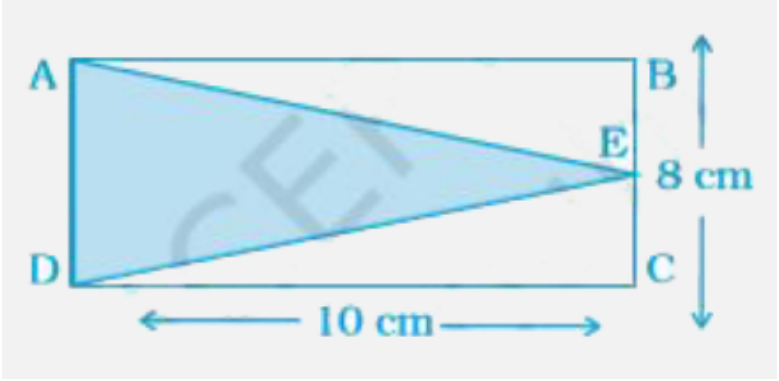
MATHS

BOOKS - NCERT EXEMPLAR

MENSURATION

Solved Examples

1. What is the area of the triangle ADE in the following figure?



A. $45cm^2$

B. $50cm^2$

C. $55cm^2$

D. $40cm^2$

Answer: D

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2. What will be the change in the volume of a cube when its side becomes 10 times the original side?

A. Volume becomes 1000 times.

B. Volume becomes 10 times.

C. Volume becomes 100 times.

D. Volume becomes $\frac{1}{1000}$ times

Answer: A

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3. Area of a rhombus is equal to _____ product of its diagonals.

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4. If the area of a face of a cube is $10cm^2$, then the total surface area of the cube is _____.

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5. State whether the statements are true (T) or false (F).

1L = 1000 cm^3

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6. State whether the statements are true (T) or false (F).

Amount of region occupied by a solid is called its surface area.

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7. 160 m^3 of water is to be used to irrigate a rectangular field whose area is 800 m^2. What will be the height of the water level in the field?

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8. Find the area of a rhombus whose one side measures 5 cm and one diagonal as 8 cm.

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9. The parallel sides of a trapezium are 40 cm and 20 cm. If its non-parallel sides are both equal, each being 26 cm, find the area of the trapezium.

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10. Find the area of polygon ABCDEF, if AD = 18cm, AQ = 14 cm, AP = 12 cm, AN = 8 cm, AM = 4 cm, and FM, EP, QC and BN are perpendiculars to diagonal AD.

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Exercises

1. A cube of side 5 cm is painted on all its faces. If it is sliced into 1 cubic centimetre cubes, how many 1 cubic centimetre cubes will have exactly one of their faces painted?

A. 27

B. 42

C. 54

D. 142

Answer:

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2. A cube of side 4 cm is cut into 1 cm cubes. What is the ratio of the surface areas of the original cubes and cut-out cubes?

A. $1:2$

B. $1:3$

C. $1:4$

D. $1:6$

Answer:

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3. A circle of maximum possible size is cut from a square sheet of board. Subsequently, a square of maximum possible size is cut from the resultant circle. What will be the area of the final square?

A. $\frac{3}{4}$ of original square.

B. $\frac{1}{2}$ of original square.

C. $\frac{1}{4}$ of original square.

D. $\frac{2}{3}$ of original square.

Answer: B

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4. What is the area of the largest triangle that can be fitted into a rectangle of length l units and width w units?

A. lw/2

B. lw/3

C. lw/6

D. lw/4

Answer: A

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5. If the height of a cylinder becomes $\frac{1}{4}$ of the original height and the radius is doubled, then which of the following will be true?

A. Volume of the cylinder will be doubled.

B. Volume of the cylinder will remain unchanged.

C. Volume of the cylinder will be halved.

D. Volume of the cylinder will be $\frac{1}{4}$ of the original volume.

Answer:

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6. If the height of a cylinder becomes $\frac{1}{4}$ of the original height and the radius is doubled, then which of the following will be true?

A. Curved surface area of the cylinder will be doubled.

B. Curved surface area of the cylinder will remain unchanged.

C. Curved surface area of the cylinder will be halved.

D. Curved surface area will be $\frac{1}{4}$ of the original curved surface.

Answer: C

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7. If the height of a cylinder becomes $\frac{1}{4}$ of the original height and the radius is doubled, then which of the following will be true?

A. Total surface area of the cylinder will be doubled.

B. Total surface area of the cylinder will remain unchanged

C. Total surface of the cylinder will be halved.

D. None of the above.

Answer:

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8. The surface area of the three coterminus faces of a cuboid are 6, 15 and 10 cm^2 respectively. The volume of the cuboid is

A. $30cm^3$

B. $40cm^3$

C. $20cm^3$

D. $35cm^3$

Answer: A

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9. If a regular hexagon is inscribed in a circle of radius r, then find the perimeter of the hexagon.

A. 3r

B. 6r

C. 9r

D. 12r

Answer: B

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10. The dimensions of a godown are 40 m, 25 m and 10 m. If it is filled with cuboidal boxes each of dimensions $2m \times 1.25m \times 1m$, then the number of boxes will be

A. 1800

B. 2000

C. 4000

D. 8000

Answer: C

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11. The volume of a cube is 64 cm^3. Its surface area is

A. $16cm^2$

B. $64cm^2$

C. $96cm^2$

D. $128cm^2$

Answer: C

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12. If the radius of a cylinder is tripled but its curved surface area is unchanged, then its height will be

A. tripled

B. constant

C. one sixth

D. one third

Answer: D

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13. How many small cubes with edge of 20 cm each can be just accommodated in a cubical box of 2 m edge?

A. 10

B. 100

C. 1000

D. 10000

Answer: C

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14. The volume of a cylinder whose radius r is equal to its height is

A. $\frac{1}{4}\pi r^3$

B. $\frac{\pi r^3}{32}$

C. πr^3

D. $\frac{r^3}{8}$

Answer: C

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15. The volume of a cube whose edge is 3x is

