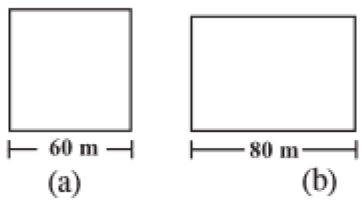
CBSE NCERT Solutions for Class 8 Mathematics Chapter 11

Back of Chapter Questions

Exercise 11.1

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



Solution:

Given, side of square $= 60$ m and length of rectangle $= 80\text{m}$

We know that, perimeter of square $= 4a$

And perimeter of rectangle$= 2(l + b)$

Perimeter of square $= 4 \times 60 = 240\text{m}$

Perimeter of rectangle $= 2[l + b]$

$= 2(80 + b)$

Given, Perimeter of Square $=$ Perimeter of Rectangle

$\Rightarrow 240 = 2(80 + b)$

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

We know that, Area of square$= a^2$

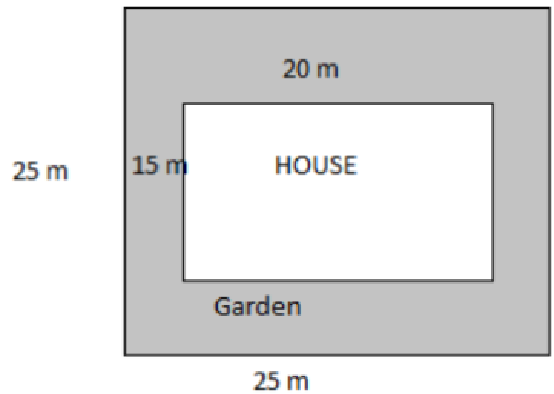
Area of rectangle $= lb$

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

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

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

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.



Solution:

Given, Side of square $= 25\text{m}$

Length of house $= 15\text{m}$

Breadth of house $= 20\text{m}$

We know that, Area of square $= \text{a}^2$

Area of rectangle $= \text{lb}$

Area of remaining portion $=$ Area of square plot $-$ Area of house

Now, area of Square $= 25 \times 25 = 625\ \text{m}^2$

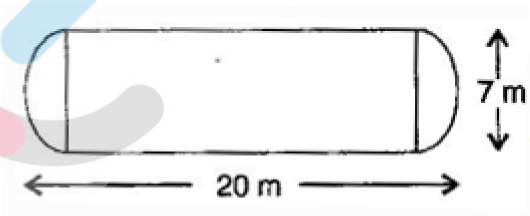
And area of house $= 15 \times 20 = 300\ \text{m}^2$

Hence, area of remaining portion $= 625\ \text{m}^2 - 300\ \text{m}^2 = 325\ \text{m}^2$

Total cost $=$ ₹ $(325 \times 55) =$ ₹ $17{,}875$.

Hence, the total cost for developing a garden is ₹17,875.

3. The shape of a garden is rectangular in the middle and semicircular 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].



Solution:

Given total length $= 20$ m

And diameter of the semicircle $= 7$ m

$\Rightarrow$ Radius of the semicircle $= \frac{7}{2}\text{m} = 3.5\text{m}$

Length of rectangular field $= 20 - (3.5 + 3.5)$

$= 20 - 7 = 13$ m

Breadth of the rectangular field $= 7$m

Area of rectangular field $= l \times b$

$= 13 \times 7$

$= 91\text{m}^2$

Area of two semi circles $= 2 \times \frac{1}{2} \times \pi \times r^2$

$= 2 \times \frac{1}{2} \times \frac{22}{7} \times 3.5 \times 3.5$

$= 38.5\text{m}^2$

Therefore, area of garden $= 91 + 38.5 = 129.5\ \text{m}^2$

Perimeter of two semi circular arcs $= 2 \times \pi r$

$= 2 \times \frac{22}{7} \times 3.5$

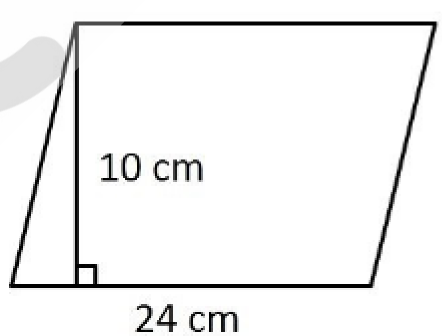
$= 22$ m

Hence, Perimeter of garden $= 22 + 13 + 13$

$= 48$ m

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).

