MATHS

BOOKS - ICSE

SOLIDS

Questions

1. The outer dimensions of a closed wooden box are 22cm, 15cm and 10cm. Thickness of the

wood is 1cm. Find the cost of wood required to make the box, if $1cm^3$ of wood costs Rs 7.50

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2. A cube of a metal of 5cm edge is melted and casted into a cuboid whose base is $2.50cm \times 0.50cm$. Find the height of the cuboid. Also, find the surface areas of cube and cuboid.

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3. A small indoor green house (herbarium) is made entirely of glass panes (including base) held together with tape. The dimensions of the green house are $40cm \times 30cm \times 25cm$. Find:

the area of the glass used

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4. A small indoor green house (herbarium) is made entirely of glass panes (including base) held together with tape. The dimensions of

the green house are $40cm \times 30cm \times 25cm$.

Find:

the length of the tape required

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5. A certain quantity of wood costs Rs 250 per m^3. A solid cubical block of such wood is bought for Rs 182.25. Calculate the volume of the block and use the method of factors to find the length of one edge of the cube.

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6. Three cubes, each with 8cm edge, are joined end to end. Find the total surface area of the resulting cuboid

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7. A rectangular container, whose base is a square of side 15cm, stands on a horizontal table and holds water upto 3cm from the top. When a cube is placed in the water and is completely submerged, the water rises to the

top and $54cm^3$ of water overflows. Calculate the volume of the cube and its surface area.

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8. A field is 15m long and 12m broad. At one corner of this field a rectangular well of dimensions $8m \times 2.5m \times 2m$ is dug and the dug-out soil is spread evenly over the rest of the field. Find the rise in the level of the rest of the field.

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9. The sum of length, breadth and depth of a cuboid is $19cm$ and the length of its diagonal is $11cm$. Find the surface area of the cuboid.

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10. How many bricks, (each measuring $20cm \times 16cm \times 8cm$), will be required to build a wall 30m long, 30cm thick and 5m high, with a provision of 2 doors, each measuring $2.5m \times 1.2m$. It is given that one-ninth of the

wall is occupied by the cement and the sand mixture.

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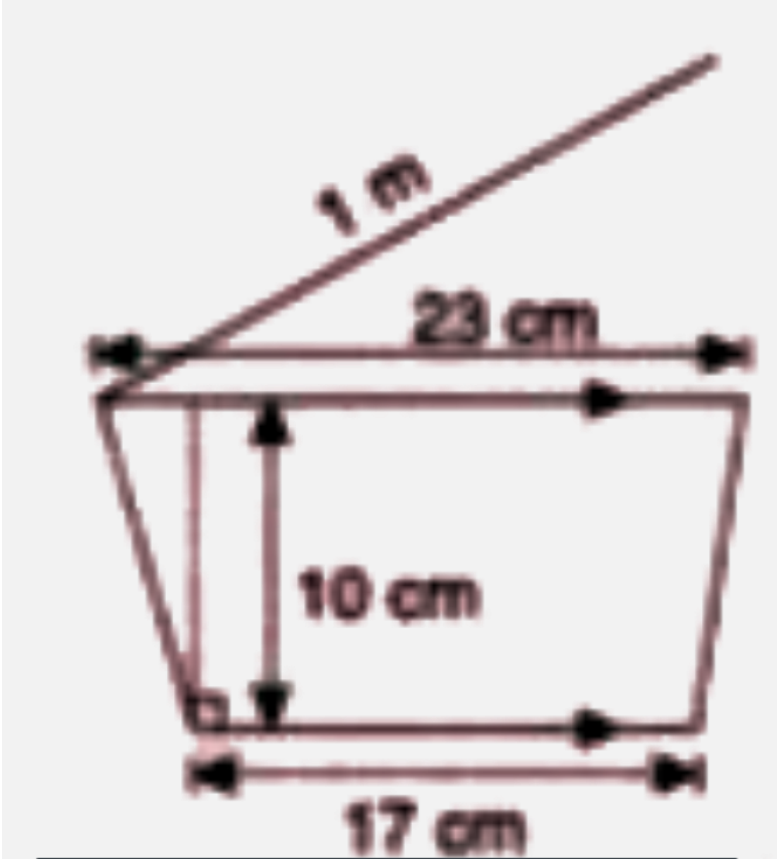
11. The adjoining figure shows a solid of uniform cross-section whch is a trapezium in shape. If the length of the solid is 1m, find its

volume



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12. How many litres of water flow out of a pipe having an area of cross-section of $5cm^2$ in one minute, if the speed of water in the pipe is $20\ cm/sec$?