A. $27x^3$

B. $9x^3$

C. $6x^3$

D. $3x^3$

Answer: A

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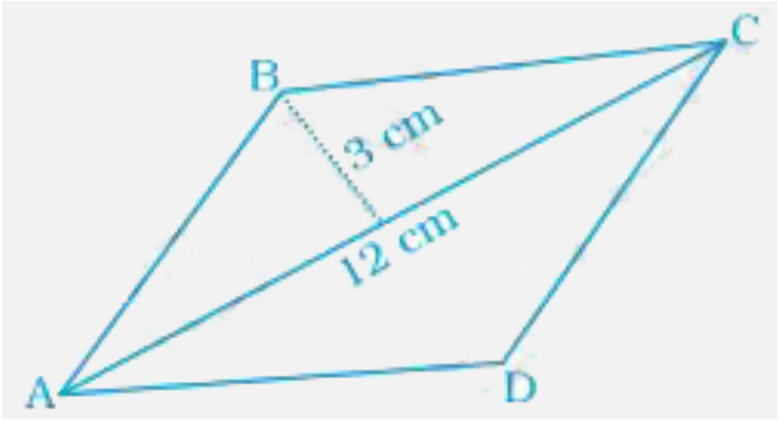
16. The figure ABCD is a quadrilateral in which AB = CD and BC = AD. Its area is



A. $72cm^2$

B. $36cm^2$

C. $24cm^2$

D. $18cm^2$

Answer: B

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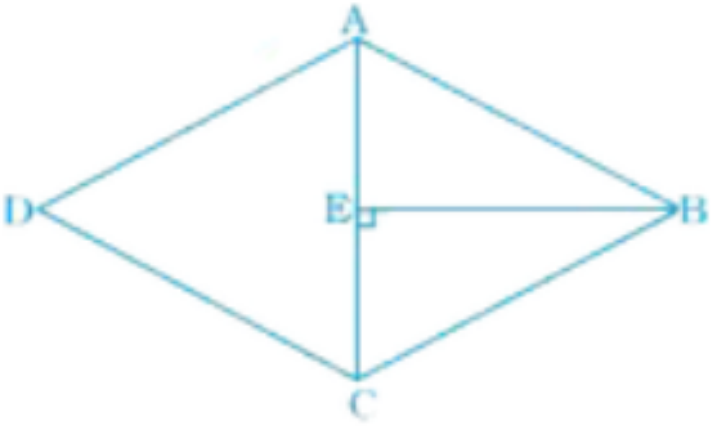
17. What is the area of the rhombus ABCD below if AC = 6 cm, and BE = 4cm?



A. $36cm^2$

B. $16cm^2$

C. $24cm^2$

D. $13cm^2$

Answer:

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18. The area of a parallelogram is 60 cm^2 and one of its altitude is 5 cm. The length of its corresponding side is

A. 12 cm

B. 6 cm

C. 4 cm

D. 2 cm

Answer: A

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19. If the perimeter of a trapezium be $52cm$, its non parallel sides are equal to $10cm$ each and

its altitude is $8cm$, find the area of the trapezium.

A. $124cm^2$

B. $118cm^2$

C. $128cm^2$

D. $112cm^2$

Answer: C

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20. Area of a quadrilateral ABCD is 20 cm^2 and perpendiculars on BD from opposite vertices are 1 cm and 1.5 cm. The length of BD is

A. 4 cm

B. 15 cm

C. 16 cm

D. 18 cm

Answer: C

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21. A metal sheet 27 cm long, 8 cm broad and 1 cm thick is melted into a cube. The side of the cube is

A. 6 cm

B. 8 cm

C. 12 cm

D. 24 cm

Answer: A

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22. Three cubes of metal whose edges are 6 cm, 8 cm and 10 cm respectively are melted to form a single cube. The edge of the new cube is

A. 12 cm

B. 24 cm

C. 18 cm

D. 20 cm

Answer: A

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23. A covered wooden box has the inner measures as 115 cm, 75 cm and 35 cm and thickness of wood as 2.5 cm. The volume of the wood is

A. 85,000 cm^3

B. 80,000 cm^3

C. $82, 125cm^3$

D. 84,000 cm^3

Answer:

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24. The ratio of radii of two cylinders is 1: 2 and heights are in the ratio 2:3. The ratio of their volumes is

A. $1:6$

B. $1:9$

C. $1:3$

D. $2:9$

Answer:

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25. Two cubes have volumes in the ratio 1:64. The ratio of the area of a face of first cube to that of the other is

A. $1:4$

B. $1:8$

C. $1:16$

D. $1:32$

Answer: C

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26. The surface areas of the six faces of a rectangular solid are 16, 16, 32, 32, 72 and 72 square centimetres. The volume of the solid, in cubic centimetres, is

A. 192

B. 384

C. 480

D. 2592

Answer: A

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27. Ramesh has three containers.

(a) Cylindrical container A having radius r and height h,

(b) Cylindrical container B having radius 2r and height 1/2 h, and

(c) Cuboidal container C having dimensions

$r \times r \times h$

The arrangement of the containers in the increasing order of their volumes is

A. A, B, C

B. B, C, A

C. C, A, B

D. cannot be arranged

Answer: C

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28. If R is the radius of the base of the hat, then the total outer surface area of the hat is

A. $\pi R(2h + R)$

B. $2\pi R(h + R)$

C. $2\pi rh + \pi R^2$

D. None of these

Answer: C

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29. A cube of side 4 cm is painted on all its sides. If it is sliced in 1 cubic cm cubes, then number of such cubes that will have exactly two of their faces painted is _____.

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30. A cube of side 5 cm is cut into 1 cm cubes. The percentage increase in volume after such cutting is _____.

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31. The surface area of a cuboid formed by joining two cubes of side a cm face to face is _____.

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32. If the diagonals of a rhombus get doubled, then the area of the rhombus becomes _____ its original area.

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33. If a cube fits exactly in a cylinder with height h, then the volume of the cube is _____ and surface area of the cube is _____.

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34. The volume of a cylinder becomes _____ the original volume if its radius becomes half of the original radius.

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35. The curved surface area of a cylinder is reduced by _____ per cent if the height is half of the original height.

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36. The volume of a cylinder which exactly fits in a cube of side a is _____.

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37. The surface area of a cylinder which exactly fits in a cube of side b is _____.

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38. If the diagonal d of a quadrilateral is doubled and the heights h_1 and h_2 falling on d are halved, then the area of quadrilateral is _____.

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39. The perimeter of a rectangle becomes _____ times its original perimeter, if its length and breadth are doubled.

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40. A trapezium with 3 equal sides and one side double the equal side can be divided into _____ equilateral triangles of _____ area.

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41. All six faces of a cuboid are _____ in shape and of _____ area.

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42. Opposite faces of a cuboid are _____ in area.

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43. Curved surface area of a cylinder of radius h and height r is _____.

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44. Total surface area of a cylinder of radius h and height r is _____

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45. Volume of a cylinder with radius h and height r is _____.

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46. Area of a rhombus $= \frac{1}{2}$ product of _____.

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47. Two cylinders A and B are formed by folding a rectangular sheet of dimensions 20 cm $\times$ 10 cm along its length and also along its breadth respectively. Then volume of A is _____ of volume of B.

