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MATHS

BOOKS - NAND LAL PUBLICATION

MENSURATION

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 ?

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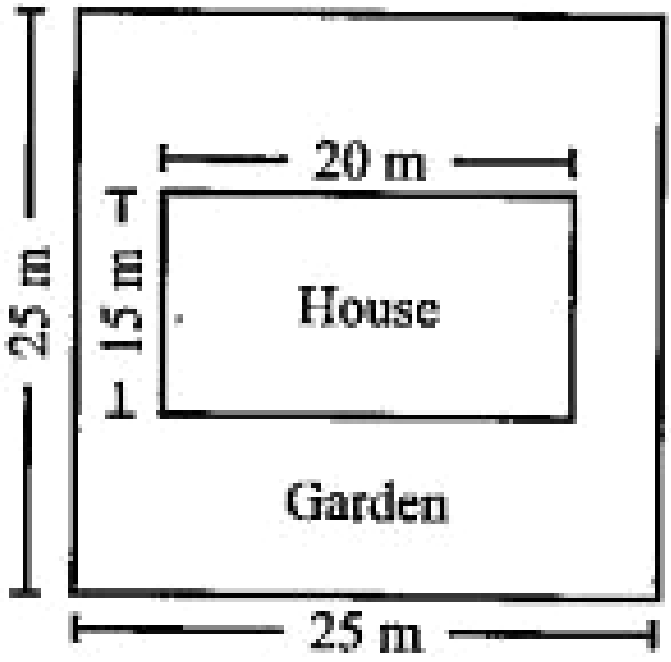
2. Mrs. Kaushik has a square plot with the measurement as shown in the figure. She wants to construct a house in the middle of the plot. A garden is developed around the house. Find the total case o developing a garden around the house at the rate of Rs. 55

per m^2.



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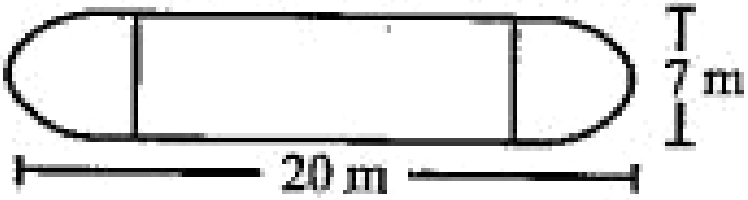
3. The shape of a garden is rectangular in the middle and semi-circular at the ends as shown

in the diagram.



Find the area and the perimeter of this garden.

(length of rectangle is 20 - (3.5 + 3.5 meter).

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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 $1080m^2$? (If required you can split the tiles in whatever way you want to fill up the corners).

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5. An ant is moving around a few food pieces of different shapes scatterd 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.

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Exercise 11 2

1. The shape of top sufrace 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.

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2. The area of a trapezium is $34cm^2$ 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.

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3. Length of the fence of a trapezium shaped field ABCD is 120 m.If BC=48m.,CD = 17 m and AD=40 m,find the area of this field.Side AB is perpendicular to the parallel sides AD and BC.

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

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

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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.

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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 Rs 4.

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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 10,500 cm^2 and the perpendicular distance between the two parallel sides is 100m,find the length of the side along the river.

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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.

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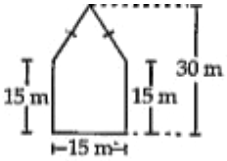
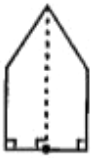
10. There is pentagonal shaped park as shown in the figure. For finding its area Jyoti and Kawita divided it in two different ways.





Jyoti's diagram

Kavita's diagram

Find the area of this park using both ways. Can

you suggest some other way of finding its area?

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

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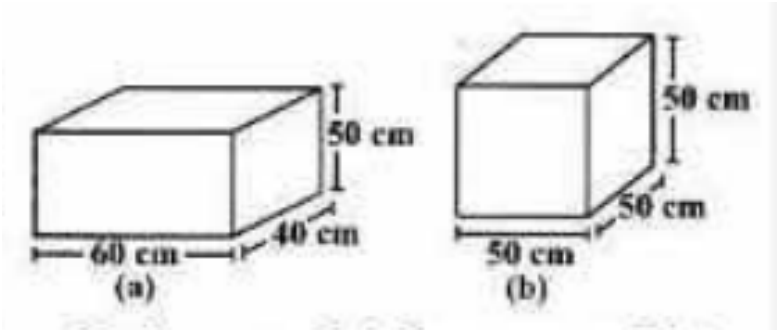
Exercise 11 3

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



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

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

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

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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 $100m^2$ of area is painted.How

many cans of paint will she need to paint the room?

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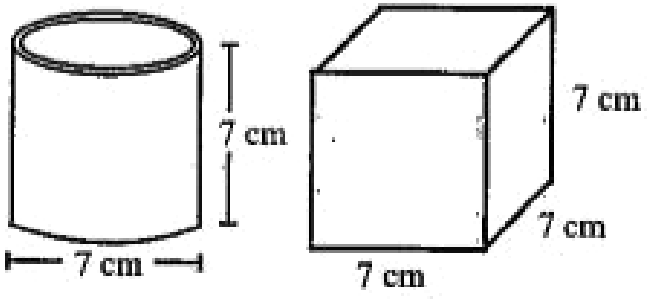
6. Describe how the two figures at the right are alike and how they are different. Which box has larger surface area?



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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?

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

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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..

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10. A compnay 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?

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Exercise 11 4

1. Given a cylindrical tank, in which situation will you find surface area and in which situation volume: To find the number of

smaller tanks that can be filled with water from it.

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2. Given a cylindrical tank, in which situation will you find surface area and in which situation volume: Number of cement bags required to plaster it.

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3. Given a cylindrical tank, in which situation will you find surface area and in which situation volume: To find the number of smaller tanks that can be filled with water from it.