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13. A rectangular tank is 25m long and 9.5m deep. If 600 cubic metres of water be drawn off the tank, the level of water in the tank goes

down by 1.5m. Calculate :

the width of the tank

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14. A rectangular tank is 25m long and 9.5m deep. If 600 cubic metres of water be drawn off the tank, the level of water in the tank goes down by 1.5m. Calculate :

the total volume of water which the tank can hold

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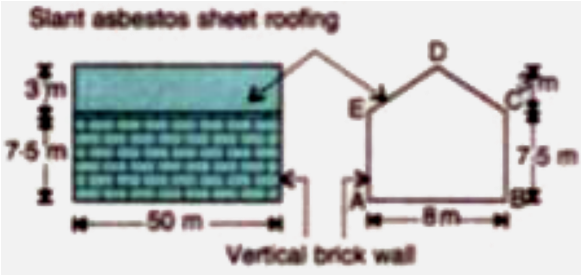
15. ABCDE is the end view of a factory shed which is 50m long. The roofing of the shed consists of asbestos sheets as shown in the figure. The two ends of the shed are completely closed by brick walls.



Calculate the total volume content of the shed

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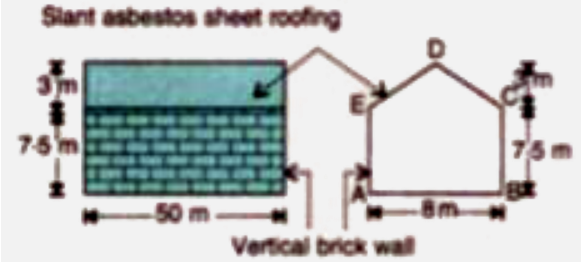
16. ABCDE is the end view of a factory shed which is 50m long. The roofing of the shed consists of asbestos sheets as shown in the figure. The two ends of the shed are completely closed by brick walls.



If the cost of asbestos sheet roofing is Rs 25 per m^2 (sq. metre), find the cost of roofing.

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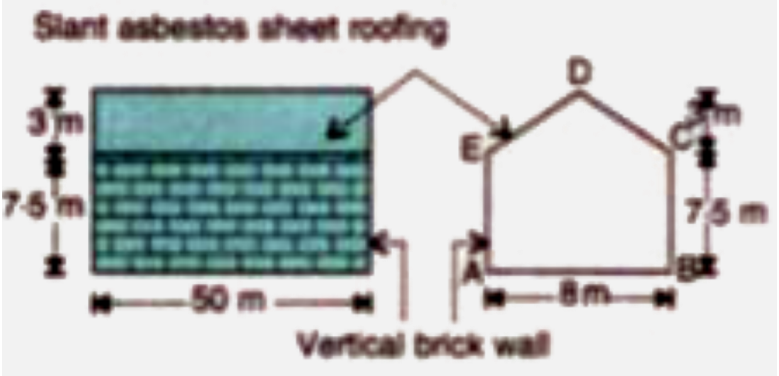
17. ABCDE is the end view of a factory shed which is 50m long. The roofing of the shed consists of asbestos sheets as shown in the figure. The two ends of the shed are completely closed by brick walls.



If the whole outside surface of the shed (including roofing) is to be painted, find the cost of painting it at Rs 5 per m^2(sq.metre).

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Exercise 21 A

1. The length, breadth and height of a rectangular solid are in the ratio $5:4,2$. If the total surface area is $1216cm^2$, find the length, the breadth and the height of the solid.

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2. The volume of a cube is $729cm^3$. Find its total surface area

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3. The dimensions of a Cinema Hall are 100m, 60m and 15m. How many persons can sit in the hall, if each requires $150m^3$ of air?

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4. 75 persons can sleep in a room 25m by 9.6m. If each person requires $16m^3$ of air, find the height of the room.

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5. The edges of three cubes of metal are 3cm, 4cm and 5cm. They are melted and formed into a single cube. Find the edge of the new cube.

