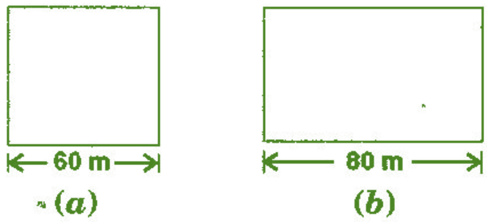
Exercise 11.1

Question 1:

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



Answer 1:

Given: The side of a square = 60 m

And the length of rectangular field = 80 m

According to question,

Perimeter of rectangular field = Perimeter of square field

$\Rightarrow \quad 2(l+b)$ = 4 x side

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

$\Rightarrow \quad 160+2b=240$

$\Rightarrow \quad 2b=240-160$

$\Rightarrow \quad 2b=80$

$\Rightarrow \quad b=40$ m

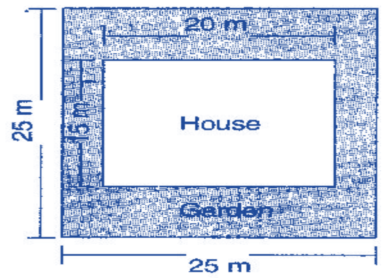
Now Area of Square field = $(\text{Side})^2$ = $(60)^2$ = 3600 m^2

And Area of Rectangular field = length x breadth = 80 x 40 = 3200 m^2

Hence, area of square field is larger.

Question 2:

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 ₹ 55 per m^2.



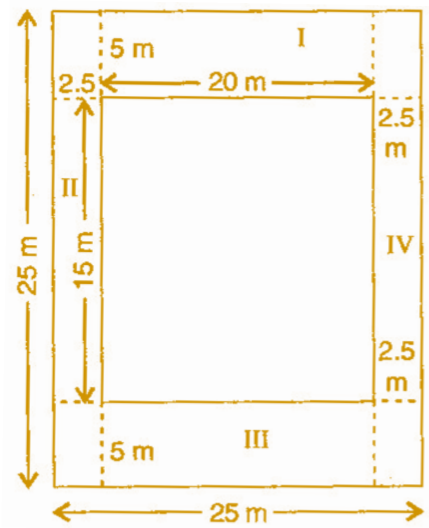
Answer 2:

Side of a square plot = 25 m

$\therefore$ Area of square plot = $(\text{Side})^2 = (25)^2 = 625\ m^2$

Length of the house = 20 m and

Breadth of the house = 15 m



$\therefore$ Area of the house = length x breadth = 20 x 15 = 300 m^2

Area of garden = Area of square plot – Area of house

= 625 – 300 = 325 m^2

$\because$ Cost of developing the garden per sq. m = ₹ 55

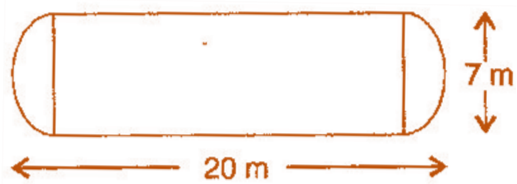
$\therefore$ Cost of developing the garden 325 sq. m = ₹ 55 x 325

= ₹ 17,875

Hence total cost of developing a garden around is ₹ 17,875.

Question 3:

The shape of a garden is rectangular in the middle and semi-circular at the ends as shown in the diagram. Find the area and the perimeter of this garden [Length of rectangle is 20 – (3.5 + 3.5 meters]



Answer 3:

Given: Total length = 20 m

Diameter of semi circle = 7 m

$\therefore$ Radius of semi circle = $\frac{7}{2}$ = 3.5 m

Length of rectangular field = 20 – (3.5 + 3.5) = 20 – 7 = 13 m

Breadth of the rectangular field = 7 m

$\therefore$ Area of rectangular field = $l \times b$ = 13 x 7 = 91 m^2

Area of two semi circles = $2 \times \frac{1}{2} \pi r^2$ = $2 \times \frac{1}{2} \times \frac{22}{7} \times 3.5 \times 3.5$ = 38.5 m^2

Area of garden = 91 + 38.5 = 129.5 m^2

Now Perimeter of two semi circles = $2 \times \pi r = 2 \times \frac{22}{7} \times 3.5$ = 22 m

And Perimeter of garden = 22 + 13 + 13 = 48 m

Question 4:

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 m^2? [If required you can split the tiles in whatever way you want to fill up the corners]

Answer 4:

Given: Base of flooring tile = 24 cm = 0.24 m

Corresponding height of a flooring tile = 10 cm = 0.10 m

Now Area of flooring tile = Base x Altitude = 0.24 x 0.10 = 0.024 m^2

$\therefore$ Number of tiles required to cover the floor = $\frac{\text{Area of floor}}{\text{Area of one tile}}$