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4. Diameter of cylinder A is 7 cm, and the height is 14 cm.Diameter of cylinder B is 14 cm an 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?

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

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

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7. Find the height of the cylinder whose volume is $1.54m^3$ and diameter of the base is 140 cm ?

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8. 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?

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9. If each edge of a cube is doubled: how many times will its surface area increase?

Watch Video Solution

10. If each edge of a cube is doubled: how many times will its volume increase?

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

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Additional Questions For Practice Objective Type Questions

1. Answer the multiple choice questions.

A rectangle x cm long and y cm wide is made 4m longer. The area in cm^3 now has increased by

A. $4x$

B. $4y$

C. $4xy$

D.

Answer: 4y

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2. Answer the multiple choice questions.

Area of which regular figure is given by $\frac{1}{2} \times$ product of diagonals.

A. parallelogram

B. rhombus

C. trapezium

D.

Answer: rhombus

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3. Answer the multiple choice questions.

Volume of cube of side 0.01 min cm^3 is

A. 1.0E-6

B. 0.0001

C. 1

D.

Answer: 1

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4. Answer the multiple choice questions.

In cuboid all faces are

A. Square

B. triangle

C. rectangle

D.

Answer: rectangle

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5. Answer the multiple choice questions.

Surface area of open box whose length, breadth and height are l, b, h respectively is

A. $2(lb + bh) + hl$

B. $2(bh + hl) + lb$

C. $2(lb + bh) + hl$

D.

Answer: $2(bh + hl) + lb$

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6. Answer the multiple choice questions.

If base of the triangle is doubled and height is halved, its area will be

A. doubled

B. remains same

C. halved

D.

Answer: remains same

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7. Answer the multiple choice questions.

If V and C respectively stand for volume and lateral surface area of cylinder with base radius r then

A. $2V = Cr$

B. $2C = Vr$

C. $2r = Vc$

D.

Answer: $2V = Cr$

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8. Fill in the blanks.

Sum of the area of all six faces of cuboid is the

_____ of cuboid.

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9. Fill in the blanks.

Area of trapezium = $\frac{1}{2}$ (_____) $\times$ perpendicular distance

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10. Fill in the blanks.

Area of parallelogram of height 5 cm in 6.25 cm^2 then the length of the base is _____

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11. Fill in the blanks.

Side of the rhombus whose diagonals are x and y is _____ .

Watch Video Solution

12. Fill in the blanks.

Two cubes have their volumes in the ratio $1:8$ the ratio of the surface area is _____ .

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13. Fill in the blanks.

Lateral surface area of the cylinder of height 7 cm and radius 3 cm is _____

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14. Fill in the blanks.

A rectangle of length 44 cm is rolled along its length to form a cylinder then the radius of the cylinder is _____ .

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15. State whether True or False.

Six faces of a cube are squares of same size.

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16. State whether True or False.

Volume of the cube $= 6 \times (\text{side})^2$

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17. State whether True or False.

Volume of water tank is measured in square units.

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18. State whether True or False.

If radius of cylinder is doubled and height is halved then the new volume becomes 2 times.

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19. State whether True or False.

Area of quadrilateral can found by splitting into two triangles.

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20. State whether True or False.

1000 $\mathrm{cm}^3 = 1000$ litres.

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21. Three Cubes each of side 7 cm are joined together side by side to form a cuboid. Find the total surface area of cuboid.

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22. Perimeter of the rhombus is 40 cm and one diagonal has a length 16 cm. Find the area of the rhombus.

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23. If the radius of two circular cylinders are in the ratio $2:3$ and their heights are in the ratio $9:10$. Find the ratio of their curved surface areas.

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24. Find the area of the isosceles ΔABC, whose base is 12 cm and one of the equal sides is 10 cm.

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25. A metal cube of volume $2933\ \mathrm{cm}^3$ is melted and recast into three smaller cubes of sides 14 cm and 5 cm. Find the side of the third cube.

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26. The ratio between curved surface area and total surface area of right circular cylinder is $1:2$ find the ratio between the height and the radius of the cylinder.

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27. A square of side 3 cm is inscribed in a circle. Find the area of the shaded portion.

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Additional Questions For Practice Long Answer Type Questions

1. The capacity of a closed cylindrical vessel of height 1m is 15.4 litres. How many square

metres of metal sheet would be needed to make it ? ($1000l = 1m^3$)

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2. A cylinderical pipe has an outer diameter of 1.4 m and an inner diameter of 1.12m. Its length is 10 m. Find the total area to be painted if the rate of painting is Rs. 100 per m^2.

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3. Earth is dug out to a depth of 15 m from a circular plot of land of radius 7 m. The earth is then spread out evenly on an adjacent rectangular plot of dimension $16\ \mathrm{m} \times 7\ \mathrm{m}$. Find the height of the earth on the rectangular plot.

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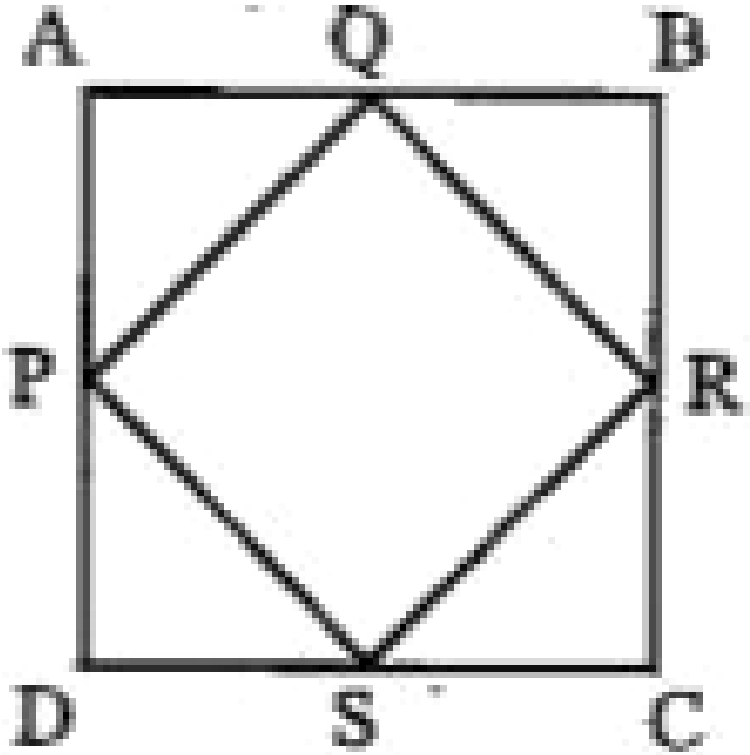
4. The area of the square ABCD is 64 sq. cm. Find the area of the square joining the mid

points of the sides of square ABCD.