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6. Three cubes, whose edges are x cm, 8cm and 10cm respectively, are melted and recasted into a single cube of edge 12cm. Find 'x'

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7. Three equal cubes are placed adjacently in a row. Find the ratio of the total surface area of the resulting cuboid to that of the sum of the total surface areas of the three cubes.

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8. The cost of papering the four walls of a room at 75 paise per square metre is Rs 240. The height of the room is 5 metres. Find the length and the breadth of the room, if they are in the ratio $5:3$.

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9. The area of a playground is $3650m^2$. Find the cost of covering it with gravel 1.2cm deep,

if the gravel costs Rs 6.40 per cubic metre.

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10. A square plate of side 'x' cm is 8mm thick. If its volume is $2880cm^3$, find the value of x.

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11. The external dimensions of a closed wooden box are 27cm, 19cm and 11cm. If the

thickness of the wood in the box is 1.5 cm, find:

volume of the wood in the box

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12. The external dimensions of a closed wooden box are 27cm, 19cm and 11cm. If the thickness of the wood in the box is 1.5 cm, find:

the cost of the box, if wood costs Rs 1.20 per cm^3

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13. The external dimensions of a closed wooden box are 27cm, 19cm and 11cm. If the thickness of the wood in the box is 1.5 cm, find: number of 4cm cubes that could be placed into the box.

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14. A tank 20m long, 12m wide and 8m deep is to be made of iron sheet. It is open at the top. Determine the cost of iron-sheet, at the rate of Rs 12.50 per metre, if the sheet is 2.5m wide.

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15. A closed rectangular box is made of wood of 1.5cm thickness. The exterior length and breadth are respectively 78cm and 19cm, and the capacity of the box is 15 cubic decimetres. Calculate the exterior height of the box

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16. The square on the diagonal of a cube has an area of 1875 sq. cm. Calculate:

the side of the cube

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17. The square on the diagonal of a cube has an area of 1875 sq. cm. Calculate:

the total surface area of the cube.

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18. A hollow square-shaped tube open at both ends is made of iron. The internal square is of 5cm side and the length of the tube is 8cm. There are $192cm^3$ of iron in this tube. Find its thickness.

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19. Four identical cubes are joined end to end to form a cuboid. If the total surface area of the resulting cuboid is $684cm^2$, find the length of edge of each cube. Also, find the ratio

between the surface area of the resulting cuboid and the surface area of a cube.

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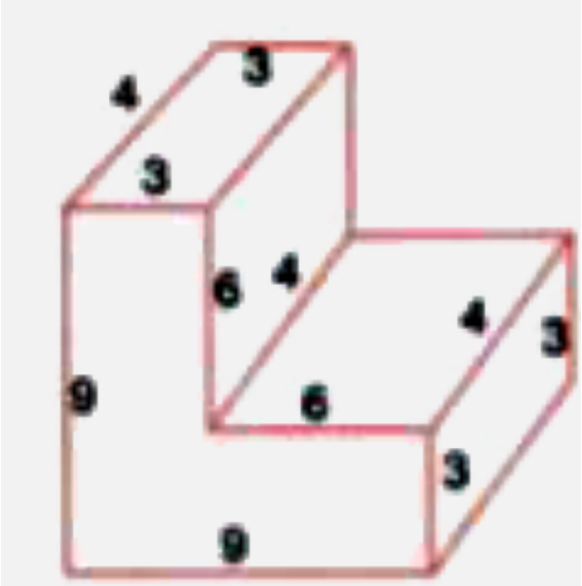
Exercise 21 B

1. The following figure shows a solid of uniform cross-section. Find the volume of the solid. All measurements are in centimetres. Assume that all angles in the figure are right

angles.



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2. A swimming pool is 40m long and 15m wide. Its shallow and deep ends are 1.5m and 3m deep respectively. If the bottom of the pool

slopes uniformly, find the amount of water in lites required to fill the pool.