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48. Two cylinders A and B are formed by folding a rectangular sheet of dimensions 20 cm × 10 cm along its length and also along its breadth respectively. Curved surface area of A is _____ curved surface area of B.

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49. _____ of a solid is the measurement of the space occupied by it.

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50. _____ surface area of room = area of 4 walls.

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51. Two cylinders of equal volume have heights in the ratio 1:9. The ratio of their radii is _____.

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52. Two cylinders of same volume have their radii in the ratio 1:6, then ratio of their heights is _____.

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53. State whether the statements are true (T) or false (F).

The areas of any two faces of a cube are equal.

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54. State whether the statements are true (T) or false (F).

The areas of any two faces of a cuboid are equal.

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55. State whether the statements are true (T) or false (F).

The surface area of a cuboid formed by joining

face to face 3 cubes of side x is 3 times the surface area of a cube of side x.

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56. State whether the statements are true (T) or false (F).

Two cuboids with equal volumes will always have equal surface areas.

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57. State whether the statements are true (T) or false (F).

The area of a trapezium become 4 times if its height gets doubled.

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58. State whether the statements are true (T) or false (F).

A cube of side 3 cm painted on all its faces, when sliced into 1 cubic centimetre cubes, will

have exactly 1 cube with none of its faces painted.

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59. State whether the statements are true (T) or false (F).

Two cylinders with equal volume will always have equal surface areas.

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60. State whether the statements are true (T) or false (F).

The surface area of a cube formed by cutting a cuboid of dimensions $2 \cdot 1 \cdot 1$ in 2 equal parts is 2 sq. units.

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61. State whether the statements are true (T) or false (F).

Ratio of area of a circle to the area of a square whose side equals radius of circle is $1:\pi$.

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62. The area of a rectangular field is 48 m^2 and one of its sides is 6m. How long will a lady take to cross the field diagonally at the rate of 20 m/minute?

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63. The circumference of the front wheel of a cart is 3 m long and that of the back wheel is 4 m long. What is the distance travelled by the cart, when the front wheel makes five more revolutions than the rear wheel?

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64. Four horses are tethered with equal ropes at 4 corners of a square field of side 70 metres

so that they just can reach one another. Find the area left ungrazed by the horses.

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65. The walls and ceiling of a room are to be plastered. The length, breadth and height of the room are 4.5m, 3m and 350cm, respectively. Find the cost of plastering at the rate of Rs. 8 per square metre.

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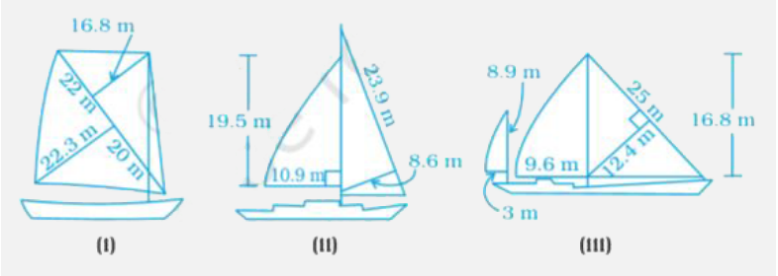
66. Most of the sailboats have two sails, the jib and the mainsail. Assume that the sails are triangles. Find the total area of each sail of the sail boats to the nearest tenth.



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67. The area of a trapezium with equal non-parallel sides is 168 m^2. If the lengths of the

parallel sides are 36 m and 20 m, find the length of the non-parallel sides.

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68. Mukesh walks around a circular track of radius 14 m with a speed of 4 km/hr. If he takes 20 rounds of the track, for how long does he walk?

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69. The areas of two circles are in the ratio 49:64. Find the ratio of their circumferences.

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70. There is a circular pond and foot-path runs along its boundary. A man walks around it, exactly once, keeping close to the edge. If his step is 66 cm long and he takes exactly 400 steps to go around the pond, what is the diameter of the pond?

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71. A running track has 2 semicircular ends of radius 63 m and two straight lengths. The perimeter of the track is 1000 m. Find each straight length.

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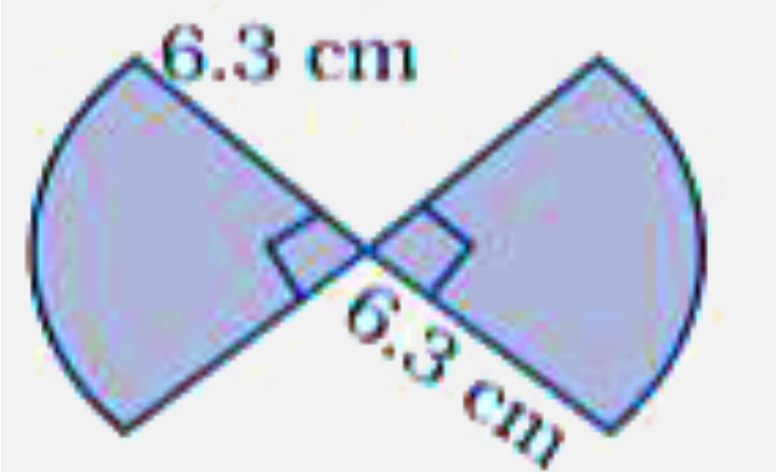
72. Find the perimeter of the given figure.



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73. A bicycle wheel makes 500 revolutions in moving 1 km. Find the diameter of the wheel.

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74. A boy is cycling such that the wheels of the cycle are making 140 revolutions per minute. If the diameter of the wheel is 60 cm, calculate the speed per hour with which the boy is cycling.

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75. Find the length of the largest pole that can be placed in a room of dimensions