Solution:



Given, base of a parallelogram $= 24$ cm.

And height of a parallelogram$= 10$ cm.

Area of a parallelogram $=$ bh

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

We know that $1\text{m} = 100\text{cm}$

Total area $= 1080 \times 10000 = 10800000\text{cm}^2$.

Hence,

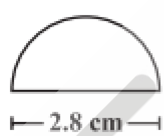
Total tiles required $= \frac{\text{Total area}}{\text{Area of one tile}}$

$= \dfrac{1080 \times 10000}{240}$

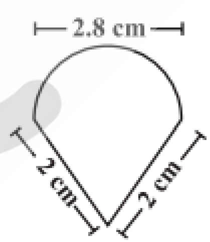
$= 45000$ Tiles

Therefore, 45000 tiles are required to cover area of 1080 m^2

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.

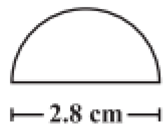
(a) 

(b) 

(c) 

Solution:

(a) Given figure



Given that diameter of a circle $= 2.8$ cm

Radius of circle $= \frac{\text{Diameter}}{2}$

$= 1.4$ cm

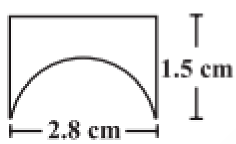
Circumference of the semi-circle $= \pi r$

$= \frac{22}{7} \times 1.4$

$= 4.4$

Total distance covered $= 4.4\text{cm} + 2.8\text{cm} = 7.2\text{cm}$

(b)



Given diameter of a semicircle $= 2.8$ cm

Radius of semicircle $= \frac{2.8}{2} = 1.4$ cm

Circumference of the semi-circle $= \pi r$

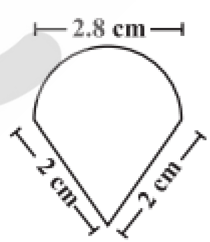
$= \frac{22}{7} \times 1.4$

$= 4.4$

Total distance covered $= 1.5 + 2.8 + 1.5 + 4.4$

$= 10.2$ cm

(c)



Given diameter of a semicircle $= 2.8$ cm

Radius of semicircle $= \frac{2.8}{2} = 1.4$ cm

Circumference of the semi-circle $= \pi r$

$= \frac{22}{7} \times 1.4$

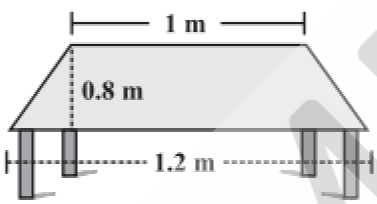
$= 4.4$

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

Therefore, for food piece of shape (b), ant have to take a longer round.

Exercise 11.2

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.



Solution:

Given, Length of parallel sides of trapezium are 1 m and 1.2 m

Perpendicular distance between parallel sides $= 0.8$ m

We know, Area of Trapezium $= \frac{1}{2}h(a + b)$

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

$= 0.88\ m^2$

Therefore, Area of top surface of table is $0.88\ m^2$

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.

Solution:

Let the length of the unknown parallel side be x.

Given, Area of a trapezium is $34\ cm^2$.

And length of one of parallel sides of trapezium $= 10$ cm

We know, area of Trapezium $= \frac{1}{2}h(a+b)$

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

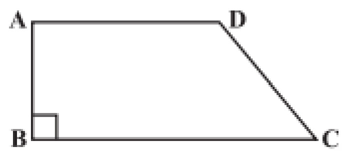
$$\Rightarrow 34 = 2\,(10 + x)$$

$$\Rightarrow 17 = 10 + x$$

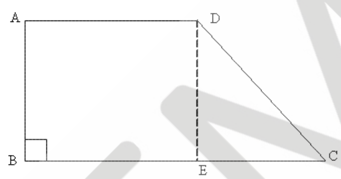
$$\Rightarrow x = 17 - 10 = 7 \text{ cm}$$

Hence, length of the other parallel side $= 7$ cm

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.