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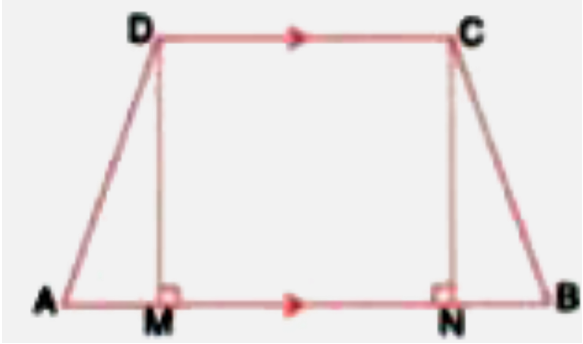
3. The cross-section of a tunnel perpendicular to its length is a trapezium ABCD as shown in the following figure, also given that: AM= BN, AB= 7m, CD= 5m. The height of the tunnel is 2.4m. The tunnel is 40m long. Calculate :



the cost of painting the internal surface of the tunnel (excluding the floor) at the rate of Rs 5 per m^2 (sq. metre).

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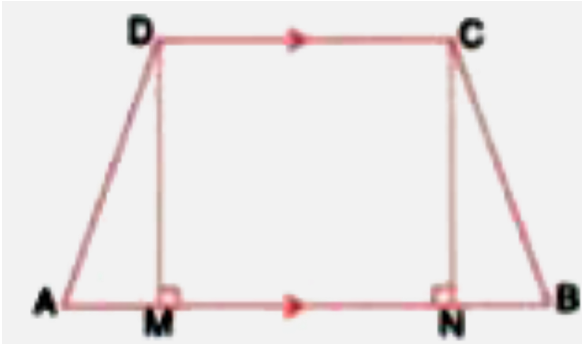
4. The cross-section of a tunnel perpendicular to its length is a trapezium ABCD as shown in the following figure, also given that: AM= BN,

AB= 7m, CD= 5m. The height of the tunnel is 2.4m. The tunnel is 40m long. Calculate :



the cost of paying the floor at the rate of Rs 18 per m^2.

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5. Water is discharged from a pipe of cross-section area $3.2cm^2$ at the speed of 5m//s.

Calculate the volume of water discharged:

in cm^3 per sec

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6. Water is discharged from a pipe of cross-section area $3.2cm^2$ at the speed of 5m//s. Calculate the volume of water discharged:

in litres per minute.

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7. A hose-pipe of cross-section area $2cm^2$ delivers 1500 litres of water in 5 minutes. What is the speed of water in m/s through the pipe?

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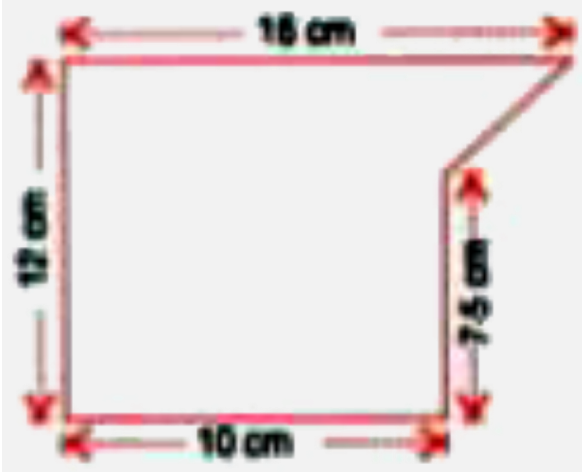
8. The cross-section of a piece of metal 4m in length is shown below. Calculate:



the volume of the piece of metal in cubic centimetres

If 1 cubic centimetre of the metal weights 6.6 g, calculate the weight of the piece of metal to the nearest kg.

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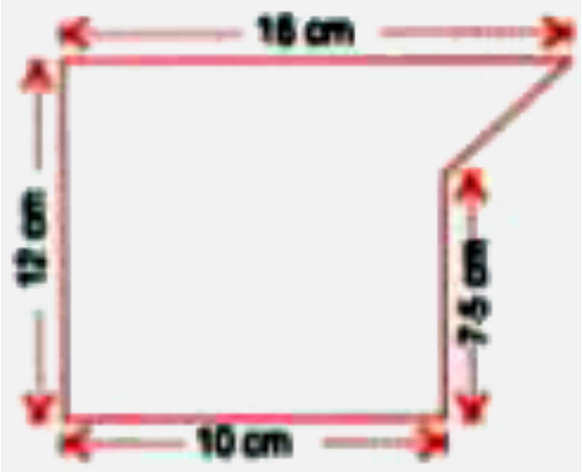
9. The cross-section of a piece of metal 4m in length is shown below. Calculate:



the volume of the piece of metal in cubic centimetres

If 1 cubic centimetre of the metal weights 6.6 g, calculate the weight of the piece of metal to the nearest kg.