$12m \times 4m \times 3m.$

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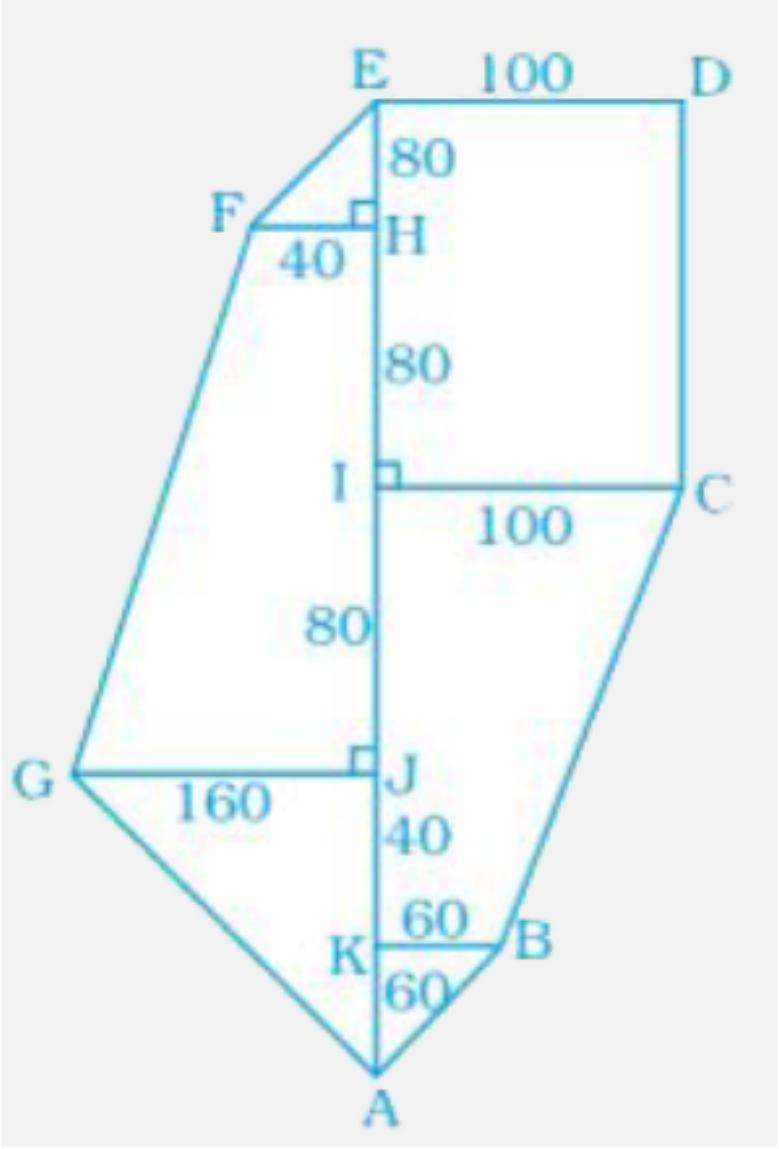
76. Find the area of the following fields. All dimensions are in metres.



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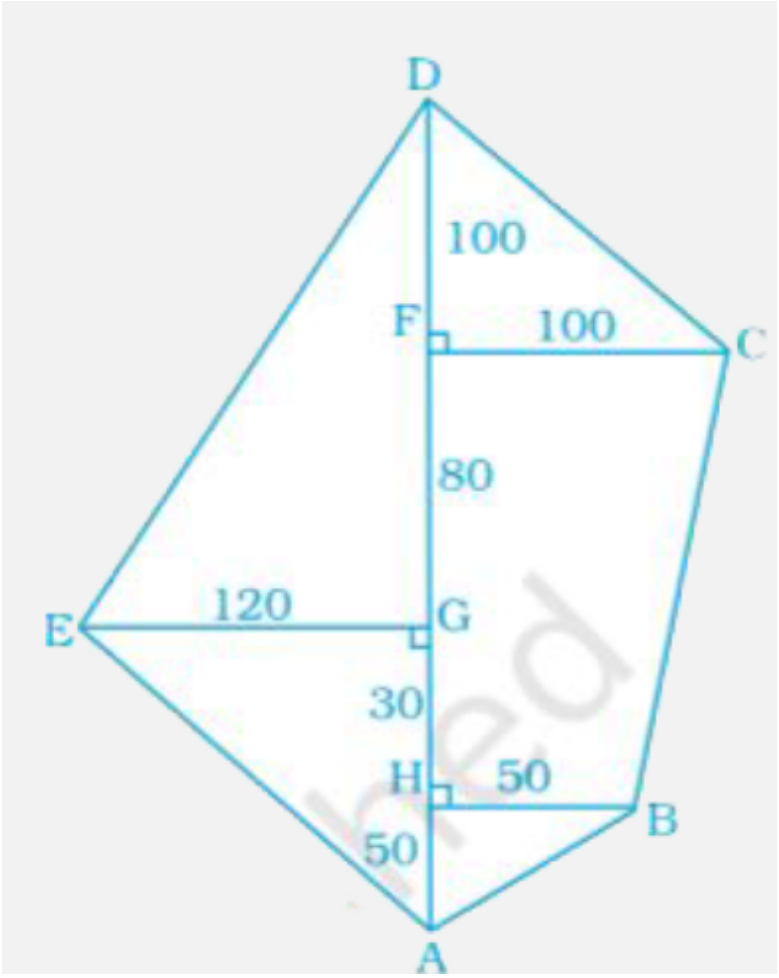
77. Find the area of the following fields. All dimensions are in metres.



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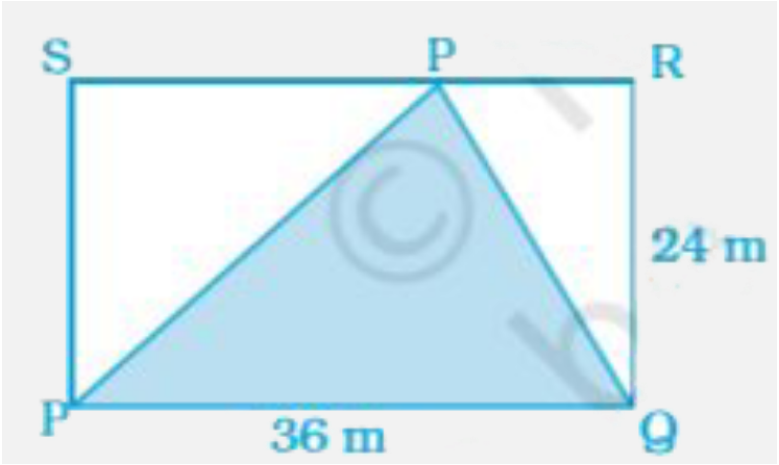
78. Find the area of the shaded portion in the following figures.



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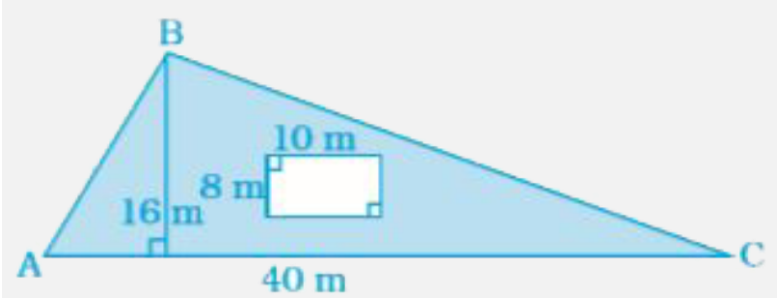
79. Find the area of the shaded portion in the following figures.