Solution:



Given, Length of the fence of a trapezium shaped field ABCD $= 120$ m

BC $= 48$ m

CD $= 17$ m

AD $= 40$ m

Now, AB$= 120 - 48 - 17 - 40$

$= 15$ m

Draw a perpendicular from D on BC

AB $=$ DE

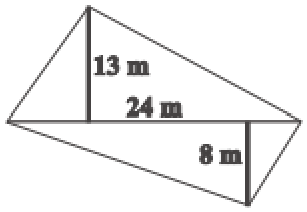
Area of Trapezium $= \frac{1}{2}h(a+b)$

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

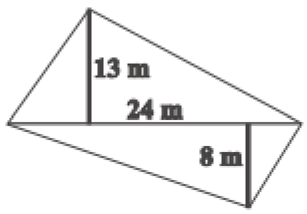
$$= 660 \text{ m}^2$$

Therefore, area of field $= 660\ \text{m}^2$

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



Solution:



Given, Length of base $= 24$ m.

Height of upper triangle $= 13$ m

Height of lower triangle $= 8$ m

We know, area of triangle $= \frac{1}{2} \times \text{height} \times \text{base}$

Hence, Area of upper triangle $= \frac{1}{2} \times 13 \times 24 = 156\ \text{m}^2$

And area of lower triangle $= \frac{1}{2} \times 8 \times 24 = 96\ \text{m}^2$

Therefore, Area of field $= 156 + 96 = 252\ \text{m}^2$

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

Solution:

We Area of rhombus $= \frac{1}{2} \times \text{Diagonal 1} \times \text{Diagonal 2}$

Given, Length of diagonal $1 = 7.5$ cm

Length of diagonal $2 = 12$ cm

Area of rhombus $= \frac{1}{2} \times 7.5 \times 12$

$= 45\ \text{cm}^2$

Therefore, area of given rhombus $=\ 45\ \text{cm}^2$

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

Solution:

We know that area of rhombus $= \frac{1}{2} \times$ product of its diagonals

Since, a rhombus is also a parallelogram

$\therefore$ Area of rhombus $= 5\text{cm} \times 4.8\text{cm} = 24\text{cm}^2$

Let the length of another diagonal be x.

Now, $24\text{cm}^2 = \frac{1}{2}(8 \text{ cm} \times x)$

$$\Rightarrow x = \frac{24 \times 2}{8} \text{cm} = 6 \text{ cm}$$

Thus, the length of other diagonal is 6 cm.

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.

Solution:

Given length of diagonals are 45 cm and 30 cm.

We know that area of rhombus $= \frac{1}{2} \times$ product of its diagonals.

Area of rhombus (Each tile) $= \frac{1}{2} \times 45 \times 30 = 675 \text{ cm}^2$

Now, area of 3000 tiles $= 3000 \times 675 \text{ cm}^2$

$= 2025000 \text{ cm}^2$

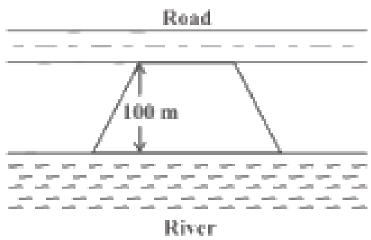
$= 202.5 \text{ m}^2$

Given that the cost of polishing is 4m^2.

Cost of polishing 202.5 m^2 area $=$ ₹ (4×202.5)

$=$ ₹ 810

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.



Solution:

Given, Perpendicular distance (Height) $= 100$ m .

Area of field $= 10500\ \text{m}^2$.

Let the length of side alongside the road be x. Given that side along the river is twice the side along the road.

