each. How many complete revolutions does each wheel make in 10 minutes when the car is travelling at a speed of 66 km per hour?

**Solution**

Diameter of wheel ( $D$ ) =  $80\text{ cm}$

Radius ( $r$ ) =  $\frac{80}{2} = 40\text{ cm}$ .

1 complete revolution of wheel = Circumference of wheel ( $C$ )

$$C = 2\pi r = 2\pi \times 40 = 80\pi\text{ cm}$$

$$C = 0.8\pi\text{ m}$$

$$\text{Speed of the car} = 66\text{ km / hr.} = \frac{66 \times 1000}{60}\text{ m/ min.}$$

$$\therefore \text{Speed of the car} = 1100\text{ m / min.}$$

Therefore, in 10min., the car will travel a distance of  $1100 \times 10 = 11000\text{ m}$

$$\text{No. of revolutions of wheel} = \frac{11000}{0.8\pi} = \frac{11000 \times 7}{0.8 \times 22} = 4375$$

Each wheel of the car makes 4375 complete revolutions in 10 min.

#427777

Topic: Cuboid and Cube

The volume of a cube is 512 cubic metres. Find the length of the side of the cube.

Answer: 8

Solution

Given, volume of cube = 512 cu.m

We know that, the volume of a cube (side)<sup>3</sup>

$$\begin{aligned}
 &= \sqrt[3]{512} \\
 &= \sqrt[3]{2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2} \\
 &= 2 \times 2 \times 2 = 8 \text{ m}
 \end{aligned}$$

#463207

Topic: Cuboid and Cube

Is a square prism same as a cube? Explain.

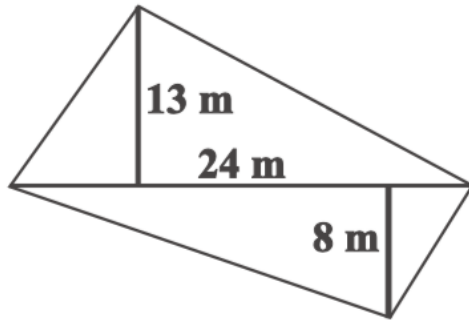
Solution

A square prism is a cube. A prism is "a solid geometrical figure whose two end faces are similar, equal, and parallel rectilinear figures and whose sides are parallelograms".

In the case of a cube, all sides are similar therefore it fits the definition of a square prism.

#463323

Topic: Quadrilateral



The diagonal of a quadrilateral shaped field is 24 m and the perpendiculars dropped on it from the remaining opposite vertices are 8 m and 13 m. Find the area of the field.

Solution

Area of the field

= Area of upper triangle + Area of Lower triangle

$$= \frac{1}{2} \times 13 \times 24 + \frac{1}{2} \times 8 \times 24$$

$$= 156 + 96 = 252 \text{ sq m}$$

#463324

Topic: Trapezium, Parallelogram and Rhombus

The diagonals of a rhombus are 7.5 cm and 12 cm. Find its area.

Solution

Area of rhombus

$$= \frac{1}{2} \times \text{Product of Diagonals}$$

$$= \frac{1}{2} \times (7.5 \times 12)$$

$$= 45 \text{ sq m}$$

---

**#463325**

**Topic:** Trapezium, Parallelogram and Rhombus

Find the area of a rhombus whose side is 5 cm and whose altitude is 4.8 cm. If one of its diagonal is 8 cm long, find the length of the other diagonal.

**Solution**

$$\text{Area of rhombus} = \text{Base} \times \text{Height} = \frac{1}{2} \times \text{Product of diagonals}$$

$$\Rightarrow 5 \times 4.8 = \frac{1}{2} \times (8 \times x)$$

$$\Rightarrow 24 = \frac{1}{2} \times (8 \times x)$$

$$\Rightarrow x = 6 \text{ cm}$$

---

**#463326**

**Topic:** Trapezium, Parallelogram and Rhombus

The floor of a building consists of 3000 tiles which are rhombus shaped and each of its diagonals are 45 cm and 30 cm in length. Find the total cost of polishing the floor, if the cost per sq. metre is Rs 4.