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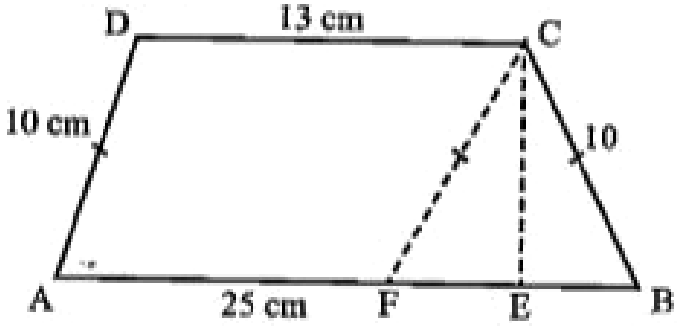
5. The parallel sides of the trapezium are 13 cm, 25 cm and the non parallel sides are 10 cm. Find the area of the trapezium.



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Additional Questions For Practice Hots High Order Thinking Skill

1. From a rope of length 15 m, two pieces of length $4\frac{3}{5}m$ and $2\frac{3}{10}$ m, are cut off The left over rope is converted into a circle. What is the radius of the circle?

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Sample Paper For Practice

1. Answer the multiple choice questions.

Area of the trapezium whose parallel sides are

6 cm and 8 cm, the distance between them is 5 cm is

A. $35 \quad \mathrm{cm}^2$

B. $70 \quad \mathrm{cm}^2$

C. $19 \quad \mathrm{cm}^2$

D.

Answer: $35 cm^2$

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2. Answer the multiple choice questions.

Area of the rhombus whose diagonals are 16 cm and 8 cm is

A. $64 \quad \mathrm{mm}^2$

B. $6.4 \quad \mathrm{cm}^2$

C. $64 \quad \mathrm{cm}^2$

D.

Answer: $64cm^2$

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3. Answer the multiple choice questions.

Volume of the cylinder whose height is twice its radius is

A. πr^3

B. $2\pi r^3$

C. $4\pi r^3$

D.

Answer: $2\pi r^3$

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4. Answer the multiple choice questions.

Volume of cube whose side is 3y is

A. $3y^3$

B. $9y^3$

C. $27y^3$

D.

Answer: $27y^3$

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5. Fill in the blanks.

_____ of a room is equal to the area of four walls.

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6. Fill in the blanks.

Trapezium whose non-parallel sides ae equal is known as _____ .

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7. Fill in the blanks.

Volume of the oil tank is $4 \ \ \mathrm{m}^3$. Its capacity in litres is _____ .

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8. Fill in the blanks.

_____ cubes each of 10 cm edge can be put in a cubical box of edge 1 m.

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9. State whether True or False. Correct the statements.

Square is a special parallelogram in which all sides are equal in length.

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10. State whether True or False. Correct the statements.

Volume of the cylinder whose radius is half its height is $\frac{\pi r^3}{8}$

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11. State whether True or False. Correct the statements.

$1m^3 = 100000 \ \ \text{cm}^3$.

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12. State whether True or False. Correct the statements.

Distance between the two parallel sides of the trapezium is called the base of the trapezium.

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13. Match the following

(a)	$2\pi rh$	–	Cuboid
(b)	$\frac{1}{2} \times d \times (h_1 + h_2)$	–	Cube
(c)	$\frac{1}{2} \times d_1 \times d_2$	–	parallelogram
(d)	$b \times h$	–	Trapezium
(e)	$6a^2$	–	Rhombus
(f)	$2h\,(l + b)$	–	Cylinder

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14. The area of cross section of the pipe is 4.8 cm2 and water is pumped out of it and the

rate of 24 km/hr. Find in litres the volume of water which flows out of the pipe in one minute.

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15. The outer Surface of the cube of side 6 m is painted. If the cost of painting is Rs. 1 per 100 cm^2. Find the total cost of painting the cube.

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16. The rainfall recorded on a particular day was 10 cm. The rain water that fell on the roof 60 m long and 20 m wide was collected in a cylinderical tank of radius 7m. Find the Volume of the rain water that fell on the roof.

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17. The rainfall recorded on a particular day was 10 cm. The rain water that fell on the roof 60 m long and 20 m wide was collected in a

cylinderical tank of radius 7m. Find the

Rise of water level in the tank due to rain water.

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18. How many persons can be accommodated in the hall Whose length is 18 m and breadth is 14 m and height of the hall is 5 m assuming that $4.5m^3$ of air is required for 1 person.

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19. Total surface area of the cylinder is 2640 cm^2 and the circumference of its base is 44 cm. Find the volume of the cylinder.