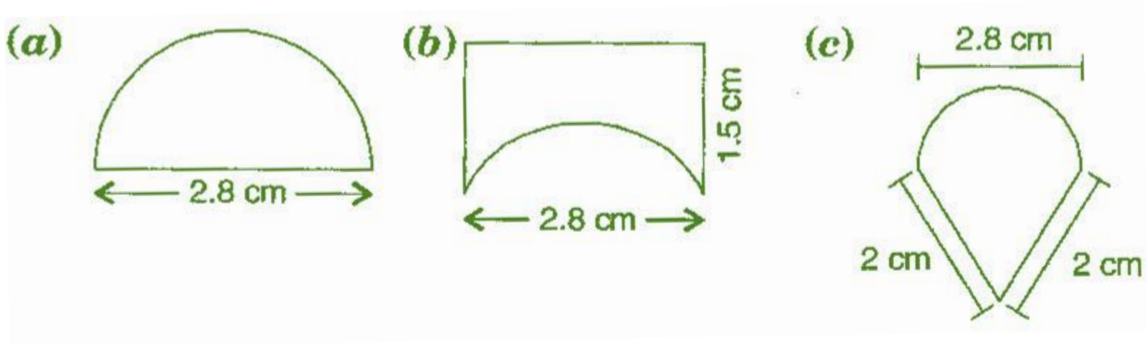
$= \frac{1080}{0.024}$

= 45000 tiles

Hence 45000 tiles are required to cover the floor.

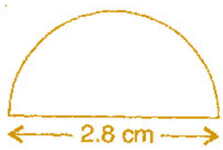
Question 5:

An ant is moving around a few food pieces of different shapes scattered on the floor. For which food-piece would the ant have to take a longer round? Remember, circumference of a circle can be obtained by using the expression $c = 2\pi r$, where r is the radius of the circle.



Answer 5:

(a) Radius = $\frac{\text{Diameter}}{2} = \frac{2.8}{2}$ = 1.4 cm

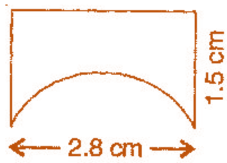


Circumference of semi circle = πr = $\frac{22}{7} \times 1.4$ = 4.4 cm

Total distance covered by the ant = Circumference of semi circle + Diameter

= 4.4 + 2.8 = 7.2 cm

(b) Diameter of semi circle = 2.8 cm

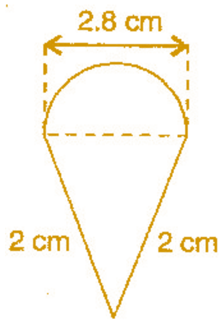


$\therefore$ Radius = $\frac{\text{Diameter}}{2} = \frac{2.8}{2}$ = 1.4 cm

Circumference of semi circle = πr = $\frac{22}{7} \times 1.4$ = 4.4 cm

Total distance covered by the ant = 1.5 + 2.8 + 1.5 + 4.4 = 10.2 cm

(c) Diameter of semi circle = 2.8 cm



$\therefore$ Radius = $\frac{\text{Diameter}}{2} = \frac{2.8}{2}$ = 1.4 cm

Circumference of semi circle = πr = $\frac{22}{7} \times 1.4$ = 4.4 cm

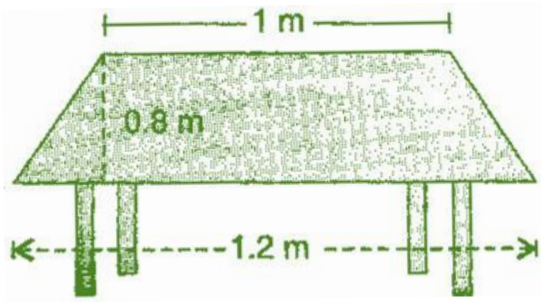
Total distance covered by the ant = 2 + 2 + 4.4 = 8.4 cm

Hence for figure (b) food piece, the ant would take a longer round.

Exercise 11.2

Question 1:

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



Answer 1:

Here one parallel side of the trapezium (a) = 1 m

And second side (b) = 1.2 m and height (h) = 0.8 m

$\therefore$ Area of top surface of the table = $\frac{1}{2}(a+b)\times h$

$= \frac{1}{2}\times(1+1.2)\times 0.8$

$= \frac{1}{2}\times 2.2\times 0.8 = 0.88 \text{ m}^2$

Hence, the surface area of the table is 0.88 m^2.

Question 2:

The area of a trapezium is 34 cm^2 and the length of one of the parallel sides is 10 cm and its height is 4 cm. Find the length of the other parallel side.

Answer 2:

Let the length of the other parallel side be b.

Length of one parallel side (a) = 10 am and height (h) = 4 cm

Area of trapezium = $\frac{1}{2}(a+b)\times h$

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

$\Rightarrow \quad 34 = (10+b)\times 2$

$\Rightarrow \quad 34 = 20 + 2b$

$\Rightarrow \quad 34 - 20 = 2b$

$\Rightarrow \quad 14 = 2b$

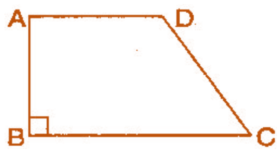
$\Rightarrow \quad 7 = b$

$\Rightarrow \quad b = 7$

Hence, the another required parallel side is 7 cm.