**Solution**

$$\text{Area of each tile} = \frac{1}{2} \times 45 \times 30 = 675 \text{ sq. cm}$$

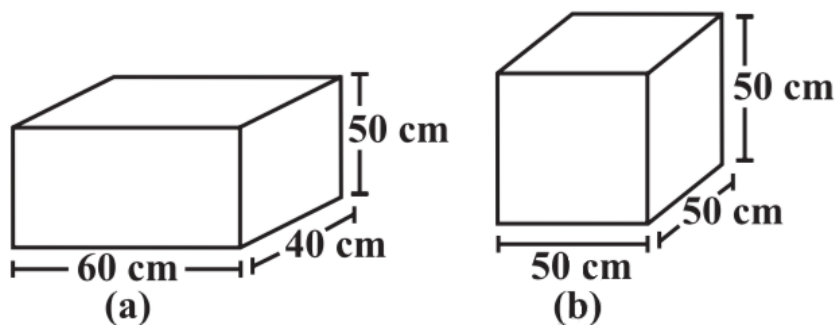
$$\text{Area of 3000 tiles} = 675 \times 3000 = 202.5 \text{ sq metre}$$

$$\text{Total cost} = \text{Rs } [202.5 \times 4] = \text{Rs } 810$$

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**#463651**

**Topic:** Cuboid and Cube



There are two cuboidal boxes as shown in the adjoining figure. Which box requires the lesser amount of material to make?

**Solution**

$$\begin{aligned} \text{Total surface area of cuboid} &= [2 \times (60 \times 40) + (40 \times 50) + (50 \times 60)] \\ &= 14800 \text{ sq cm} \end{aligned}$$

$$\text{total surface area of cube} = 6 \times 50 = 15000 \text{ sq cm}$$

So, the cuboidal box will require lesser amount of material.

#463656

Topic: Cuboid and Cube

A suitcase with measure 80 cm  $\times$  48 cm  $\times$  24 cm is to be covered with a tarpaulin cloth. How many metres of tarpaulin of width 96 cm is required to cover 100 such suitcases?

Solution

$$\text{T.S.A} = 2[(80 \times 48) + (48 \times 24) + (24 \times 80)] = 13824 \text{ sq cm}$$

$$\text{T.S.A of 100 suitcases} = 13824 \times 100 = 1382400 \text{ sq cm}$$

$$\text{Length of tarpaulin} = \frac{1382400}{96} = 14400 \text{ cm} = 144 \text{ m}$$

#463701

Topic: Cuboid and Cube

Find the side of a cube whose surface area is 600 sq. cm

Solution

$$\text{Surface area} = 600 \text{ sq.cm}$$

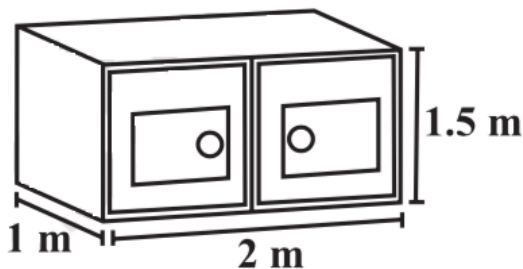
$$\Rightarrow 6l^2 = 600$$

$$\Rightarrow l = 10 \text{ cm}$$

$$\text{Side of cube} = 10 \text{ cm}$$

#463703

Topic: Cuboid and Cube



Rukhsar painted the outside of the cabinet of measure  $1\text{m} \times 2\text{m} \times 1.5\text{m}$ . How much surface area did she cover if she painted all except the bottom of the cabinet?

Solution

A cabinet has 6 surfaces including bottom surface.

However, we have to paint only 5 surfaces.

So, we have one front and one back surface ( $2 \times 1.5$ ),

one left and one right surface ( $1 \times 1.5$ ) and one upper surface ( $2 \times 1$ ).

So, area to be painted is

$$= (2 \times (2 \times 1.5)) + (2 \times (1 \times 1.5)) + (2 \times 1)$$

$$= 11 \text{ sq. m}$$

#463704

Topic: Cuboid and Cube

Daniel is painting the walls and ceiling of a cuboidal hall with length, breadth and height of 15 m, 10 m and 7 m respectively. From each can of paint 100 sq metre of area is painted. How many cans of paint will she need to paint the room?

Solution

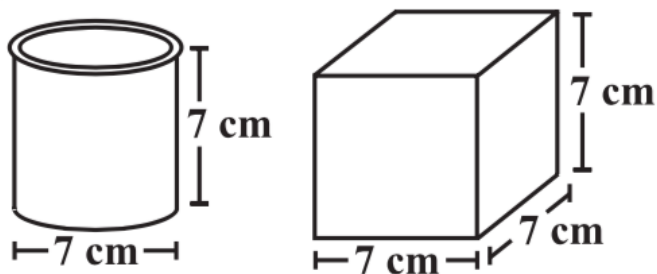
$$\text{Area to be painted} = \text{area of the walls} + \text{area of ceiling}$$

$$= [2 \times 7 \times (15 + 10) + (15 \times 10)] = 500 \text{ sq m}$$

$$\text{No. of cans required} = \frac{500}{100} = 5$$

#463708

Topic: Cylinder



Describe how the two figures at the right are alike and how they are different. Which box has larger lateral surface area ?