Hence, length of other side $= 2x$.

We know that, Area of Trapezium $= \frac{1}{2} \times$ sum of parallel sides $\times$ perpendicular distance.

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

$$\Rightarrow 3x = 10500 \times \frac{2}{100}$$

$$\Rightarrow 3x = 210$$

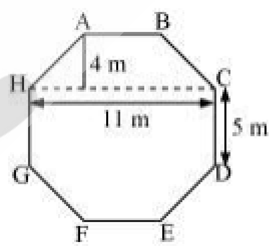
$$\Rightarrow x = 70$$

Therefore, length of side along the road $=$ 70 m.

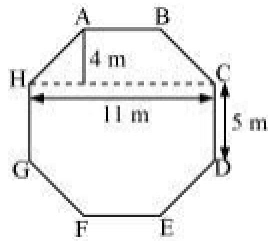
and length of side along the river $=$ 140 m.

Hence, Length of side along the river $= 140$ m.

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.



Solution:



From the given figure, Area of trapezium ABCH $=$ Area of trapezium DEFG

We know that, Area of Trapezium $= \frac{1}{2} \times$ sum of parallel sides $\times$ perpendicular distance.

Hence, area of Trapezium ABCH $= \left[\frac{1}{2}(4)(11+5)\right] \mathrm{m}^2$

$= \left(\frac{1}{2} \times 4 \times 16\right) \mathrm{m}^2$

$= 32\mathrm{m}^2$

Area of rectangle HGDC $=$ length $\times$ breadth $= 11 \times 5 = 55\ \mathrm{m}^2$

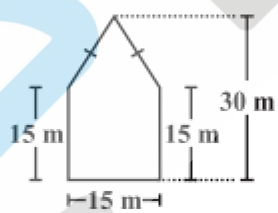
Therefore, Area of octagon $=$ Area of trapezium ABCH $+$ Area of trapezium DEFG $+$ Area of rectangle HGDC

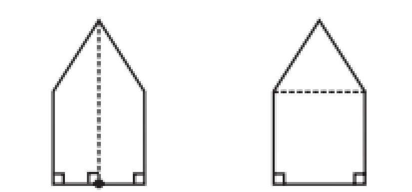
Area of Octagon $= 32\ \mathrm{m}^2 + 32\ \mathrm{m}^2 + 55\ \mathrm{m}^2$

$= 119\ \mathrm{m}^2$

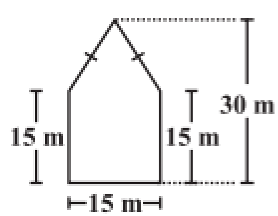
Hence, area of the octagon is $119\ \mathrm{m}^2$

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?



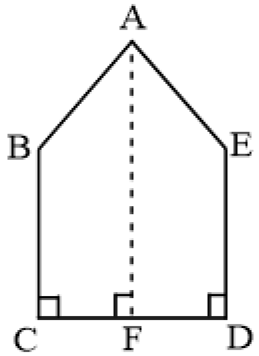


Solution:



(a) From the given figure, Area of pentagon = Area of trapezium AEDF + Area of trapezium ABCF

Area of pentagon = 2 (Area of trapezium ABCF)

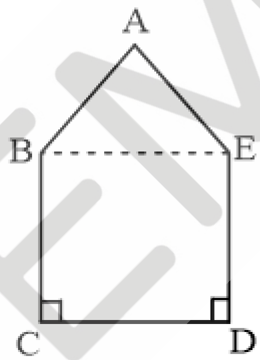


We know that, Area of Trapezium $= \frac{1}{2} \times$ sum of parallel sides $\times$ perpendicular distance.