Question 3:

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.



Answer 3:

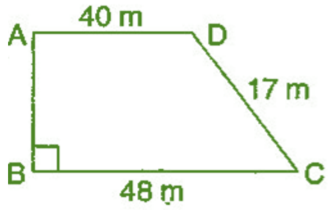
Given: BC = 48 m, CD = 17 m, AD = 40 m and perimeter = 120 m

$\because$ Perimeter of trapezium ABCD = AB + BC + CD + DA

$\Rightarrow$ 120 = AB + 48 + 17 + 40

$\Rightarrow$ 120 = AB = 105

$\Rightarrow$ AB = 120 – 105 = 15 m



Now Area of the field = $\frac{1}{2} \times (BC + AD) \times AB$

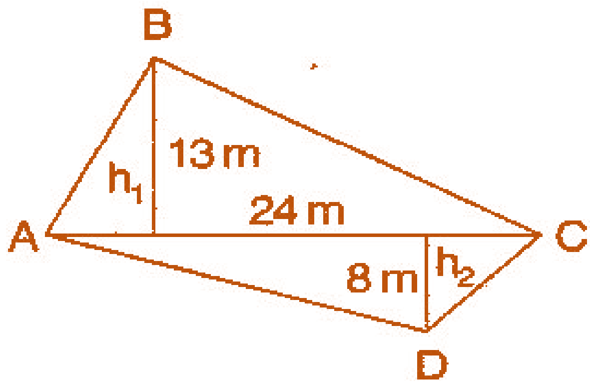
$= \frac{1}{2} \times (48 + 40) \times 15 = \frac{1}{2} \times 88 \times 15$

= 660 m^2

Hence, area of the field ABCD is 660 m^2.

Question 4:

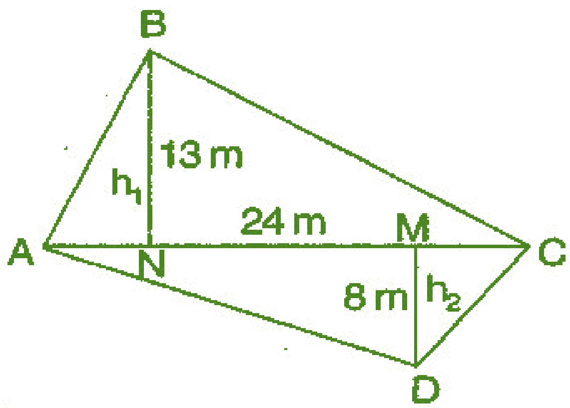
The diagonal of a quadrilateral shaped field is 24 m and the perpendiculars dropped on it from the remaining opposite vertices are 8 m and 13 m. Find the area of the field.



Answer 4:

Here h_1 = 13 m, h_2 = 8 m and AC = 24 m

Area of quadrilateral ABCD = Area of $\triangle$ABC + Area of $\triangle$ADC



$$= \frac{1}{2} b \times h_1 + \frac{1}{2} b \times h_2$$

$$= \frac{1}{2} b (h_1 + h_2)$$

$$= \frac{1}{2} \times 24 \times (13 + 8) = \frac{1}{2} \times 24 \times 21 = 252 \text{ m}^2$$

Hence, required area of the field is 252 m².

Question 5:

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

Answer 5:

Given: d_1 =7.5 cm and d_2 = 12 cm

We know that,

Area of rhombus = $\frac{1}{2}\times d_1 d_2$ = $\frac{1}{2}\times 7.5\times 12$ = 45 cm^2

Hence, area of rhombus is 45 cm^2.

Question 6:

Find the area of a rhombus whose side is 6 cm and whose altitude is 4 cm. If one of the diagonals is 8 cm long, find the length of the other diagonal.

Answer 6:

Since rhombus is also a kind of parallelogram.

$\therefore$ Area of rhombus = Base x Altitude

= 6 x 4 = 24 cm^2

Also Area of rhombus = $\frac{1}{2} d_1 d_2$

$\Rightarrow$ 24 = $\frac{1}{2}\times 8\times d_2$

$\Rightarrow$ $24 = 4d_2$

$\Rightarrow$ $d_2 = \frac{24}{4}$ = 6 cm

Hence, the length of the other diagonal is 6 cm.

Question 7:

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 m^2 is ₹ 4.