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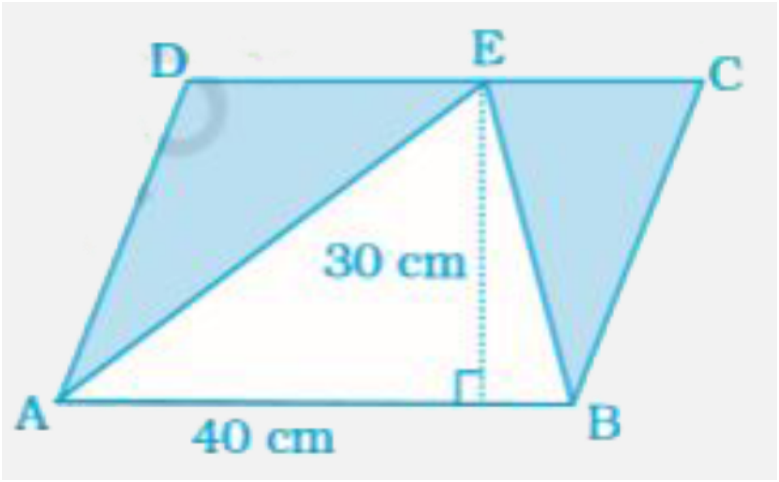
80. Find the area of the shaded portion in the following figures.



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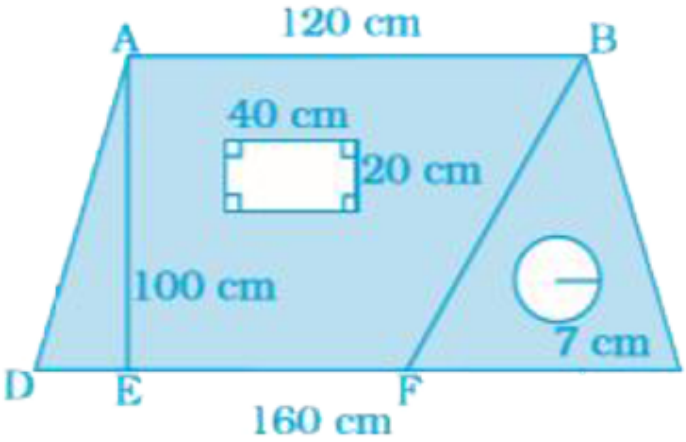
81. Find the area of the shaded portion in the following figures.



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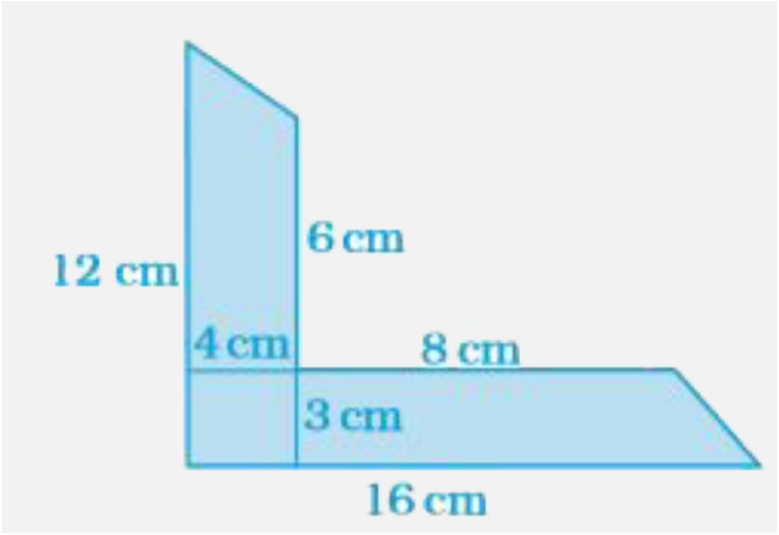
82. Find the area of the shaded portion in the following figures.



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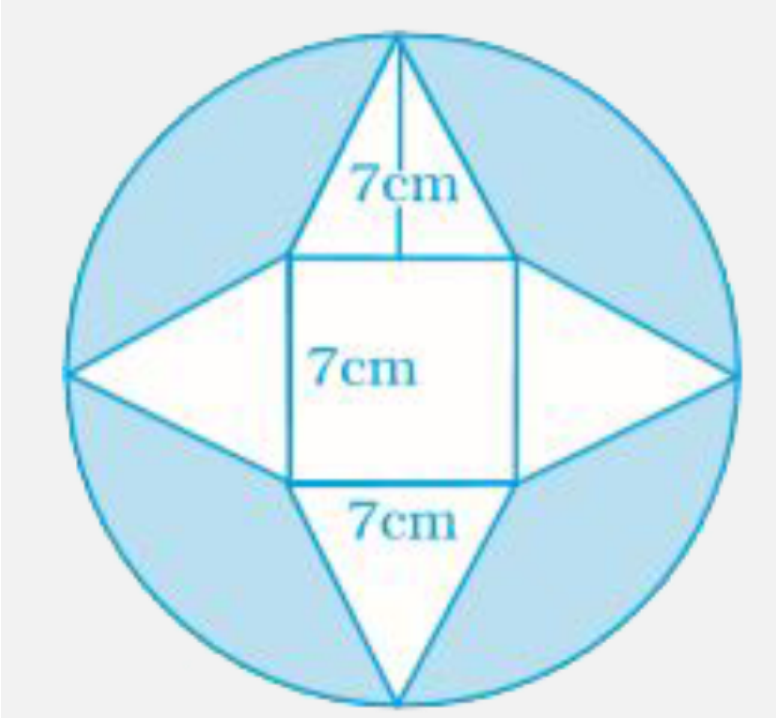
83. Find the area of the shaded portion in the following figures.



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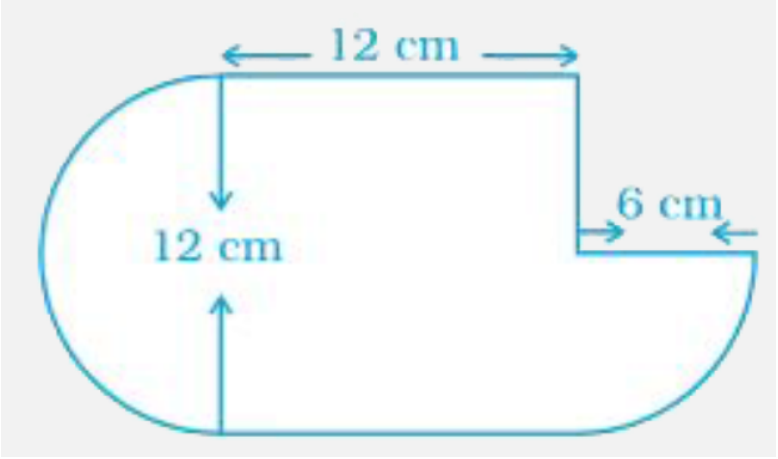
84. Find the area of the shaded portion in the following figures.