**Solution**

Both the figures have same heights.

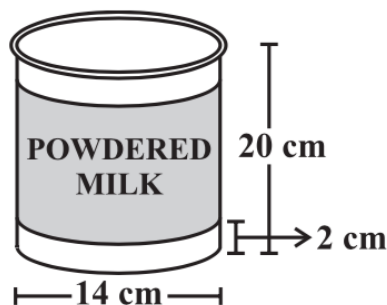
Lateral surface area of cube =  $4 \times 7 \times 7 = 196$  sq cm

lateral surface area of cylinder =  $2 \times \frac{22}{7} \times \frac{7}{2} \times 7 = 154$  sq cm

So, cube has larger surface area.

#463713

Topic: Cylinder



A company packages its milk powder in cylindrical container whose base has a diameter of 14 cm and height 20 cm. Company places a label around the surface of the container (as shown in the figure). If the label is placed 2 cm from top and bottom, what is the area of the label.

**Solution**

Height of the label =  $20 - 2 - 2 = 16$  cm

Radius =  $\frac{d}{2} = \frac{14}{2} = 7$  cm

Area of the label =  $2\pi rh = 2 \times \frac{22}{7} \times 7 \times 16 = 704$  sq cm

#463716

Topic: Cuboid and Cube

Find the height of a cuboid whose base area is 180 sq. cm and volume is 900 cu. cm?

**Solution**

Area =  $l \times b = 180$

Volume of cuboid =  $l \times b \times h = 900$

$\Rightarrow 180 \times h = 900$

$\Rightarrow h = \frac{900}{180} = 5$  cm

#463717

Topic: Cuboid and Cube

A cuboid is of dimensions 60 cm × 54 cm × 30 cm. How many small cubes with side 6 cm can be placed in the given cuboid?

**Solution**

Volume of cuboid =  $60 \times 54 \times 30 = 97200$  cu. cm

Volume of a cube =  $6 \times 6 \times 6 = 216$  cu. cm

Required no. of cubes =  $\frac{97200}{216} = 450$

**#463720**

**Topic:** Cuboid and Cube

If each edge of a cube is doubled,

(i) how many times will its surface area increase?

(ii) how many times will its volume increase?

**Solution**

(i) Initial surface area =  $6 \times l \times l$

New surface area =  $6 \times (2 \times l) \times (2 \times l) = 4 \times$  initial surface area.

So, the new surface area will be increased by 4 times.

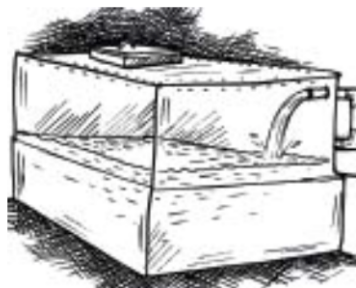
(ii) Initial volume =  $l \times l \times l$

Final volume =  $(2l) \times (2l) \times (2l) = 8 \times$  initial volume.

So, volume of the cube will be increased by 8 times.

**#463721**

**Topic:** Cuboid and Cube



Water is pouring into a cuboidal reservoir at the rate of 60 litres per minute. If the volume of reservoir is 108 m, find the number of hours it will take to fill the reservoir.

**Solution**

Volume of cuboidal reservoir =  $108 \times 1000 = 108000$  l

Required number of hours =  $\left( \frac{108000}{3600} \right) = 30$  hours

So, it will take 30 hrs to fill the reservoir

**#464118**

**Topic:** Cuboid and Cube

The paint in a certain is sufficient to paint an area equal to 9,375 m<sup>2</sup>. How many bricks of dimensions 22.5 cm × 10 cm × 7.5 cm can be painted out of this container?

**Solution**

$$\text{Total surface of cuboid (brick)} = 2(lb + bh + lh)$$

$$2(22.5 \times 10 + 10 \times 7.5 + 22.5 \times 7.5) \text{ cm}^2$$

$$= 2 \times 468.75 = 937.5 \text{ cm}^2$$

$$\text{Area that can be painted by part of container} = 9.375 \text{ m}^2$$

Let  $x$  number of bricks will be used.

$$\text{Area} = 937.5 \times x \text{ cm}^2$$

$$\frac{937.5}{10} = x$$

$$x = 100$$

---

**#464120**

**Topic:** Cuboid and Cube

A cubical box has each edge 10 cm and another cuboidal box is 12.5 cm long, 10 cm wide and 8 cm high.