Answer 7:

Here, d_1 = 45 cm and d_2 = 30 cm

$\because$ Area of one tile = $\frac{1}{2} d_1 d_2$ = $\frac{1}{2}\times 45\times 30$ = 675 cm^2

∴ Area of 3000 tiles = 675 x 3000 = 2025000 cm²

$= \frac{2025000}{10000}$ = 202.50 m2 $\left[\because \ 1 \text{ m}^2 = 10000 \text{ cm}^2\right]$

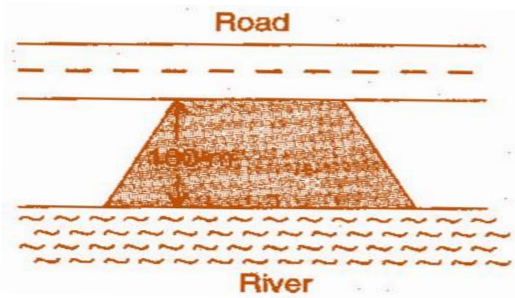
∵ Cost of polishing the floor per sq. meter = ₹ 4

∴ Cost of polishing the floor per 202.50 sq. meter = 4 x 202.50 = ₹ 810

Hence, the total cost of polishing the floor is ₹ 810.

Question 8:

Mohan wants to buy a trapezium shaped field. Its side along the river is parallel to and twice the side along the road. If the area of this field is 10500 m^2 and the perpendicular distance between the two parallel sides is 100 m, find the length of the side along the river.



Answer 8:

Given: Perpendicular distance (h) = 100 m

Area of the trapezium shaped field = 10500 m^2

Let side along the road be x m and side along the river = $2x$ m

∴ Area of the trapezium field = $\frac{1}{2}(a+b)\times h$

$\Rightarrow$ 10500 = $\frac{1}{2}(x+2x)\times 100$

$\Rightarrow$ $10500 = 3x \times 50$

$\Rightarrow$ $3x = \frac{10500}{50}$

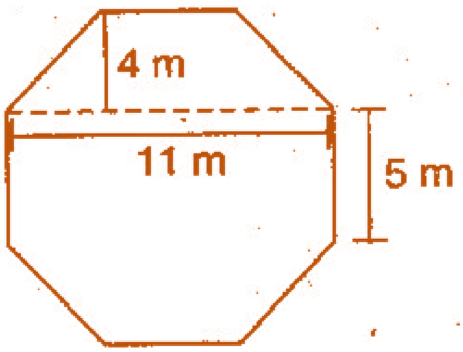
$\Rightarrow$ $x = \frac{10500}{50\times 3}$

$\Rightarrow$ $x = 70$ m

Hence, the side along the river = $2x$ = 2 x 70 = 140 m.

Question 9:

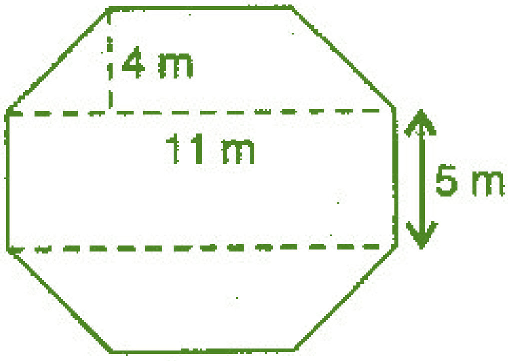
Top surface of a raised platform is in the shape of a regular octagon as shown in the figure. Find the area of the octagonal surface.



Answer 9:

Given: Octagon having eight equal sides, each 5 m.

Construction: Divided the octagon in 3 figures, two trapeziums whose parallel and perpendicular sides are 11 m and 4 m respectively and third figure is rectangle having length and breadth 11 m and 5 m respectively.



Now Area of two trapeziums = 2 x $\frac{1}{2}(a+b)\times h$

$= 2 \text{ x } \frac{1}{2}(11+5)\times 4 = 4 \text{ x } 16 = 64 \text{ m}^2$

And Area of rectangle = length x breadth

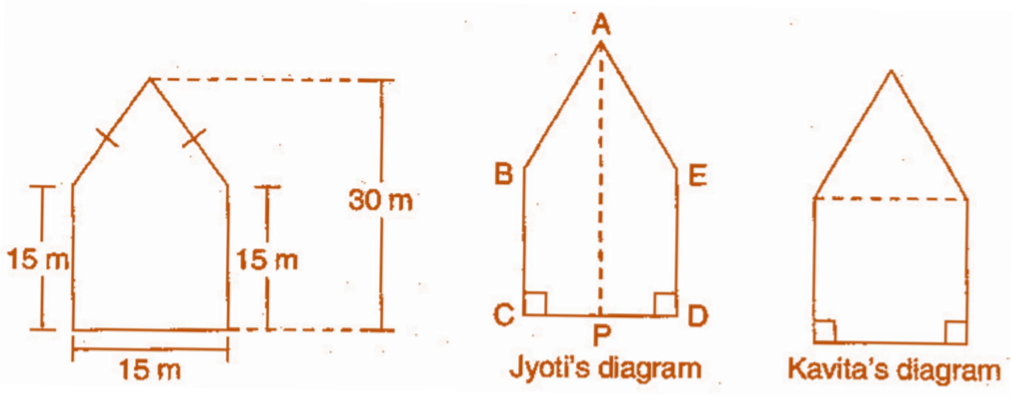
$= 11 \text{ x } 5 = 55 \text{ m}^2$

$\therefore$ Total area of octagon = 64 + 55 = 119 m^2

Question 10:

There is a pentagonal shaped park as shown in the figure.