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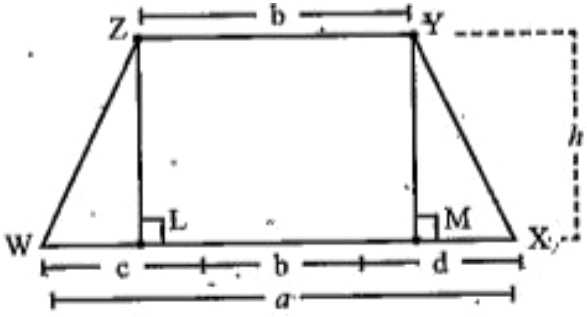
Try These

1. Nazma's sister also has a trapezium shaped plot. Divide it into three parts as shown (fig. 11.4). Show that the area of trapezium WXYZ

$= \frac{h(a+b)}{2}$



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2. If h=10 cm,c=6cm,b=12 cm,d=4 cm,find the values of each of its parts separately and add to find the area WXYZ.Verify it by putting the values of h,a and b in the expression $\frac{h(a+b)}{2}$.

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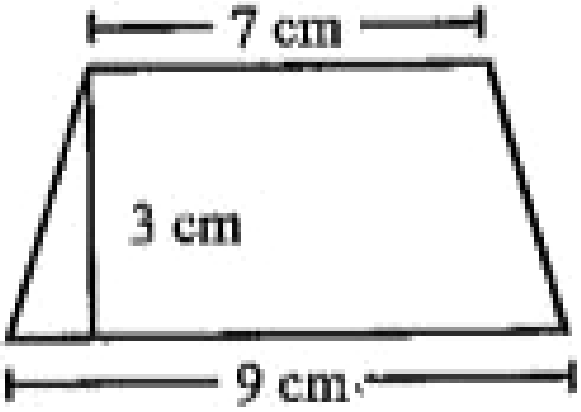
3. Find the area of the following trapeziums:



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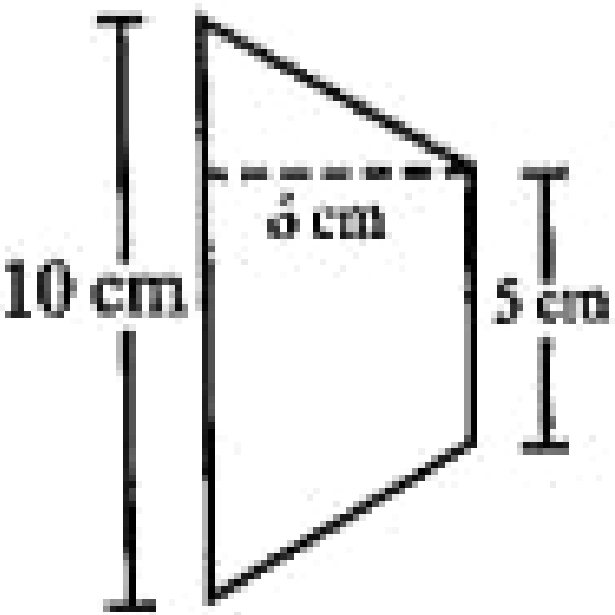
4. Find the area of the following trapeziums:



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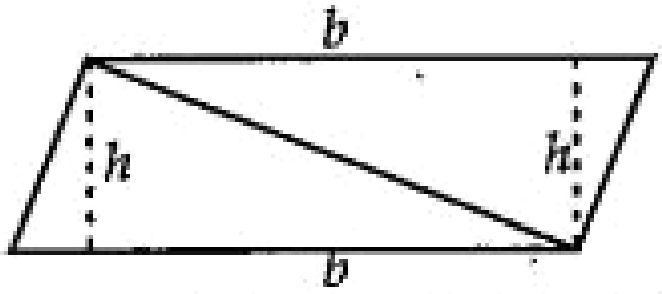
5. 

We know that parallelogram is also a quadrilateral. Let us also split such a quadrilateral into two triangles. Find their areas and hence that of the parallelogram. Does this agree with the formula that you know already?

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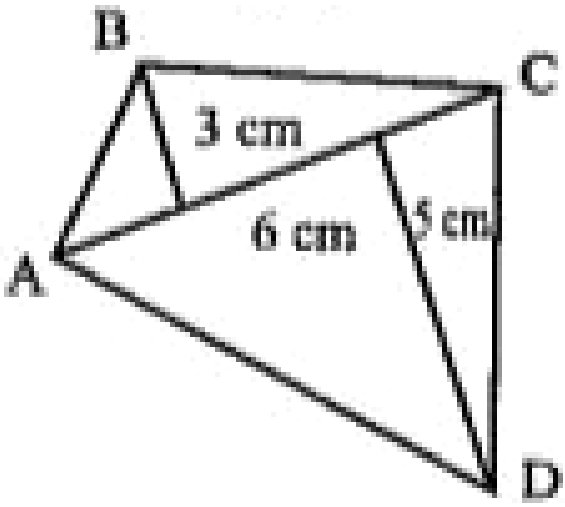
6. Find the area of these quadrilaterals.



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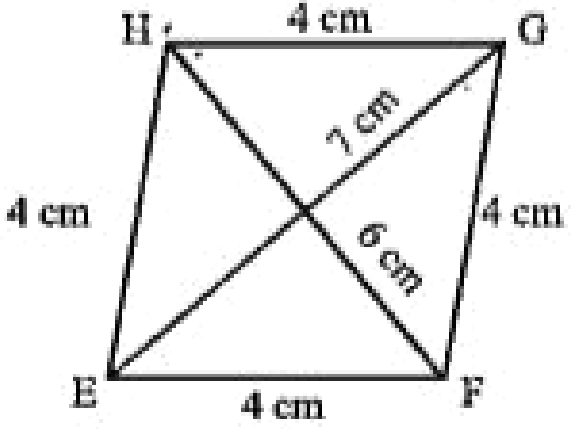
7. Find the area of these quadrilaterals.



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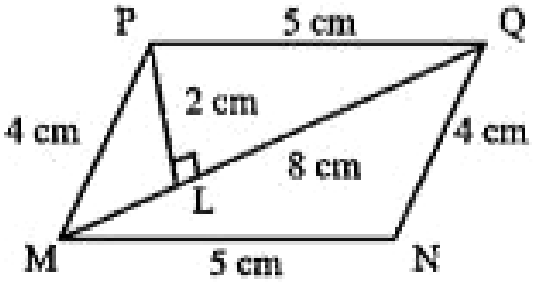
8. Find the area of these quadrilaterals.