(i) Which box has the greater lateral surface area and by how much?

(ii) Which box has the smaller total surface area and by how much?

**Solution**

(i) Lateral surface area of cube =  $4(\text{edge})^2$

$$= 4(10)^2 = 400 \text{ cm}^2$$

$$\text{Lateral surface area of cuboidal box} = 2(lh + bh)$$

$$2(12.5 \times 8 + 10 \times 8)$$

$$= 2 \times 180 = 360 \text{ cm}^2$$

$$\therefore \text{Lateral surface area of cubical box} > \text{Lateral surface area of cuboidal box}$$

$$\Rightarrow \text{Difference: } 400 - 360 \text{ cm}^2$$

$$= 40 \text{ cm}^2$$

(ii) Total surface area of cubical box =  $6(\text{edge})^2$

$$= (6)^2 = 300 \text{ cm}^2$$

$$\text{Total surface area of cuboidal box} = 2(lb + bh + lh)$$

$$2(12.5 \times 100 + 10 \times 8 + 12.5 \times 8)$$

$$= 610 \text{ cm}^2$$

$$\text{Total S.A of cuboidal box} < \text{cuboidal total S.A}$$

$$\text{Difference} = 610 - 600 \text{ cm}^2 = 10 \text{ cm}^2$$

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**#464125**

**Topic:** Cuboid and Cube

Shanti sweets stall was placing an order for making cardboard boxes for packing their sweets. Two sizes of boxes were required. The bigger of dimensions 25 cm  $\times$  20 cm  $\times$  5 cm and the smaller of dimensions 15 cm  $\times$  12 cm  $\times$  5 cm. For all the overlaps, 5% of the total surface area is required extra. If the cost of the cardboard is 4 for 1000  $\text{cm}^2$ , find the cost of cardboard required for supplying 250 boxes of each kind.

**Solution**

Total S.A of bigger box =  $2(lb + bh + lh)$

$$2(25 \times 20 + 25 \times 5 + 20 \times 5) \text{ cm}^2$$

$$2(500 + 125 + 100)$$

$$1450 \text{ cm}^2$$

$$\text{For overlapping extra area required} = \frac{450 \times 5}{100} = 72.5 \text{ cm}^2$$

$\therefore$  Total S.A (including overlaps)

$$= 1450 + 72.5 = 1522.5 \text{ cm}^2$$

Area of cardboard sheet for 250 such boxes

$$= (1522.5 \times 250) \text{ cm}^2$$

Total S.A of smaller box =  $2(15 \times 12 + 15 \times 5 + 12 \times 5) \text{ cm}^2$

$$= 630 \text{ cm}^2$$

$$\text{For overlapping area required} = \frac{630 \times 5}{100} = 31.5 \text{ cm}^2$$

Total S.A (including overlaps) =  $630 + 31.5 = 661.5 \text{ cm}^2$

Area of cardboard sheet required for 250 such boxes

$$= 250 \times 661.5 \text{ cm}^2 = 165375 \text{ cm}^2$$

Total cardboard sheet required =  $380625 + 165375$

$$= 546000 \text{ cm}^2$$

Cost of 1000  $\text{cm}^2$  cardboard sheet = Rs.4

$$\text{Cost of } 546000 \text{ cm}^2 \text{ cardboard sheet} = \text{Rs. } \frac{546000 \times 4}{1000}$$

$$= \text{Rs. } 2184$$

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#### #464127

**Topic:** Cuboid and Cube

Parveen wanted to make a temporary shelter for her car, by making a box-like structure with tarpaulin that covers all the four sides and the top of the car (with the front face as a flap which can be rolled up). Assuming that the stitching margins are very small, and therefore negligible, how much tarpaulin would be required to make the shelter of height 2.5 m, with base dimensions 4 m  $\times$  3m?

#### Solution

Area of tarpaulin required =  $2(lb + bh) + lb$  [because it will be required for top and four sides shelter]

$$= [2(4 \times 2.5 + 3 \times 2.5) + 4 \times 3] \text{ m}^2$$

$$= [2(10 + 7.5) + 12]$$

$$= 47 \text{ m}^2$$

---

#### #464128

**Topic:** Cylinder

The curved surface area of a right circular cylinder of height 14 cm is  $88 \text{ cm}^2$ . Find the diameter of the base of the cylinder.

#### Solution



Height = 14 cm

To calculate: diameter.