For finding its area Jyoti and Kavita divided it in two different ways.



Find the area of this park using both ways. Can you suggest some other way of finding its area?

Answer 10:

First way : By Jyoti's diagram,

Area of pentagon = Area of trapezium ABCP + Area of trapezium AEDP

$= \frac{1}{2}$ (AP + BC) x CP + $\frac{1}{2}$ (ED + AP) x DP

$= \frac{1}{2}$ (30 + 15) x CP + $\frac{1}{2}$ (15 + 30) x DP

$= \frac{1}{2}$ (30 + 15) (CP + DP)

$= \frac{1}{2}$ x 45 x CD

$= \frac{1}{2}$ x 45 x 15 = 337.5 m^2

Second way : By Kavita's diagram

Here, a perpendicular AM drawn to BE.

AM = 30 – 15 = 15 m

Area of pentagon = Area of $\triangle$ABE + Area of square BCDE

$= \frac{1}{2}$ x 15 x 15 + 15 x 15

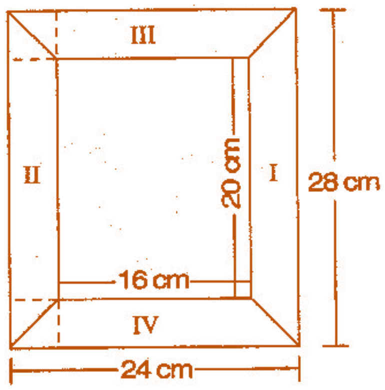
= 112.5 + 225.0

= 337.5 m^2

Hence, total area of pentagon shaped park = 337.5 m^2.

Question 11:

Diagram of the adjacent picture frame has outer dimensions = 24 cm x 28 cm and inner dimensions 16 cm x 20 cm. Find the area of each section of the frame, if the width of each section is same.



Answer 11:

Here two of given figures (I) and (II) are similar in dimensions.
And also figures (III) and (IV) are similar in dimensions.

$\therefore$ Area of figure (I) = Area of trapezium = $\frac{1}{2}(a+b)\times h$

$= \frac{1}{2}(28+20)\times 4$

$= \frac{1}{2}\times 48\times 4 = 96 \text{ cm}^2$

Also Area of figure (II) = 96 cm^2

Now Area of figure (III) = Area of trapezium = $\frac{1}{2}(a+b)\times h$

$= \frac{1}{2}(24+16)\times 4$

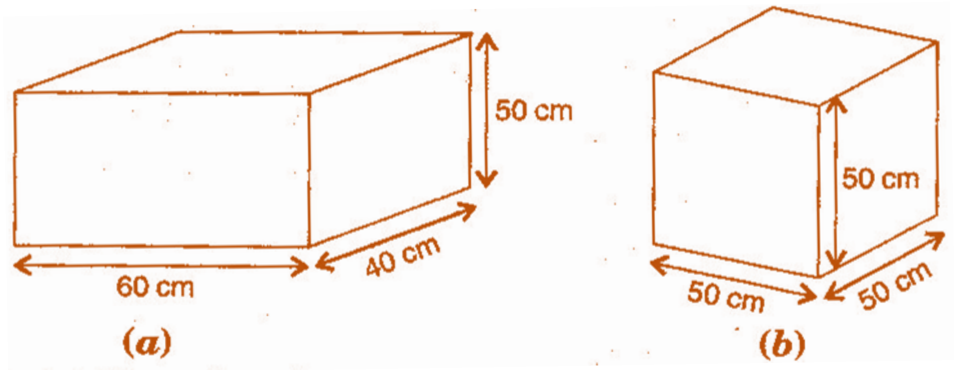
$= \frac{1}{2}\times 40\times 4 = 80 \text{ cm}^2$

Also Area of figure (IV) = 80 cm^2

Exercise 11.3

Question 1:

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



Answer 1:

(a) Given: Length of cuboidal box (l) = 60 cm

Breadth of cuboidal box (b) = 40 cm

Height of cuboidal box (h) = 50 cm

$\therefore$ Total surface area of cuboidal box = $2(lb + bh + hl)$

= 2 (60 x 40 + 40 x 50 + 50 x 60)

= 2 (2400 + 2000 + 3000)

= 2 x 7400 = 14800 cm^2

(b) Given: Length of cuboidal box (l) = 50 cm

Breadth of cuboidal box (b) = 50 cm

Height of cuboidal box (h) = 50 cm

$\therefore$ Total surface area of cuboidal box = $2(lb + bh + hl)$

= 2 (50 x 50 + 50 x 50 + 50 x 50)

= 2 (2500 + 2500 + 2500)

= 2 x 7500 = 15000 cm^2

Hence, the cuboidal box (a) requires the lesser amount of material to make, since surface area of box (a) is less than that of box (b).