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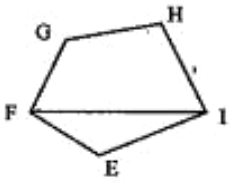
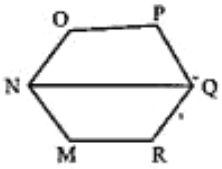
9. Divide the following polygons into parts (triangles and trapezium) to find out its area.



FI is a diagonal of plygon EFGHI



NQ is a diagonal of polygon MNOPQR

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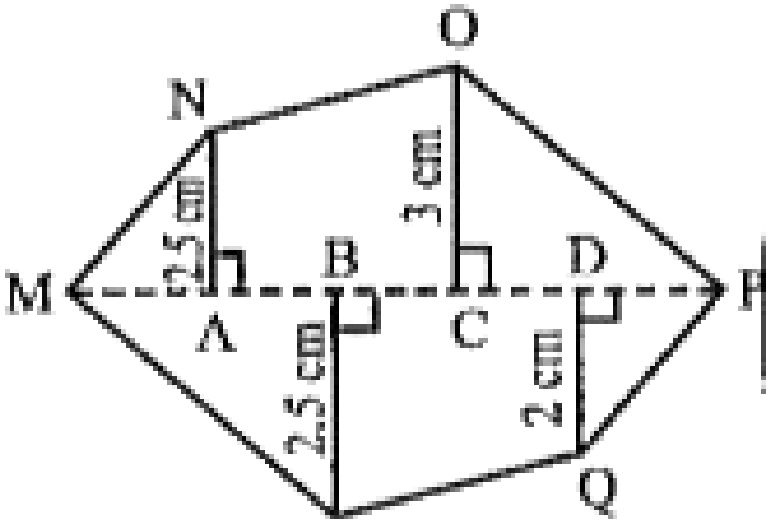
10. Find the area of polygon MNOPQR (fig 11.19)

If $MP = 9 \ \text{cm}, MD = 7 \ \text{cm}, MC = 6\text{cm},$

$MB = 4 \ \text{cm}, MA = 2 \ \text{cm}$

NA, OC, QD, RB are perpendiculars to diagonal

MP



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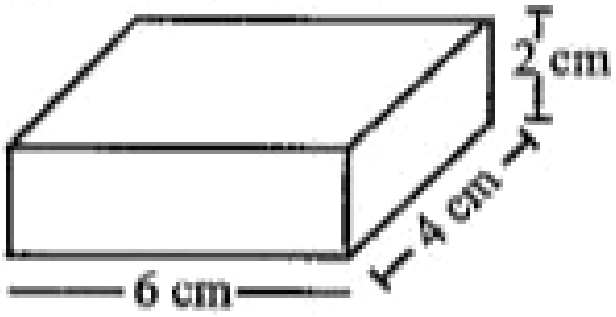
11. Find the total surface area of the following cuboids.



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12. Find the volume of the following cuboids.

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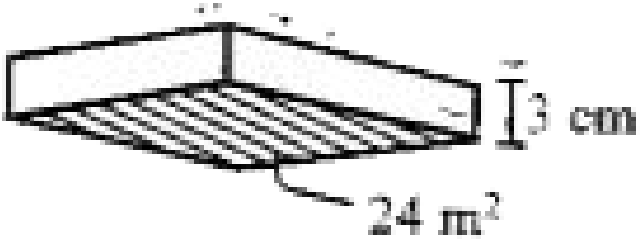
13. Find the volume of the following cuboids.



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14. Find the volume of the following cubes.

With a side 4 cm

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15. Find the volume of the following cubes.

With a side 1.5m

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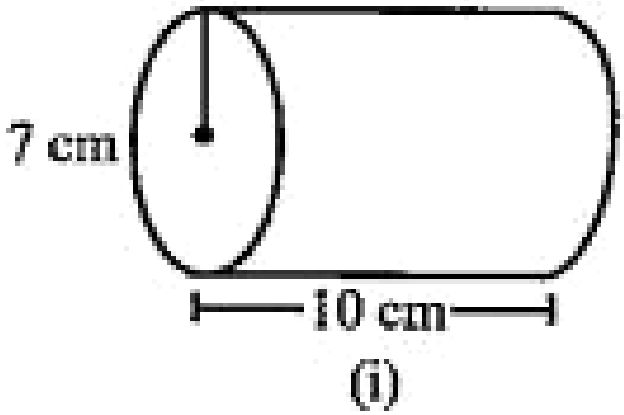
16. Find the volume of the following cylinders



(i)

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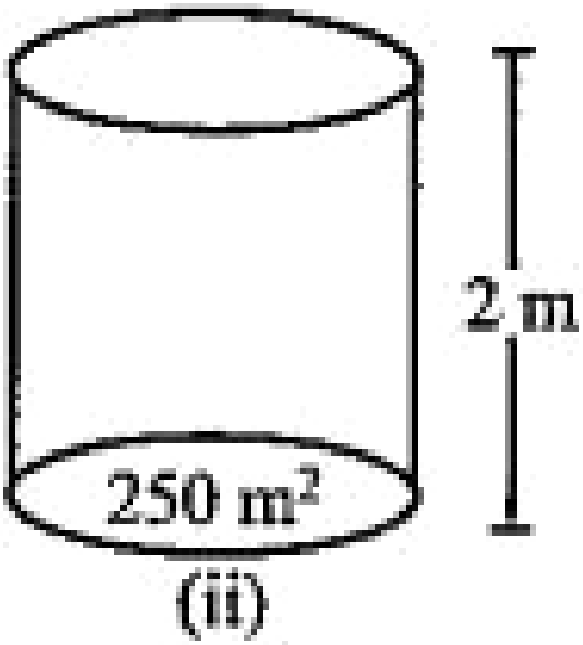
17. Find the volume of the following cylinders