Let  $x$  be the diameter

Curved surface Area =  $88 \text{ cm}^2$

$$2\pi rh = 88$$

$$2r = x, \pi rh = 88$$

$$x = \frac{88 \times 7}{22 \times 14}$$

$$x = 2 \text{ cm}$$

Diameter = 2 cm

**#464129**

**Topic:** Cylinder

It is required to make a closed circular cylindrical tank of height 1 m and base diameter 140 cm from a metal sheet. How many square metres of the sheet are required for the same?

**Solution**

$$\text{Height} = 1 \text{ m, radius} = \frac{140}{2} \text{ cm} = 0.7 \text{ m}$$

Area of sheet required = Total surface area of tank

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

$$= 2 \times \frac{22}{7} \times 0.7(1.7) \text{ m}^2$$

$$= 7.48 \text{ m}^2$$

**#464131**

**Topic:** Cylinder



A metal pipe is 77 cm long. The inner diameter of a cross section is 4 cm, the outer diameter being 4.4 cm (see figure). Find its

- (i) inner curved surface area.
- (ii) outer curved surface area
- (iii) total surface area

**Solution**

$$\text{Inner radius} = \frac{4}{2} = 2 \text{ cm} = r_1$$

$$\text{Outer radius} = \frac{4.4}{2} = 2.2 \text{ cm} = r_2$$

$$\text{Height} = 77 \text{ cm}$$

$$(i) \text{ Curved S.A} = 2\pi r_1 h \text{ (inner)}$$

$$= 2 \times \frac{22}{7} \times 2 \times 77 = 968 \text{ cm}^2$$

$$(ii) \text{ Curved S.A (outer)} = 2\pi r_2 h$$

$$= (2 \times \frac{22}{7} \times 2.2 \times 77) \text{ cm}^2 = (22 \times 22 \times 2.2) \text{ cm}^2$$

$$= 1064.8 \text{ cm}^2$$

$$(iii) \text{ Total S.A of pipe} = \text{CSA of inner surface} + \text{CSA of outer surface} + \text{Area of circular base and top}$$

$$= 968 + 1064.8 + 2\pi(2.2)^2 - 2\pi(2)^2$$

$$= 2032.8 + 5.28 \text{ cm}^2$$

$$= 2038.08 \text{ cm}^2$$

---

**#464134****Topic:** Cylinder

The diameter of a roller is 84 cm and its length is 120 cm. It takes 500 complete revolutions to move once over to level a playground. Find the area of the playground in m<sup>2</sup>

**Solution**

$$\text{Height} = 120 \text{ cm}, R = \frac{84}{2} = 42 \text{ cm}$$

$$\text{CSA} = 2\pi rh = 2 \times \frac{22}{7} \times 42 \times 120 \text{ cm}^2 = 31680 \text{ cm}^2$$

$$\text{Area} = 500 \times \text{CSA}$$

$$500 \times 31680 \text{ cm}^2$$

$$= 15840000 \text{ cm}^2 = \frac{15840000}{10000} \text{ m}^2 = 1584 \text{ m}^2$$

---

**#464135****Topic:** Cylinder

A cylindrical pillar is 50 cm in diameter and 3.5 m in height. Find the cost of painting the curved surface of the pillar at the rate of 12.50 per m<sup>2</sup>.

**Solution**

$$H = 3.5 \text{ m}, R = \frac{50}{2} = 25 \text{ cm} = \frac{25}{100} = 0.25 \text{ m}$$

$$\text{CSA} = 2\pi rh = (2 \times \frac{22}{7} \times \frac{0.25}{100} \times \frac{3.5}{10}) \text{ m}^2$$

$$= 44 \times \frac{125}{1000} \text{ m}^2 = 5.5 \text{ m}^2$$

$$\text{Cost of painting 1 m}^2 \text{ area} = \text{Rs.}12.50$$

$$\text{Cost of painting 5.5 m}^2 \text{ area} = \text{Rs.}5.5 \times 12.50$$

$$= \text{Rs.}68.75$$

---

**#464136****Topic:** Cylinder

Curved surface area of a right circular cylinder is  $4.4 \text{ m}^2$ . If the radius of the base of the cylinder is  $0.7 \text{ m}$ , find its height.