Question 2:

A suitcase with measures 80 cm x 48 cm x 24 cm is to be covered with a tarpaulin cloth. How many meters of tarpaulin of width 96 cm is required to cover 100 such suitcases?

Answer 2:

Given: Length of suitcase box (l) = 80 cm,

Breadth of suitcase box (b) = 48 cm

And Height of cuboidal box (h) = 24 cm

$\therefore$ Total surface area of suitcase box = $2(lb+bh+hl)$

= 2 (80 x 48 + 48 x 24 + 24 x 80)

= 2 (3840 + 1152 + 1920)

= 2 x 6912 = 13824 cm^2

Area of Tarpaulin cloth = Surface area of suitcase

$\Rightarrow$ $l \times b$ = 13824

$\Rightarrow$ $l \times 96 = 13824$

$\Rightarrow$ $l = \frac{13824}{96}$ = 144 cm

Required tarpaulin for 100 suitcases = 144 x 100 = 14400 cm = 144 m

Hence, the tarpaulin cloth required to cover 100 suitcases is 144 m.

Question 3:

Find the side of a cube whose surface area id 600 cm^2.

Answer 3:

Here Surface area of cube = 600 cm^2

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

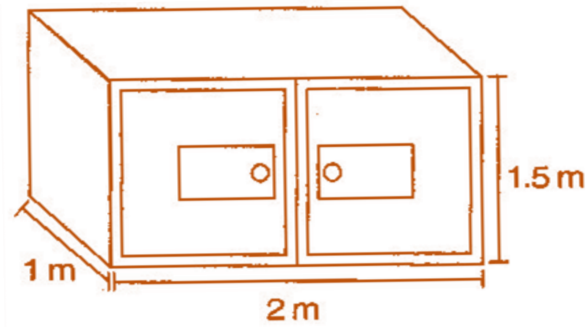
$\Rightarrow$ l^2 = 100

$\Rightarrow$ l = 10 cm

Hence the side of cube is 10 cm

Question 4:

Rukshar painted the outside of the cabinet of measure 1 m x 2 m x 1.5 m. How much surface area did she cover if she painted all except the bottom of the cabinet?



Answer 4:

Here,

Length of cabinet (l) = 2 m,

Breadth of cabinet (b) = 1 m

And Height of cabinet (h) = 1.5 m

$\therefore$ Surface area of cabinet = $lb + 2(bh + hl)$

= 2 x 1 + 2 (1 x 1.5 + 1.5 x 2)

= 2 + 2 (1.5 + 3.0)

= 2 + 9.0

= 11 m^2

Hence, the required surface area of cabinet is 11 m^2.

Question 5:

Daniel is paining 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 m^2 of area is painted. How many cans of paint will she need to paint the room?

Answer 5:

Here,

Length of wall (l) = 15 m,

Breadth of wall (b) = 10 m

And Height of wall (h) = 7 m

$\therefore$ Total Surface area of classroom = $lb + 2(bh + hl)$

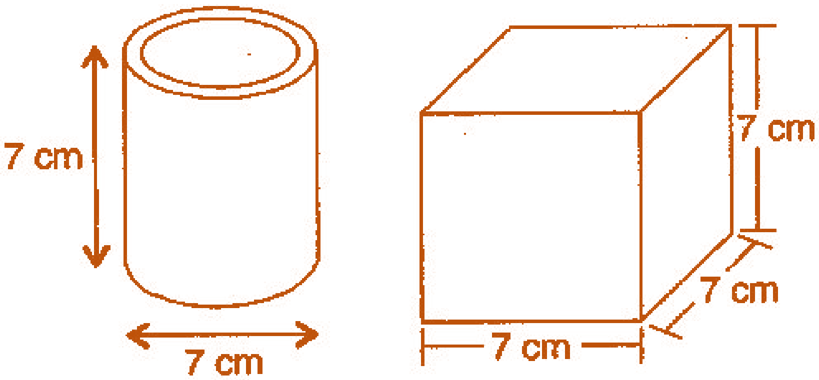
= 15 x 10 + 2 (10 x 7 + 7 x 15)
= 150 + 2 (70 + 105)
= 150 + 350
= 500 m^2

Now Required number of cans = $\frac{\text{Area of hall}}{\text{Area of one can}} = \frac{500}{100}$ = 5 cans

Hence, 5 cans are required to paint the room.

Question 6:

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



Answer 6:

Given: Diameter of cylinder = 7 cm

$\therefore$ Radius of cylinder (r) = $\frac{7}{2}$ cm

And Height of cylinder (h) = 7 cm

Lateral surface area of cylinder = $2\pi rh$ = $2 \times \frac{22}{7} \times \frac{7}{2} \times 7$

= 154 cm^2

Now lateral surface area of cube = $4l^2 = 4 \times (7)^2$ = 4 x 49 = 196 cm^2

Hence, the cube has larger lateral surface area.

Question 7:

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?