Area of pentagon $= \left[2 \times \frac{1}{2}(15 + 30)\left(\frac{15}{2}\right)\right] \text{m}^2$

$= 337.5 \text{ m}^2$

(b) From the given diagram, Area of rectangle BCDE $= 15 \times 15 = 225 \text{ m}^2$



Area of triangle ABE $= \frac{1}{2} \times$ Base $\times$ Height

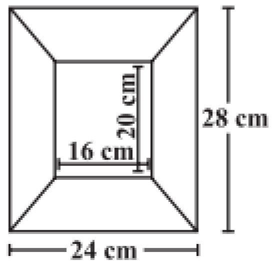
$= \frac{1}{2} \times 15 \times 15$

$= 112.5 \text{ m}^2$

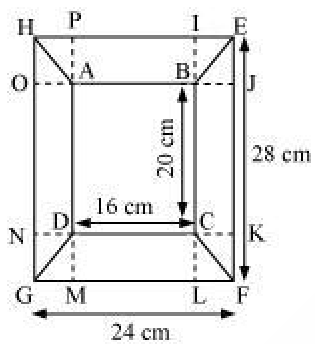
Area of pentagon ABCDE = Area of rectangle BCDE +Area of triangle ABE

$= 225 + 112.5 = 337.5 \text{ m}^2$.

11. 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:



Given that width of each section is same.

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

And $IL = IB + BC + CL$

$\Rightarrow 28 = IB + 20 + CL$

$\Rightarrow IB + CL = 28\text{ cm} - 20\text{ cm} = 8\text{ cm}$

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

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

Area of section BEFC $=$ Area of section DGHA

We know that, Area of Trapezium

$$= \frac{1}{2} \times \text{ sum of parallel sides} \times \text{perpendicular distance.}$$

Area of section BEFC $= \left[\frac{1}{2}(20 + 28)(4)\right]\text{cm}^2 = 96\text{ cm}^2$

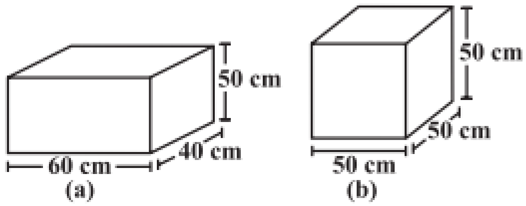
Area of section ABEH $=$ Area of section CDGF

$= \left[\frac{1}{2}(16 + 24)(4)\right]$

$= 80\text{cm}^2$

EXERCISE 11.3

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



Solution:

We know, Total surface area of the cuboid $= 2 \times (L \times H + B \times H + L \times B)$

And total surface area of the cube $= 6\ L^2$

Given, Dimensions of cuboid are $60\text{ cm} \times 40\text{ cm} \times 50\text{ cm}$

And dimensions of cube are $50\text{ cm} \times 50\text{ cm} \times 50\text{ cm}$

Total surface area of cuboid $= [2\{(60)(40) + (40)(50) + (50)(60)\}]\text{ cm}^2$

$= (2 \times 7400)\text{cm}^2$

$= 14800\text{ cm}^2$

Total surface area of cube $= 6\ (50\text{ cm})^2$

$= 15000\text{ cm}^2$

Thus, the cuboidal box will require lesser amount of material than cube.

2. A suitcase with measures $80\text{ cm} \times 48\text{ cm} \times 24$ 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?

Solution:

Given dimensions of suitcase are $80\text{ cm} \times 48\text{ cm} \times 24\text{ cm}$

We know that total surface area of the cuboid $= 2\ (L \times H + B \times H + L \times B)$

Total surface area of suitcase $= 2[(80)\ (48) + (48)\ (24) + (24)\ (80)]$

$= 2[3840 + 1152 + 1920]$

$= 13824\text{ cm}^2$

Total surface area of 100 suitcases $= (13824 \times 100)\text{cm}^2$

$= 1382400\text{ cm}^2$

Area of tarpaulin $=$ Length $\times$ Breadth

$\Rightarrow 1382400 \text{ cm}^2 = \text{Length} \times 96 \text{ cm}$

$\Rightarrow \text{Length} = \dfrac{1382400}{96} \text{cm}$

$= 14400 \text{ cm}$

$= 144 \text{ m}$

Therefore, 144 m of tarpaulin is required to cover 100 suitcases.