#### Solution

Lets assume height be  $x$

$$R = 0.7 \text{ m}$$

$$\text{CSA} = 4.4 \text{ m}^2, 2\pi rh = 4.4 \text{ m}^2, 2\pi 0.7x = 4.4$$

$$x = \frac{4.4 \times 7 \times 10}{2 \times 22 \times 7 \times 10} = 1 \text{ m}$$

$$\text{Height} = 1 \text{ m}$$

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#### #464138

Topic: Cylinder

The inner diameter of a circular well is  $3.5 \text{ m}$ . It is  $10 \text{ m}$  deep. Find

(i) Its inner curved surface area

(ii) the cost of plastering the curved surface at the rate of  $40$  per  $\text{m}^2$

#### Solution

(i)  $r$  = radius,  $h$  = depth of the well.

$$\begin{aligned} \text{Curved surface area} &= 2\pi rh \\ &= (2 \times 22 \times 3.52 \times 10) \text{ m}^2 = 110 \text{ m}^2 \end{aligned}$$

(ii) Cost of plastering = Rs  $40$  per  $\text{m}^2$

The cost of plastering the curved surface = Rs  $(110 \times 40)$  = Rs  $4400$ .

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#### #464140

Topic: Cylinder

In a hot water heating system, there is a cylindrical pipe of length  $28 \text{ m}$  and diameter  $5 \text{ cm}$ . Find the total radiating surface in the system.

#### Solution

$$H = 28 \text{ cm}, R = \frac{5}{2} = 2.5 \text{ cm} = 0.025 \text{ m} \left( \frac{2.5}{100} \right)$$

$$\text{CSA of pipe (cylindrical)} = 2\pi rh$$

$$\begin{aligned} &= 2 \times \frac{22}{7} \times 0.025 \times 2.8 \text{ m}^2 \\ &= 4.4 \text{ m}^2 \end{aligned}$$

---

#### #464141

Topic: Cylinder

Find

(i) The lateral or curved surface area of a closed cylindrical petrol storage tank that is  $4.2 \text{ m}$  in diameter and  $4.5 \text{ m}$  high.

(ii) How much steel was actually used, if  $\frac{1}{2}$  of the steel actually used was wasted in making the tank.

#### Solution

$$H = 4.5\text{m}$$

$$R = \frac{4.2}{2} = 2.1\text{m}$$

$$(i) \text{ Lateral or CSA of tank} = 2\pi rh$$

$$= 2 \times \frac{22}{7} \times 2.1 \times 4.5 \text{ m}^2$$

$$= 44 \times 0.3 \times 6.6 \text{ m}^2$$

$$59.4 \text{ m}^2$$

$$(ii) \text{ Area used in making tank} = \frac{8712}{1 - \frac{1}{12}}$$

$$= \frac{8712}{11} \times 12$$

$$= 95.04 \text{ m}^2$$

#464142

Topic: Cylinder



In the figure, you see the frame of a lampshade. It is to be covered with a decorative cloth. The frame has a base diameter of 20cm and height of 30cm. A margin of 2.5cm is to be given for folding it over the top and bottom of the frame. Find how much cloth is required for covering the lampshade.

**Solution**

$$H = 2.5 + 30 + 2.5 = 35\text{cm (It includes margin)}$$

$$R = \frac{20}{2} = 10 \text{ cm}$$

$$\text{Cloth required} = 2\pi rh \text{ (CSA)}$$

$$= (2 \times \frac{22}{7} \times 10 \times 35) \text{ cm}^2$$

$$= 2200 \text{ cm}^2$$

#464144

Topic: Cylinder

The students of a Vidyalaya were asked to participate in a competition for making and decorating penholders in the shape of a cylinder with a base, using cardboard. Each penholder was to be of radius 3cm and height 10.5cm. The Vidyalaya was to supply the competitors with cardboard. If there were 35 competitors, how much cardboard was required to be bought for the competition?

**Solution**

$$R = 3\text{cm}, H = 10.5\text{cm}$$

Surface area = Curved Surface Area + Base Area

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

$$= 2 \times \frac{22}{7} \times 3 \times \frac{10.5}{10} + \frac{22}{7} \times 3 \times 3 \text{ cm}^2$$

$$= 198 + \frac{198}{7} \text{ cm}^2$$

$$= \frac{1584}{7} \text{ cm}^2$$

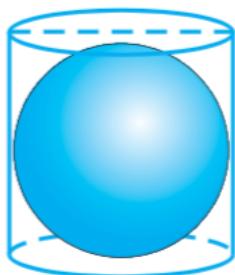
$$\text{Area of cardboard sheet used by competitor} = \frac{1584}{7} \text{ cm}^2$$

$$\text{Area of cardboard sheet used by 35 competitors} = \frac{1584}{7} \times 35$$

$$= 7920 \text{ cm}^2$$

**#464174**

**Topic:** Cylinder



A right circular cylinder just encloses a sphere of radius  $r$  (see figure). Find the

- (i) surface area of the sphere,
- (ii) curved surface area of the cylinder and (iii) ratio of the surfaces obtained in (i) and (ii).