Answer 7:

Given: Radius of cylindrical tank (r) = 7 m

Height of cylindrical tank (h) = 3 m

Total surface area of cylindrical tank = $2\pi r(h+r)$

$$= 2\times\frac{22}{7}\times 7(3+7)$$

$$= 44 \text{ x } 10 = 440 \text{ m}^2$$

Hence, 440 m^2 metal sheet is required.

Question 8:

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

Answer 8:

Given: Lateral surface area of hollow cylinder = 4224 cm^2

And Height of hollow cylinder = 33 cm

Curved surface area of hollow cylinder = $2\pi rh$

$$\Rightarrow \quad 4224 = 2\times\frac{22}{7}\times r\times 33$$

$$\Rightarrow \quad r = \frac{4224\times 7}{2\times 22\times 33} = \frac{64\times 7}{22} \text{ cm}$$

Now Length of rectangular sheet = $2\pi r$

$$\Rightarrow \quad l = 2\times\frac{22}{7}\times\frac{64\times 7}{22} = 128 \text{ cm}$$

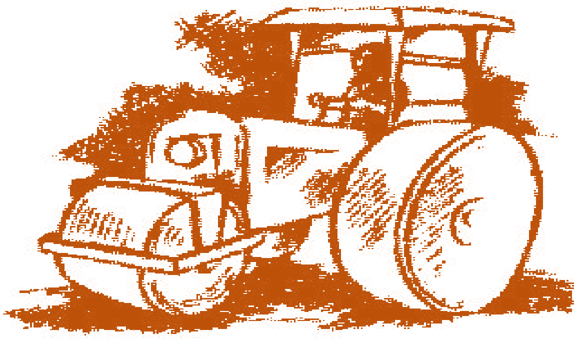
Perimeter of rectangular sheet = $2(l+b)$

$$= 2\ (128 + 33) = 2 \text{ x } 161 = 322 \text{ cm}$$

Hence, the perimeter of rectangular sheet is 322 cm.

Question 9:

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 1 m.



Answer 9:

Given: Diameter of road roller = 84 cm

$\therefore$ Radius of road roller $(r) = \frac{d}{2} = \frac{84}{2}$ = 42 cm

Length of road roller (h) = 1 m = 100 cm

Curved surface area of road roller = $2\pi rh$ = $2\frac{22}{7}\times 42\times 100$ = 26400 cm^2

$\therefore$ Area covered by road roller in 750 revolutions = 26400 x 750

= 1,98,00,000 cm^2

= 1980 m^2

[$\because$ 1 m^2 = 10,000 cm^2]

Hence, the area of the road is 1980 m^2.

Question 10:

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 figure). If the label is placed 2 cm from top and bottom, what is the area of the label?

Answer 10:

Given: Diameter of cylindrical container = 14 cm

∴ Radius of cylindrical container $(r) = \frac{d}{2} = \frac{14}{2}$ = 7 cm

Height of cylindrical container = 20 cm

Height of the label (h) = 20 – 2 – 2 = 16 cm

Curved surface area of label = $2\pi rh$ = $2\frac{22}{7}\times 7\times 16$ = 704 cm^2

Hence, the area of the label of 704 cm^2.

Exercise 11.4

Question 1:

Given a cylindrical tank, in which situation will you find surface are 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.

Answer 1:

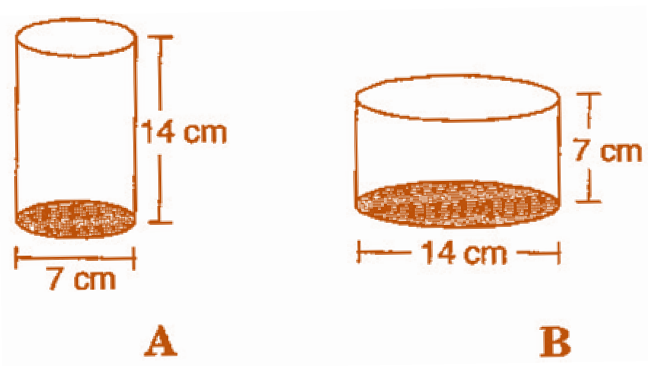
We find area when a region covered by a boundary, such as outer and inner surface area of a cylinder, a cone, a sphere and surface of wall or floor.

When the amount of space occupied by an object such as water, milk, coffee, tea, etc., then we have to find out volume of the object.

(a) Volume (b) Surface are (c) Volume

Question 2:

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.



Answer 2:

Yes, we can say that volume of cylinder B is greater, since radius of cylinder B is greater than that of cylinder A (and square of radius gives more value than previous).