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10. A rectangular water-tank measuring $80cm \times 60cm \times 60cm$ is filled from a pipe of cross-sectional area $1.5cm^2$, the water emerging at 3.2 m/s. How long does it take to fill the tank?

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11. A rectangular card-board sheet has length 32cm and breadth 26cm. Squares each of side

3cm, are cut from the corners of the sheet and the sides are folded to make a rectangular container. Find the capacity of the container formed.

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12. A swimming pool is 18m long and 8m wide. Its deep and shallow ends are 2m and 1.2m respectively. Find the capacity of the pool, assuming that the bottom of the pool slopes uniformly.

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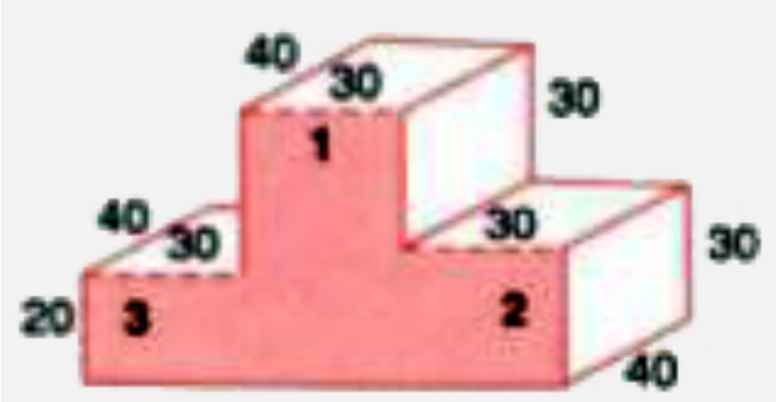
13. The following figure shows a closed victory-stand whose dimensions are given in cm.



Find the volume and the surface area of the victory stand.

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Exercise 21 C

1. Each face of a cube has perimeter equal to 32cm. Find its surface area and its volume.

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2. A school auditorium is 40m long, 30m broad and 12m high. If each student requires $1.2m^2$ of the floor area, find the maximum number of students that can be accomodated in this

auditorium. Also, find the volume of air available in the auditorium, for each student.

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3. The internal dimensions of a rectangular box are $12cm \times xcm \times 9cm$. If the length of the longest rod that can be placed in this box is 17cm, find x.

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4. The internal length, breadth and height of a box are 30cm, 24cm and 15cm. Find the largest number of cubes which can be placed inside this box if the edge of each cube is

(i) 3cm (ii) 4cm (iii) 5cm

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5. A rectangular field is 112m long and 62m broad. A cubical tank of edge 6m is dug at each of the four corners of the field and the

earth so removed is evenly spread on the remaining field. Find the rise in level.

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6. When length of each side of a cube is increased by 3cm, its volume is increased by $2457cm^3$. Find its side. How much will its volume decrease, if length of each side of it is reduced by 20%?

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7. A rectangular tank $30cm \times 20cm \times 12cm$ contains water to a depth of 6cm. A metal cube of side 10cm is placed in the tank with its one face resting on the bottom of the tank. Find the volume of water, in litres, that must be poured in the tank so that the metal cube is just submerged in the water.

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8. The dimensions of a solid metallic cuboid are $72cm \times 30cm \times 75cm$. It is melted and

recast into identical solid metal cubes with each of edge 6cm. Find the number of cubes formed. Alos, find the cost of polishing the surface of all the cubes formed at the rate Rs 150 per sq. m.

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9. The dimensions of a car petrol tank are $50cm \times 32cm \times 24cm$, which is full of petrol. If car's average consumption is 15km per litre,

find the maximum distance that can be covered by the car.

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10. The dimensions of a rectangular box are in the ratio $4:2:3$. The difference between cost of covering it with paper at Rs 12 per m^2 and with paper at the rate of 13.50 per m^2 is Rs 1,248. Find the dimensions of the box.

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