**Solution**

$$(i) \text{ SA of sphere} = 4\pi r^2$$

$$(ii) \text{ Height} = r + r = 2r$$

$$\text{radius} = r$$

$$\text{Curved Surface Area} = 2\pi rh = 2\pi r(2r) = 4\pi r^2$$

$$(iii) \text{ Ratio} = \frac{4\pi r^2}{4\pi r^2} = 1 \text{ or } 1:1$$

**#464185**

**Topic:** Cuboid and Cube

A solid cube of side 12 cm is cut into eight cubes of equal volume. What will be the side of the new cube? Also, find the ratio between their surface areas.

**Solution**

Side 12cm

Volume of cube =  $12 \times 12 \times 12 = 1728 \text{ cm}^3$

Volume of smaller cube =  $\frac{1}{8}$  of 1728

$$= \frac{1}{8} \times 1728 = 216 \text{ cm}^3$$

Let side be  $S$ .

$$\therefore S^3 = 216$$

$$S = 6 \text{ cm}$$

Ratio of SA of cubes =  $\frac{\text{SA of bigger cube}}{\text{SA of smaller cube}}$

$$= \left(\frac{12}{6}\right)^2 = \frac{2^2}{1} = \frac{4}{1}$$

$\therefore$  Ratio between their surface areas 4:1

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**#464186**

**Topic:** Cuboid and Cube

A river 3 m deep and 40 m wide is flowing at the rate of 2 km per hour. How much water will fall into the sea in a minute?

**Solution**

Ratio of flow of water = 2km/hour

$$= \left(\frac{2000}{60}\right) \text{ m/min}$$

$$h = 3 \text{ m}$$

$$b = 40 \text{ m}$$

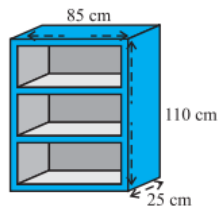
$$\text{Volume of water flowed in 1 min} = \frac{2000}{60} \times 40 \times 3$$

$$= 4000 \text{ m}^3$$

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**#464249**

**Topic:** Cuboid and Cube



A wooden bookshelf has external dimensions as follows:

Height = 110 cm, Depth = 25 cm, Breadth = 85 cm (see figure). The thickness of the plank is 5 cm everywhere. The external faces are to be polished and the inner faces are to be painted. If the rate of polishing is 20 paise per  $\text{cm}^2$  and the rate of painting is 10 paise per  $\text{cm}^2$ , find the total expenses required for polishing and painting the surface of the bookshelf.

**Solution**

External length = 85cm

External breadth = 25cm

External height = 110cm

External SA =  $lh + 2(lb) + 2bh$

$$= 85 \times 110 + 2(85 \times 25 + 25 \times 110)$$

$$= (9350 + 9750)\text{cm}^2$$

$$= 19100\text{cm}^2$$

Area to be polished =  $19100 + 2600 = 21700\text{cm}^2$

Cost of polishing  $1\text{cm}^2$  area 0.20Rs

Cost of polishing  $21700\text{cm}^2$  area =  $21700 \times 0.20$

$$= \text{Rs. } 4340$$

Now, area to be painted in 3 rows =  $3 \times$  area to be painted in 1 row

$$= 3 \times [2(l + b)b + lh]$$

$$= 3[2(75 + 30) \times 20 + 30 \times 75]$$

$$= 3[4200 + 2250] = 19350\text{cm}^2$$

Cost of painting  $1\text{cm}^2$  area = 0.10Rs

Cost of painting 19350 area = Rs.1935

Total cost =  $1935 + 4340$

$$= \text{Rs. } 6275$$

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**#464914**

**Topic:** Cuboid and Cube

Parikshit makes a cuboid of plasticine of sides 5 cm, 2 cm and 5 cm. How much such cuboids will he need to form a cube?

**Solution**

Volume of cube =  $2 \times 5 \times 5$

$2 \times 5 \times 5$  is not a perfect cube, to make it perfect we will have to multiply it with  $(2 \times 2 \times 5)$

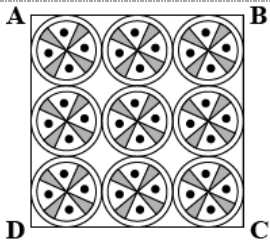
$$2 \times 2 \times 5 = 20$$

So, 20 cuboids are required to form a cube.