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

Solution:

Given surface area of cube $= 600 \text{ cm}^2$

We know that Surface area of cube $= 6 \text{ (Side)}^2$

Let side of cube be L cm.

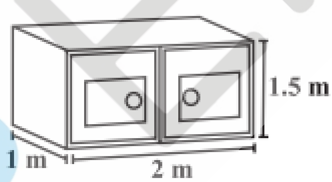
$\Rightarrow 600 \text{ cm}^2 = 6L^2$

$\Rightarrow L^2 = 100 \text{ cm}^2$

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

Therefore, the side of the cube is 10 cm.

4. 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:

Given, Length of the cabinet $= 2\text{m}$

Breadth of the cabinet $= 1\text{m}$

Height of the cabinet $= 1.5 \text{ m}$

Area of the cabinet that was painted $= 2H(L + B) + L \times B$

$= [2 \times 1.5 \times (2 + 1) + (2)(1)]\text{m}^2$

$= (9 + 2)\text{m}^2$

$= 11\text{m}^2$

Therefore, area of the cabinet that was painted is $11\ m^2$.

5. 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 $100\ m^2$ of area is painted. How many cans of paint will she need to paint the room?

Solution:

Given, Length of the cabinet= $15\ m$

Breadth of the cabinet $= 10\ m$

Height of the cabinet $= 7\ m$

Area of the cabinet that was painted $= 2H\ (L + B) + L \times B$

$= [2(7)(15 + 10) + 15 \times 10]\ m^2$

$= 500m^2$

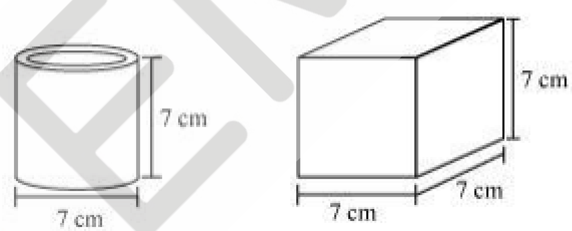
Given $100\ m^2$ can be painted from 1 can.

Number of cans required $= \frac{500}{100}$

$= 5$

Hence, number of cans required is 5.

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



Solution:

Given, side length of cube $= 7$ cm

Radius of cylinder $= 3.5$ cm

Height of cylinder $= 7$ cm.

We know, Lateral Surface area of the cube $= 4L^2$

$= 4\ (7\ )^2$

$= 196\ cm^2$

Lateral surface area of the cylinder $= 2\pi rh$

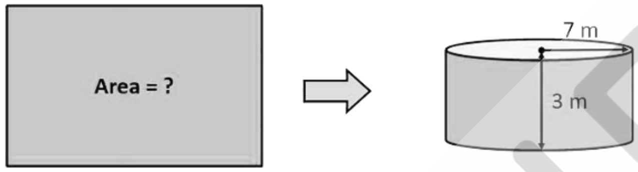
$= \left(2 \times \frac{22}{7} \times \frac{7}{2} \times 7\right) \text{cm}^2$

$= 154 \text{ cm}^2$

Hence, cube has the larger surface area than cylinder.

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?

Solution:



Given, Radius of cylinder $= 7\text{m}$

Height of cylinder $= 3\text{m}$

We know surface area of cylinder $= 2\pi r\,(r + h)$

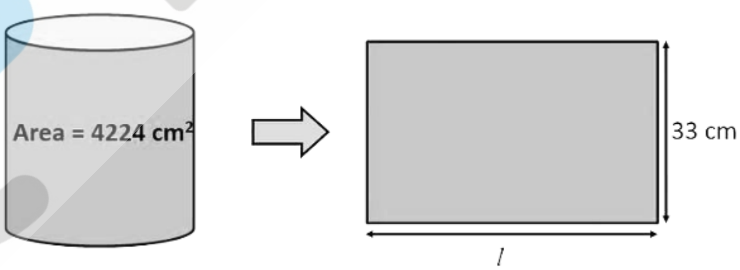
Surface area $= \left[2 \times \frac{22}{7} \times 7(7 + 3)\right] \text{m}^2$

$= 440\text{m}^2$

Thus, 440m^2 sheet of metal is required.