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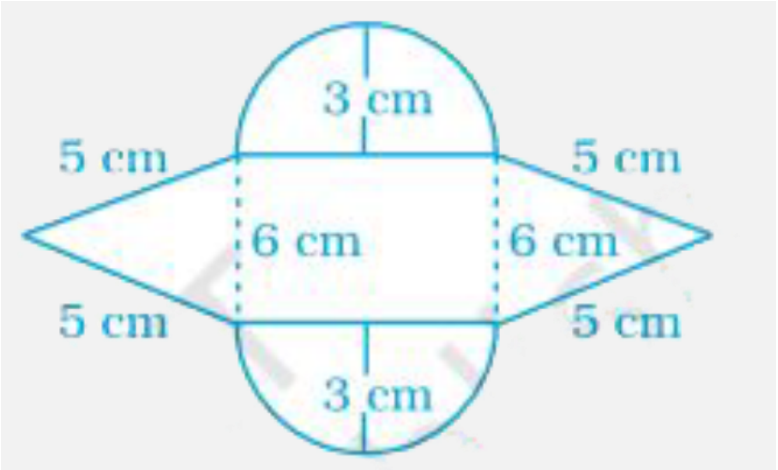
85. Find the area of the following figures.



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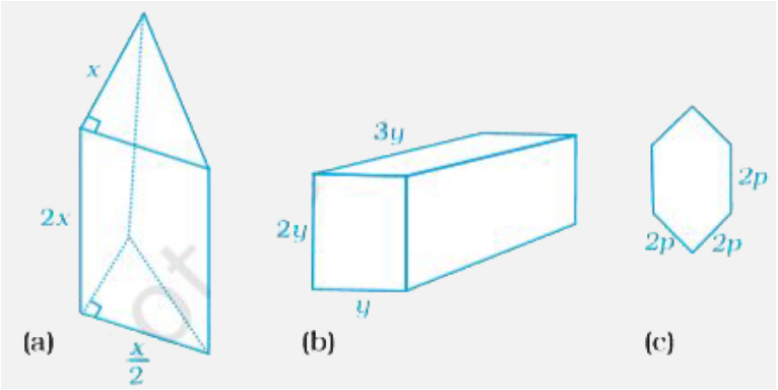
86. Find the volume of each of the given figure if volume = base area × height.



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87. A cube of side 5 cm is cut into as many 1 cm cubes as possible. What is the ratio of the surface area of the original cube to that of the sum of the surface areas of the smaller cubes?

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88. A square sheet of paper is converted into a cylinder by rolling it along its side.What is the ratio of the base radius to the side of the square?

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89. How many cubic metres of earth must be dug to construct a well 7 m deep and of diameter 2.8 m?

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90. The radius and height of a cylinder are in the ratio 3:2 and its volume is 19,404 cm^3. Find its radius and height.

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91. The thickness of a hollow metallic cylinder is 2 cm. It is 70 cm long with outer radius of 14 cm. Find the volume of the metal used in making the cylinder, assuming that it is open at both the ends. Also find its weight if the metal weighs 8 g per cm^3.

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92. Radius of a cylinder is r and the height is h. Find the change in the volume if the height is doubled.

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93. Radius of a cylinder is r and the height is h. Find the change in the volume if the height is doubled and the radius is halved.

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94. Radius of a cylinder is r and the height is h. Find the change in the volume if the height remains same and the radius is halved.

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95. If the length of each edge of a cube is tripled, what will be the change in its volume?

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96. A carpenter makes a box which has a volume of 13,400 cm^3. The base has an area of 670 cm^2. What is the height of the box?

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97. A cuboidal tin box opened at the top has dimensions $20cm \times 16cm \times 14cm$. What is the total area of metal sheet required to make 10 such boxes?

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98. Find the capacity of water tank, in litres, whose dimensions are 4.2 m, 3 m and 1.8 m?

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99. How many cubes each of side 0.5 m are required to build a cube of volume 8 m^3 ?

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100. A wooden box (including the lid) has external dimensions 40 cm by 34 cm by 30 cm. If the wood is 1 cm thick, how many cm3 of wood is used in it?

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101. A river 2 m deep and 45 m wide is flowing at the rate of 3 km per hour. Find the amount of water in cubic metres that runs into the sea per minute.

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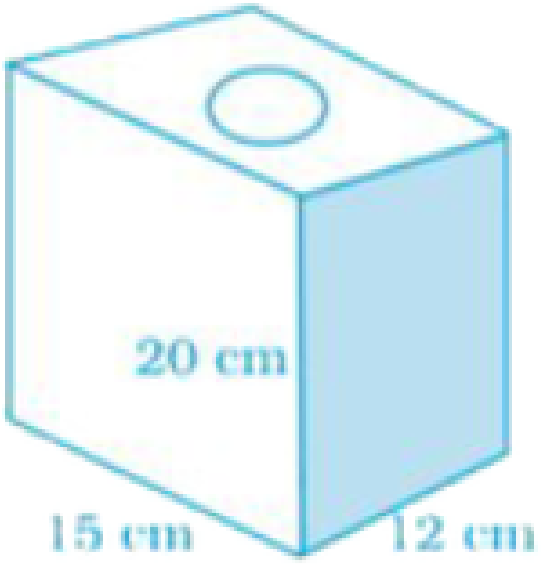
102. Find the area to be painted in the following block with a cylindrical hole. Given that length is 15 cm, width 12 cm, height 20 cm and radius of the hole 2.8 cm.



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103. A truck carrying 7.8 m3 concrete arrives at a job site. A platform of width 5 m and height 2 m is being contructed at the site. Find the length of the platform, constructed from the amount of concrete on the truck?

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104. A hollow garden roller of 42 cm diameter and length 152 cm is made of cast iron 2 cm

thick. Find the volume of iron used in the roller.

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105. Three cubes each of side 10 cm are joined end to end. Find the surface area of the resultant figure.

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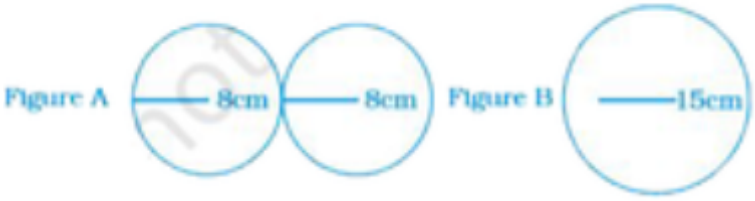
106. Below are the drawings of cross sections of two different pipes used to fill swimming pools. Figure A is a combination of 2 pipes each having a radius of 8 cm. Figure B is a pipe having a radius of 15 cm. If the force of the flow of water coming out of the pipes is the same in both the cases, which will fill the swimming pool faster?