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**#465241**

**Topic:** Circles and Ring



On a square handkerchief, nine circular designs each of radius 7cm are made. Find the area of the remaining portion of the handkerchief

**Solution**

$\square AJLE = \square ELMF = \square FMNG = \square GNOH = \square HOPI = \square IPKB$ , are all squares

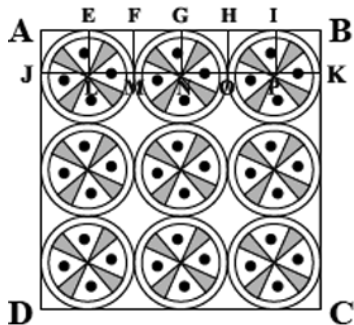
Also,  $AE = EF = FG = GH = HI = IB =$  radius of circles  $= 7\text{ cm}$

$$\therefore AB = AE + EF + FG + GH + HI + IB = 42\text{ cm}$$

$$\begin{aligned}\therefore \text{Area of } \square ABCD &= 42 \times 42 \\ &= 1764\text{ cm}^2\end{aligned}$$

$$\begin{aligned}\text{Area of 9 circles} &= 9 \times \frac{22}{7} \times 7 \times 7 \\ &= 1386\text{ cm}^2\end{aligned}$$

$$\therefore \text{Area of remaining portion of the handkerchief} = 1764 - 1386 = 378\text{ cm}^2$$



#470522

Topic: Circles and Ring

The radii of two circles are  $19\text{ cm}$  and  $9\text{ cm}$  respectively. Find the radius of the circle which has circumference equal to the sum of the circumferences of the two circles.

Solution

Let  $r_1$  and  $C_1$  be the radius and circumference, respectively of 1st circle and  $r_2$  and  $C_2$  be the radius and circumference, respectively of 2nd circle.

Let  $r_3$  and  $C_3$  be the radius and circumference, respectively of required circle.

$$r_1 = 19\text{ cm} \quad \dots \text{Given}$$

$$C_1 = 2\pi r_1$$

$$\therefore C_1 = 2\pi \times 19 = 38\pi\text{ cm} \quad \dots(1)$$

$$r_2 = 9\text{ cm} \quad \dots \text{Given}$$

$$C_2 = 2\pi r_2$$

$$\therefore C_2 = 2\pi \times 9 = 18\pi\text{ cm} \quad \dots(2)$$

$$C_3 = C_1 + C_2 \quad \dots \text{Given}$$

$$\therefore C_3 = 38\pi + 18\pi \quad \dots \text{From (1) and (2)}$$

$$C_3 = 56\pi\text{ cm.}$$

$$2\pi r_3 = 56\pi$$

$$r_3 = 28\text{ cm}$$

The radius of the required circle is  $28\text{ cm}$ .

#470523

Topic: Circles and Ring



The radii of two circles are 8 cm and 6 cm respectively. Find the radius of the circle having area equal to the sum of the areas of the two circles

#### Solution

Let  $r_1$  and  $A_1$  be the radius and area, respectively of 1st circle and  $r_2$  and  $A_2$  be the radius and area, respectively of 2nd circle.

Let  $r_3$  and  $A_3$  be the radius and area, respectively of required circle.

$$r_1 = 8 \text{ cm} \quad \dots \text{Given}$$

$$A_1 = \pi r_1^2$$

$$\therefore A_1 = \pi \times 8^2 = 64\pi \text{ cm}^2 \quad \dots(1)$$

$$r_2 = 6 \text{ cm} \quad \dots \text{Given}$$

$$A_2 = \pi r_2^2$$

$$\therefore A_2 = \pi \times 6^2 = 36\pi \text{ cm}^2 \quad \dots(2)$$

$$A_3 = A_1 + A_2 \quad \dots \text{Given}$$

$$\therefore A_3 = 64\pi + 36\pi \quad \dots \text{From (1) and (2)}$$

$$A_3 = 100\pi \text{ cm}^2$$

$$\pi r_3^2 = 100\pi$$

$$r_3 = 10 \text{ cm}$$

The radius of the required circle is 10 cm.

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#### #470526

**Topic:** Circles and Ring

If the perimeter and the area of a circle are numerically equal, then the radius of the circle is:

**A** 2 units

**B**  $\pi$  units

**C** 4 units

**D** 7 units

#### Solution

Let  $r$  be the radius,  $C$  be the circumference and  $A$  be the area of the circle.

Perimeter of circle = Circumference of circle

Circumference of circle = Area of circle  $\dots$ Given

$$\therefore 2\pi r = \pi r^2$$

$$\Rightarrow r = 2 \text{ units}$$