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?

Solution:



Given

Lateral surface area of cylinder $= 4224 \text{ cm}^2$

Clearly, Area of cylinder = Area of rectangular sheet

$\Rightarrow 4224 \text{ cm}^2 = 33 \text{ cm} \times \text{Length}$

$\Rightarrow \text{Length} = \dfrac{4224\text{cm}^2}{33\text{cm}}$

$= 128\text{cm}$

Now, perimeter of rectangular sheet= $2[\text{L} + \text{B}]$

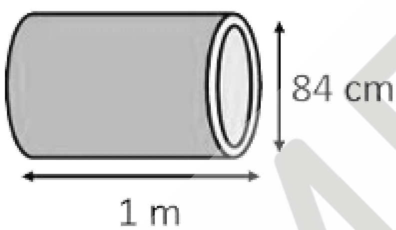
$= [2\,(128 + 33)]\text{ cm}$

$= (2 \times 161)\text{ cm}$

$= 322\text{ cm}$

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 is 1 m.

Solution:



Given, Road roller takes 750 revolutions.

Length of road roller = 1 m

Diameter of a road roller = 84 cm

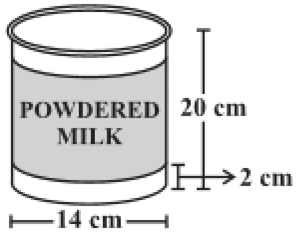
In 1 revolution, area of the road covered = $2\pi rh$

$= 2 \times \dfrac{22}{7} \times 42\text{cm} \times 1\text{m}$

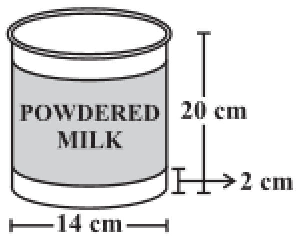
$= 2 \times \dfrac{22}{7} \times \dfrac{42}{100}\text{m} \times 1\text{m} = \dfrac{264}{100}\text{m}^2$

In 750 revolutions, area covered on the road = $750 \times \frac{264}{100}\text{m}^2 = 1980\text{m}^2$

10. A company packages its milk powder in cylindrical container whose base has a diameter of 14 cmand 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:



Given, Height of cylinder $= 20$ cm.

Diameter of cylinder $= 14$ cm.

Height of the label $= 20\text{ cm} - 2\text{ cm} - 2\text{ cm}$

$= 16$ cm

Radius of the label $= \frac{14}{2}$ cm

$= 7$ cm

Area of the label $= 2\pi$ (Radius) (Height)

$= \left(2 \times \frac{22}{7} \times 7 \times 16\right) \text{cm}^2$

$= 704 \text{ cm}^2$

Hence, area of the label $= 704 \text{ cm}^2$.

Exercise 11.4

1. 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

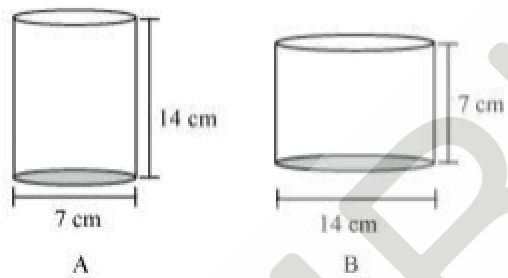
Solution:

In given situation, we will find its volume to know how much it can hold.

In given situation, we will find surface area to find number of cement bags required to plaster it.

In given situation, we will find volume to find number of smaller tanks that can be filled with water from it.

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?



Solution:

We know that Volume of cylinder$= \pi r^2 h$

If measures of r and h are same, then the cylinder with greater radius will have greater area.

Given, Radius of cylinder A $= \frac{7}{2}$ cm $= 3.5$ cm

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

Height of cylinder A $= 14$ cm

Height of cylinder B $= 7$ cm.

Therefore, volume of cylinder B is greater.