(ii)

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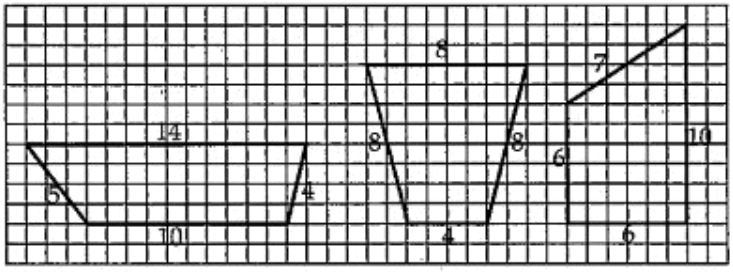
Do This

1. In class VII we learnt to draw parallelogram of equal areas with different perimeters. Can it be done for trapezium? Check if the following trapeziums are of equal areas out have different perimeters (fig. 11.9).



We know that all congruent figures are equal in area. Can we say figures equal in area need to be congruent too? Are these figures congruent? Draw at least three trapeziums

which have different areas but equal perimeters on a squared sheet.

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2. Cover the lateral surface area of a cuboidal duster (which your teacher uses in the class room) using a strip of brown sheet of paper, such that it just fits around the surface. Remove the paper. Measure the area of the paper. Is it the lateral surface area of the duster?

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3. Measure length, width and height of your class room and find

the total surface area of the room, ignoring the area of windows and doors.

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4. Measure length, width and height of your class room and find

the lateral surface area of this room.

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5. Measure length, width and height of your class room and find

the total area of the room which is to be white washed.

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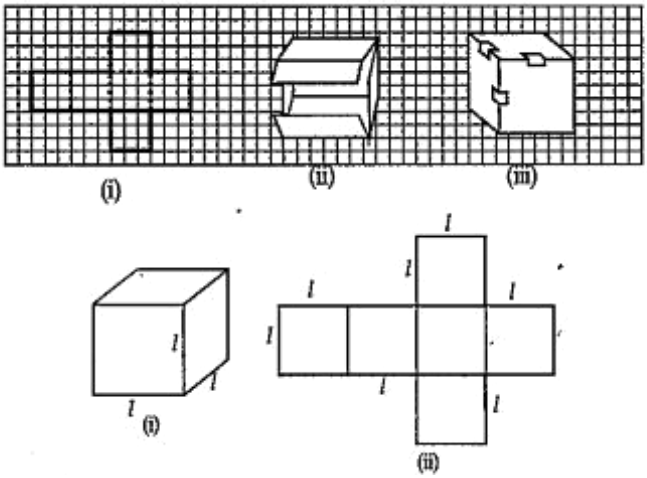
6. Draw the pattern shown on a squared paper and cut it out. You know that this pattern is a

net of cube. Fold it along the lines and tape the edge to form a cube.



What is the length, width and height of the cube? Observe that all the faces of a cube are square in shape. This makes length, height and width of a cube equal.

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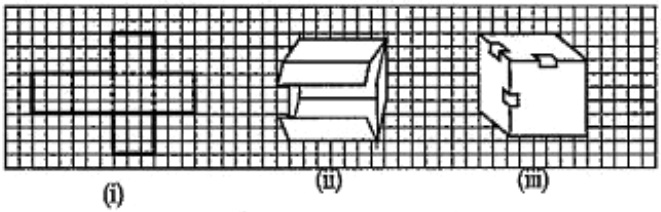
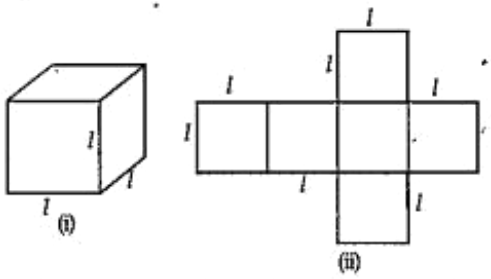
7. Draw the pattern shown on a squared paper and cut it out. You know that this pattern is a net of cube. Fold it along the lines and tape the edge to form a cube.





Write the area of each of the faces. Are they equal?

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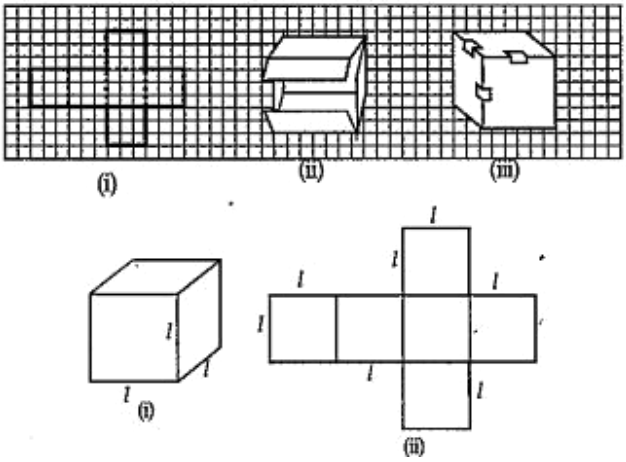
8. Draw the pattern shown on a squared paper and cut it out. You know that this pattern is a net of cube. Fold it along the lines and tape the edge to form a cube.



Write the total surface area of this cube.