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107. A swimming pool is 200 m by 50 m and has an average depth of 2 m. By the end of a summer day, the water level drops by 2 cm. How many cubic metres of water is lost on the day?

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108. A housing society consisting of 5,500 people needs 100 L of water per person per day. The cylindrical supply tank is 7 m high and

has a diameter 10 m. For how many days will the water in the tank last for the society?

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109. Metallic discs of radius 0.75 cm and thickness 0.2 cm are melted to obtain 508.68 cm3 of metal. Find the number of discs melted (use π = 3.14).

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110. The ratio of the radius and height of a cylinder is 2:3. If its volume is 12,936 cm^3, find the total surface area of the cylinder.

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111. External dimensions of a closed wooden box are in the ratio 5:4:3. If the cost of painting its outer surface at the rate of Rs 5 per dm^2 is Rs 11,750, find the dimensions of the box.

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112. 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?

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113. What will happen to the volume of the cube, if its edge is

(a) tripled

(b) reduced to one-fourth?

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114. A rectangular sheet of dimensions 25 cm $\times$ 7 cm is rotated about its longer side. Find the volume and the whole surface area of the solid thus generated.

Watch Video Solution

115. From a pipe of inner radius 0.75 cm, water flows at the rate of 7 m per second. Find the volume in litres of water delivered by the pipe in 1 hour.

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116. Four times the area of the curved surface of a cylinder is equal to 6 times the sum of the areas of its bases. If its height is 12 cm, find its curved surface area.

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117. A cylindrical tank has a radius of 154 cm. It is filled with water to a height of 3 m. If water to a height of 4.5 m is poured into it, what will be the increase in the volume of water in kl?

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118. The length, breadth and height of a cuboidal reservoir is 7m, 6m and 15m respectively. 8400 litre of water is pumped out

from the reservoir. Find the fall in the water-level in the reservoir.

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119. How many bricks of size $22cm\ x\ 10cm\ x\ 7cm$ are required to construct a wall 33m long, 3.5m high and 40cm thick, if cement and sand used in the construction occupy $\frac{1}{10}th$ part of the wall?

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120. A rectangular examination hall having seats for 500 candidates has to be built so as to allow 4 cubic metres of air and 0.5 square metres of floor area per candidate. If the length of hall be 25 m, find the height and breadth of the hall.

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121. The ratio between the curved surface area and the total surface area of a right circular

cylinder is 1:2. Find the ratio between the height and radius of the cylinder.

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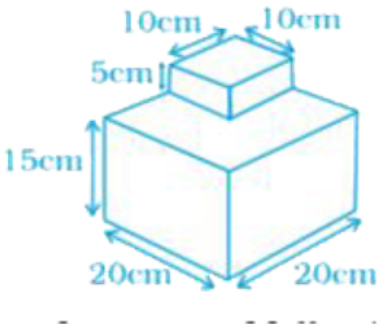
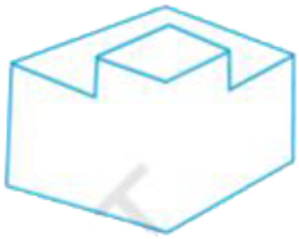
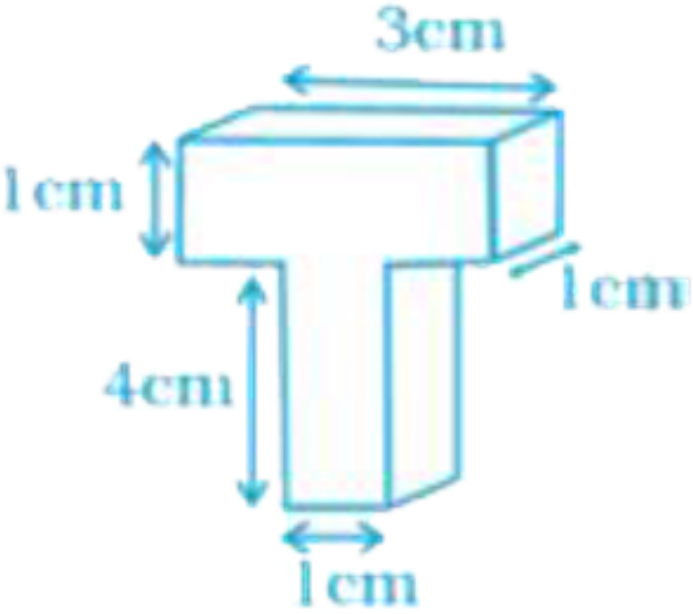
122. A birthday cake has two tiers as shown in the figure below. Find the volume of the cake.