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

$= \frac{22}{7} \times 3.5 \times 3.5 \times 14$

$= 539\ \text{cm}^3$

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

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

$= 1078 \text{ cm}^3$

Surface area of cylinder A $= 2\pi r(r + h)$

$= 2 \times \frac{22}{7} \times 3.5(3.5 + 14)$

$= 385 \text{ cm}^2$

Surface area of cylinder B $= 2\pi r(r + h)$

$= 2 \times \frac{22}{7} \times 7(14)$

$= 616 \text{ cm}^2$

The cylinder with higher volume has higher surface area.

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

Solution:

Given, Base area of a cuboid $= 180 \text{ cm}^2$

Volume of a cuboid $= 900 \text{ cm}^3$

We know that, Volume $=$ base area $\times$ height

$\Rightarrow$ Height $= \frac{\text{Volume}}{\text{Base area}}$

$= \frac{900\text{cm}^3}{180\text{cm}^2}$

$= 5 \text{ cm}$

4. A cuboid is of dimensions $60 \text{ cm} \times 54 \text{ cm} \times 30 \text{ cm}$. How many small cubes with side 6 cm can be placed in the given cuboid?

Solution:

Given that the dimensions of cuboid are $60 \text{ cm} \times 54 \text{ cm} \times 30 \text{ cm}$

And side length of cube $= 6 \text{ cm}$

We know that volume of cuboid $= lbh$

Volume of cuboid $= 60 \text{ cm} \times 54 \text{ cm} \times 30 \text{ cm}$

$= 97200 \text{ cm}^3$

Side of the cube $= 6 \text{ cm}$

Volume of cube $= a^3$

Volume of the cube $= 216 \text{ cm}^3$

Number of cubes $= \frac{\text{Volume of cuboid}}{\text{Volume of 1 cube}}$

$= \frac{97200\text{cm}^3}{216\text{cm}^3}$

$= 450$

Hence, 450 cubes can be placed in cuboid of given dimensions.

5. Find the height of the cylinder whose volume is $1.54\ \text{m}^3$ and diameter of the base is 140 cm?

Solution:

Given that the diameter of the base $= 140$ cm

Volume of the cylinder $= 1.54\ \text{m}^3$

Also, radius (r) of the base $= \frac{140}{2}\text{cm} = 70\text{cm}$

$= \frac{70}{100}\text{m} = 0.7\text{m}$

We know, Volume of cylinder $= \pi r^2 h$

$\Rightarrow 1.54\text{m}^3 = \frac{22}{7} \times 0.7\text{m} \times 0.7\text{m} \times h$

$\Rightarrow h = 1\text{m}$

Hence, Height of cylinder $= 1\text{m}$

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 litres that can be stored in the tank?

Solution:

Given, Radius of cylinder $= 1.5$ m

Length of cylinder $= 7$ m

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

$= \left(\frac{22}{7} \times 1.5 \times 1.5 \times 7\right) \text{m}^3$

$= 49.5\ \text{m}^3$

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

Required quantity $= (49.5 \times 1000)\text{L} = 49500\text{L}$

Hence, 49500 L milk can be stored in tank.

7. If each edge of a cube is doubled, How many times will its surface area increase?

How many times will its volume increase?

Solution:

Let initially the edge of the cube be L.

We know surface area of cube $= 6L^2$

If each edge of the cube is doubled, then it becomes 2L.

New surface area $= 6(2L)^2 = 4 \times 6L^2$

Clearly, the surface area will be increased by 4 times

Initial volume of the cube $= L^3$

When each edge of the cube is doubled, it becomes 2L.

New volume $= (2L)^3 = 8L^3 = 8\, x\, L^3$

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

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.

Solution:

Given, Volume of cuboidal reservoir $= 108\ m^3$

$= (108 \times 1000)L$

$= 108000\ L$

Rate at which Water pouring $= (60 \times 60)L$

$= 3600\ L$ per hour

Required number of hours $= \frac{108000}{3600}$

$= 30$ hours .

Therefore, 30 hours are required to fill the reservoir.