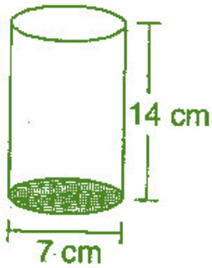
Diameter of cylinder A = 7 cm

$\Rightarrow$ Radius of cylinder A = $\frac{7}{2}$ cm

And Height of cylinder A = 14 cm

$\therefore$ Volume of cylinder A = $\pi r^2 h = \frac{22}{7} \times \frac{7}{2} \times \frac{7}{2} \times 14$

= 539 cm^3



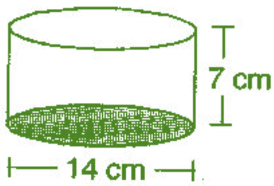
Now Diameter of cylinder B = 14 cm

$\Rightarrow$ Radius of cylinder B = $\frac{14}{2}$ = 7 cm

And Height of cylinder B = 7 cm

$\therefore$ Volume of cylinder A = $\pi r^2 h = \frac{22}{7} \times 7 \times 7 \times 7$

= 1078 cm^3



Total surface area of cylinder A = $\pi r(2h + r)$ [$\because$ It is open from top]

$= \frac{22}{7} \times \frac{7}{2}\left(2 \times 14 + \frac{7}{2}\right) = 11 \times \left(28 + \frac{7}{2}\right)$

$= 11 \times \frac{63}{2} = 346.5$ cm^2

Total surface area of cylinder B = $\pi r(2h + r)$ [$\because$ It is open from top]

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

= 22 x (14 + 7) = 22 x 21 = 462 cm^2

Yes, cylinder with greater volume also has greater surface area.

Question 3:

Find the height of a cuboid whose base area is 180 cm^2 and volume is 900 cm^3?

Answer 3:

Given: Base area of cuboid = 180 cm^2 and Volume of cuboid = 900 cm^3

We know that,

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

$\Rightarrow$ 900 = 180 $\times h$ $\quad \left[\because \text{ Base area} = l \times b = 180(\text{given})\right]$

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

Hence, the height of cuboid is 5 m.

Question 4:

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

Answer 4:

Given: Length of cuboid (l) = 60 cm,

Breadth of cuboid (b) = 54 cm and

Height of cuboid (h) = 30 cm

We know that, Volume of cuboid = $l \times b \times h$ = 60 x 54 x 30 cm^3

And Volume of cube = (Side)^3 = 6 x 6 x 6 cm^3

$\therefore$ Number of small cubes = $\frac{\text{Volume of cuboid}}{\text{Volume of cube}} = \frac{60 \times 54 \times 30}{6 \times 6 \times 6}$ = 450

Hence, the required cubes are 450.

Question 5:

Find the height of the cylinder whose volume if 1.54 m3 and diameter of the base is 140 cm.

Answer 5:

Given: Volume of cylinder = 1.54 m^3 and Diameter of cylinder = 140 cm

$\therefore$ Radius (r) = $\frac{d}{2} = \frac{140}{2}$ = 70 cm

Volume of cylinder = $\pi r^2 h$

$\Rightarrow \quad 1.54 = \frac{22}{7} \times 0.7 \times 0.7 \times h$

$\Rightarrow \quad h = \frac{1.54 \times 7}{22 \times 0.7 \times 0.7}$

$\Rightarrow \quad h = \frac{154 \times 7 \times 10 \times 10}{22 \times 7 \times 7 \times 100}$ = 1 m

Hence, the height of the cylinder is 1 m.

Question 6:

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 liters that can be stored in the tank.

Answer 6:

Given: Radius of cylindrical tank (r) = 1.5 m

And Height of cylindrical tank (h) = 7 m

Volume of cylindrical tank = $\pi r^2 h$

= $\frac{22}{7} \times 1.5 \times 1.5 \times 7$

= 49.5 cm^3

= 49.5 x 1000 liters [∵ 1 m^3 = 1000 liters]

= 49500 liters

Hence, the required quantity of milk is 49500 liters.

Question 7:

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?

Answer 7:

(i) Let the edge of cube be l.

Since, Surface area of the cube (A) = $6l^2$

When edge of cube is doubled, then

Surface area of the cube (A')= $6(2l)^2 = 6\times 4l^2 = 4\times 6l^2$

A' = 4 x A

Hence, the surface area will increase four times.

(ii) Volume of cube (V) = l^3

When edge of cube is doubled, then

Volume of cube (V')= $(2l)^3 = 8l^3$

V' = 8 x V

Hence, the volume will increase 8 times.

Question 8:

Water is pouring into a cuboidal reservoir at the rate of 60 liters per minute. If the volume of reservoir is 108 m^3, find the number of hours it will take to fill the reservoir.

Answer 8:

Given: volume of reservoir = 108 m^3

Rate of pouring water into cuboidal reservoir = 60 liters/minute

$= \frac{60}{1000}$ m^3/minute $\left[\because 1l = \frac{1}{1000}m^3\right]$

$= \frac{60\times 60}{1000}$ m^3/hour

$\because$ $\frac{60\times 60}{1000}$ m^3 water filled in reservoir will take = 1 hour

$\therefore$ 1 m^3 water filled in reservoir will take = $\frac{1000}{60\times 60}$ hours

$\therefore$ 108 m^3 water filled in reservoir will take = $\frac{108\times 1000}{60\times 60}$ hours = 30 hours

It will take 30 hours to fill the reservoir.