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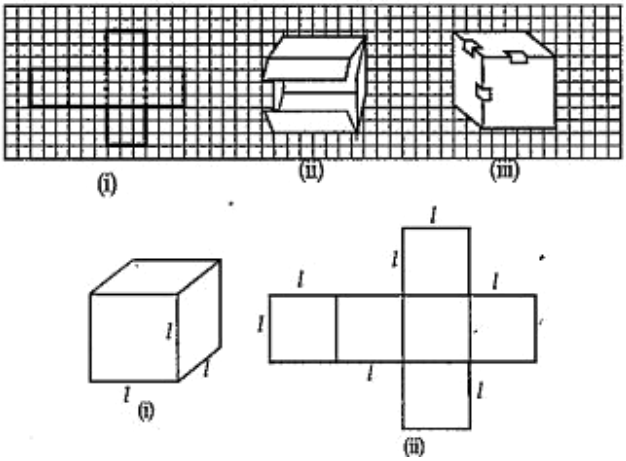
9. Draw the pattern shown on a squared paper and cut it out. You know that this pattern is a net of cube. Fold it along the lines and tape the edge to form a cube.



Write the total surface area of this cube.

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10. Arrange 64 cubes of equal size in as many ways as you can to form a cuboid. Find the surface area of each arrangement. Can solid shapes of same volume have same surface area?

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Think Discuss And Write

1. A parallelogram is divided into two congruent triangles by drawing a diagonal

across it. Can we divide a trapezium into two congruent triangles?

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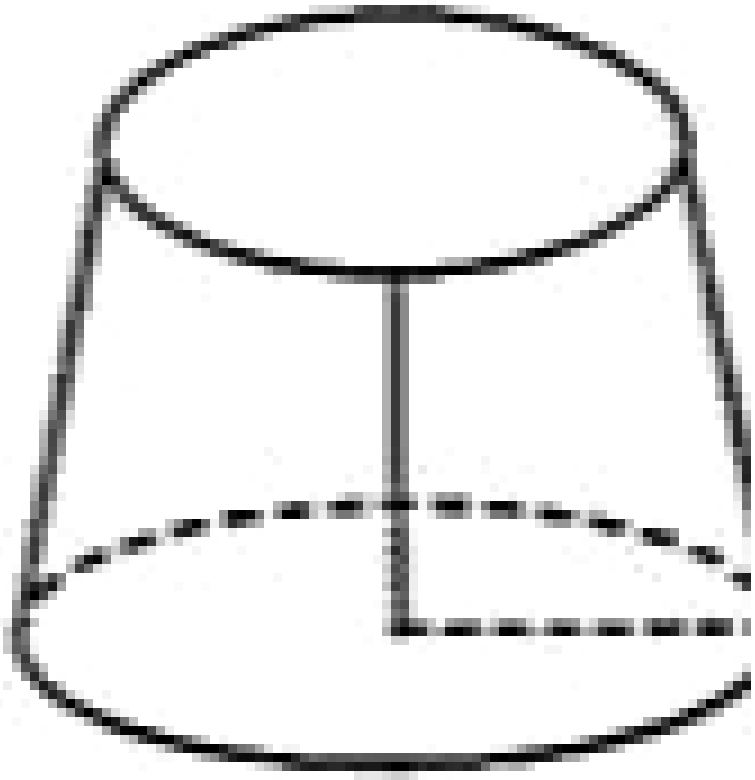
2. Why is it incorrect to call the solid shown here a cylinder?



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3. Can we say that total surface area of cuboid = lateral surface area $+2 \times$ area of base?

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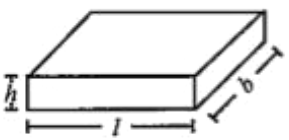
4. If we interchange the lengths of the base and height of a cuboid to get another cuboid, will its lateral surface area change?

(i)



(ii)

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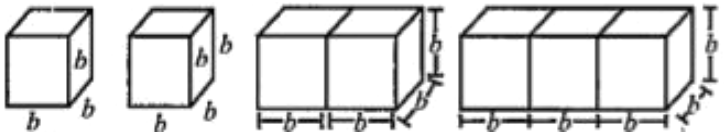
5. Two cubes each with side 'b' are joined to form a cuboid. What is the surface area of this cuboid? It is $12b^2$? Is the surface area of cuboid formed by joining three such cubes $18b^2$? Why?



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6. How will you arrange 12 cubes of equal length to form a cuboid of smallest surface area?

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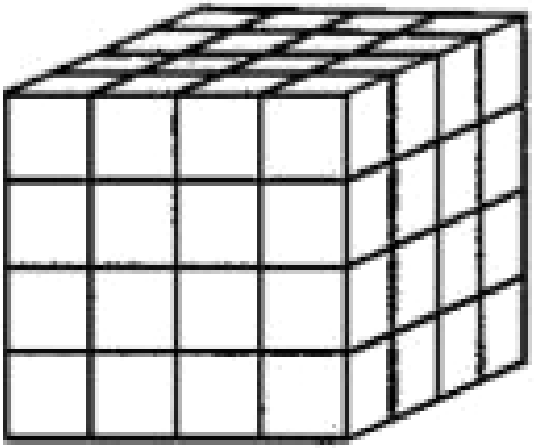
7. After the surface area of a cube is painted, the cube is cut into 64 smaller cubes of same dimensions. How many have no face painted? 1

face painted? 2 faces painted? 3 faces painted .



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8. Note that lateral surface area of a cylinder is the circumference of base $\times$ height of cylinder. Can we write lateral surface of a

cuboid as perimeter of base $\times$ height of cuboid?

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9. A company sells biscuits. For packing purpose they are using cuboidal boxes : box $A \rightarrow 3cm \times 8cm \times 20cm$, box $B \rightarrow 4cm \times 12cm \times 10cm$. What size of the box will be economical for the company? Why? Can you suggest any other size dimensions

which has the same volume but is more economical than these?

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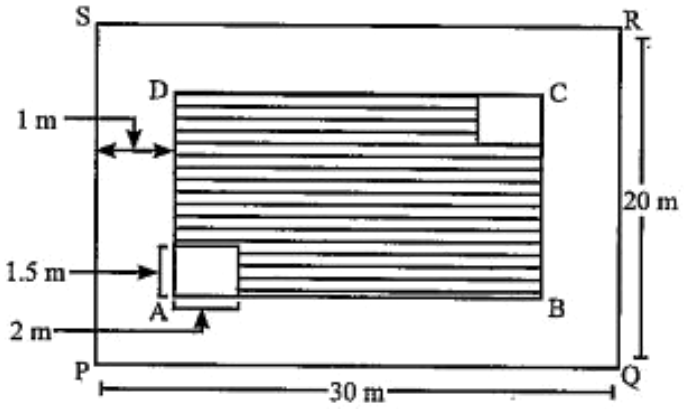
Questions

1.



This is a figure of a rectangular park (see

figure) whose length is 30m and width is 20m.

What is the total length of the fence surrounding it?

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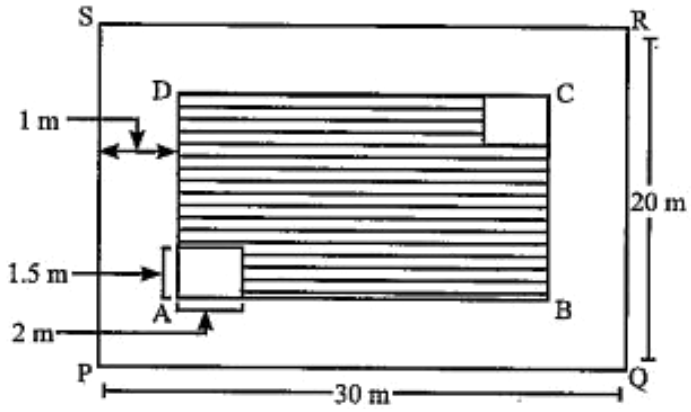
2.



This is a figure of a rectangular park (see

figure) whose length is 30m and width is 20m.

How much land is occupied by the park?

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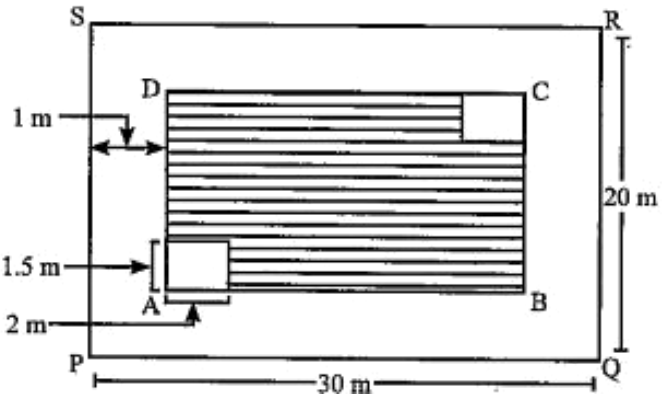
3.



This is a figure of a rectangular park (see figure) whose length is 30m and width is 20m. There is a path of one metre width running inside along the perimeter of the park that

has to be cemented. If 1 bag of cement is required to cement $4m^2$ area, how many bags of cement would be required to construct the cemented path?

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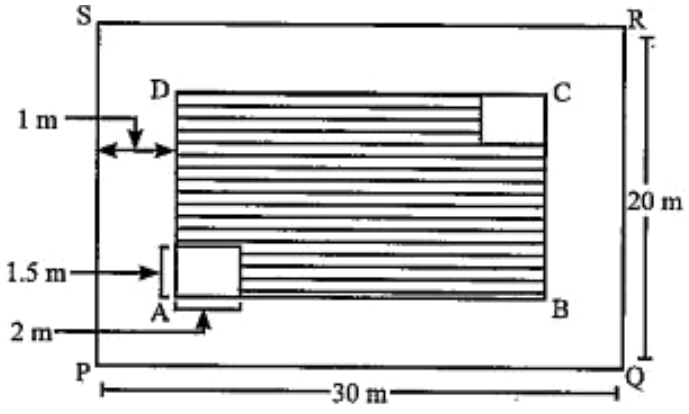
4.



This is a figure of a rectangular park (see figure) whose length is 30m and width is 20m.

There are two rectangular flower beds of size 1.5×2m each in the park as shown in the diagram and the rest has grass on it. Find the area covered by a grass.

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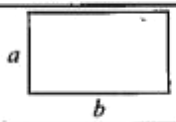
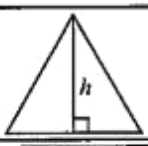
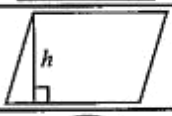
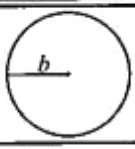
5. Match the following

Diagram	Shape	Area
	rectangle	$a \times a$
	square	$b \times h$
	triangle	πb^2
	parallelogram	$\frac{1}{2} \times b \times h$
	circle	$a \times b$

Can you write an expression for the perimeter of each of the above shapes?

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6. Observe that some shapes have two or more than two identical (Congruent) faces. Name them. Which solid has all congruent faces?

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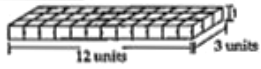
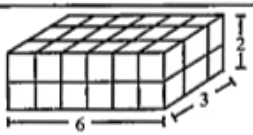
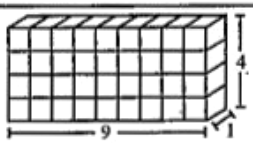
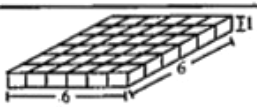
7. Take 36 cubes of equal sizes (i.e., length of each cube is same). Arrange them to form a cuboid. You can arrange them in many ways. Observe the following table and fill in the

blanks.

	Cuboid	Length	Breadth	Height	$l \times b \times h = V$
(i)		12	3	1	$12 \times 3 \times 1 = 36$
(ii)		6	...	...	...
(iii)		...	...	...	...
(iv)		...	...	...	...

What do you observe?

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