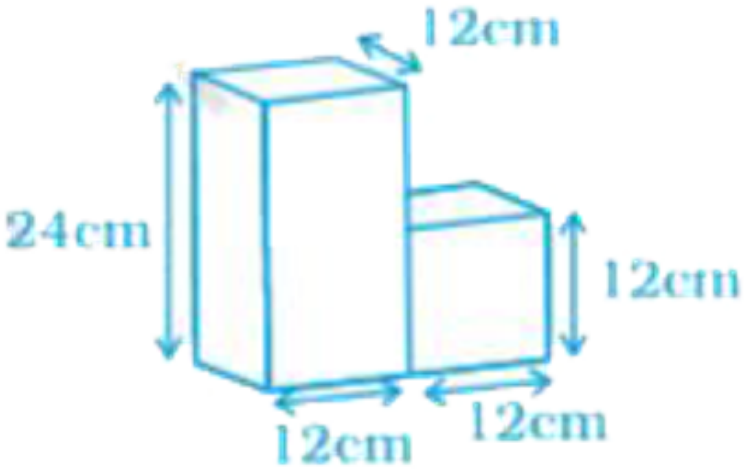
Watch Video Solution

123. Work out the surface area of following shapes



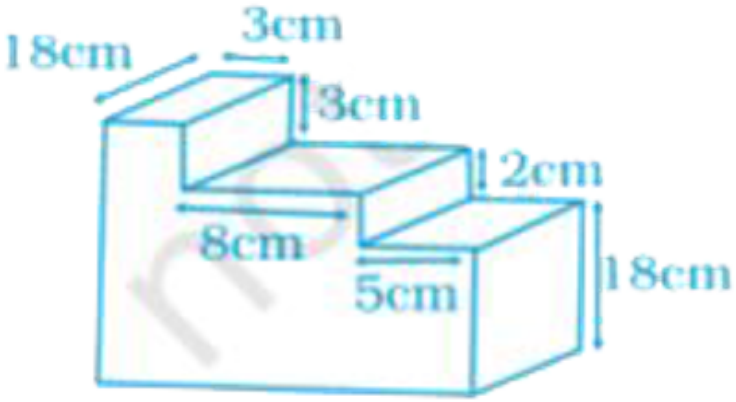
Watch Video Solution

124. Work out the surface area of following shapes



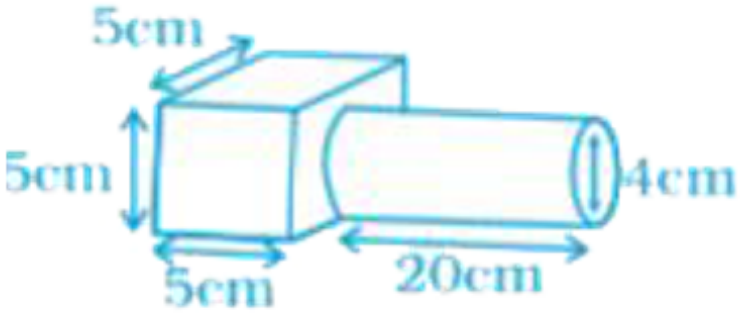
Watch Video Solution

125. Work out the surface area of following shapes



Watch Video Solution

126. Work out the surface area of following shapes



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127. Water flows from a tank with a rectangular base measuring 80 cm by 70 cm into another tank with a square base of side 60 cm. If the water in the first tank is 45 cm deep, how deep will it be in the second tank?

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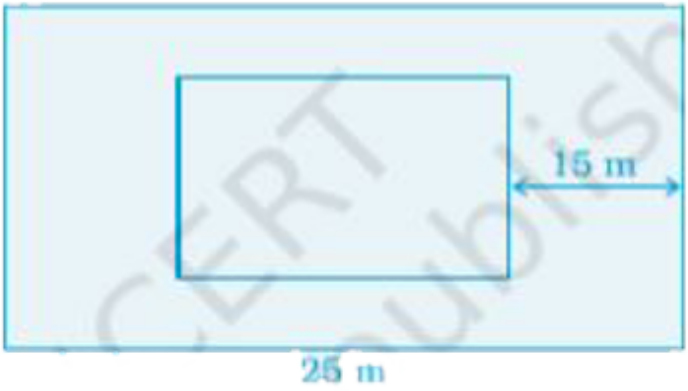
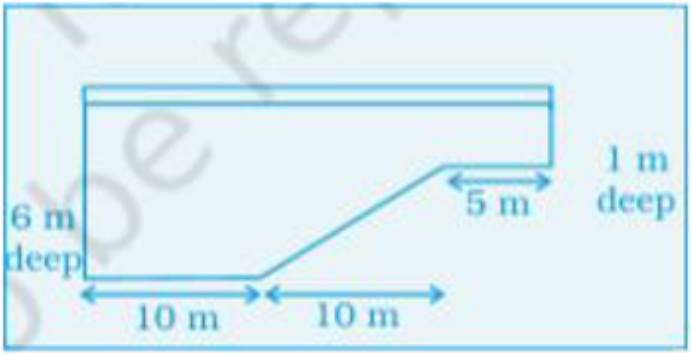
128. A rectangular sheet of paper is rolled in two different ways to form two different cylinders. Find the volume of cylinders in each case if the sheet measures 44 cm $\times$ 33 cm.

Watch Video Solution

Applications Games And Puzzles

1. Rashid has decided to build a swimming pool as shown in the figure on an empty plot 25 metres long and 15 metres wide. He is discussing with his son Majid about his plan to build the pool, put tiles on the bottom of the pool and other requirements of the pool. Can you help Majid to answer the following questions which his father has asked in the discussion?





What is the surface area of the pool?

Watch Video Solution

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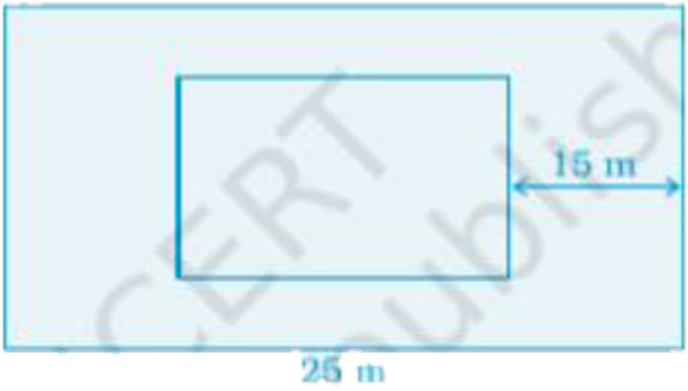

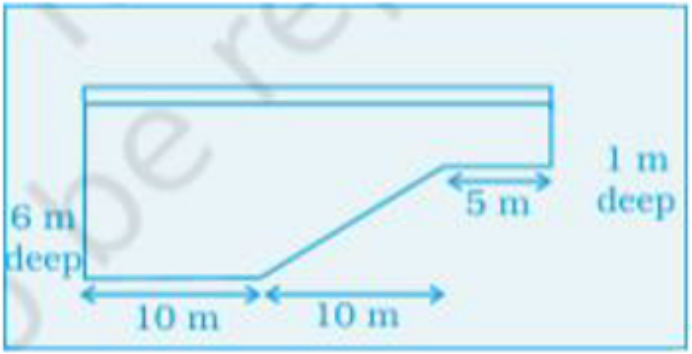

What is the surface area of the pool?

Watch Video Solution

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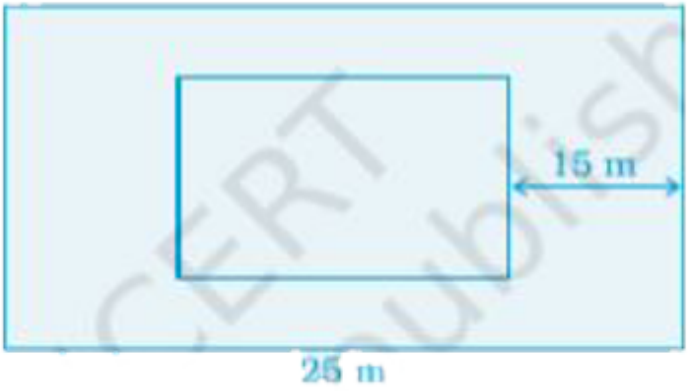

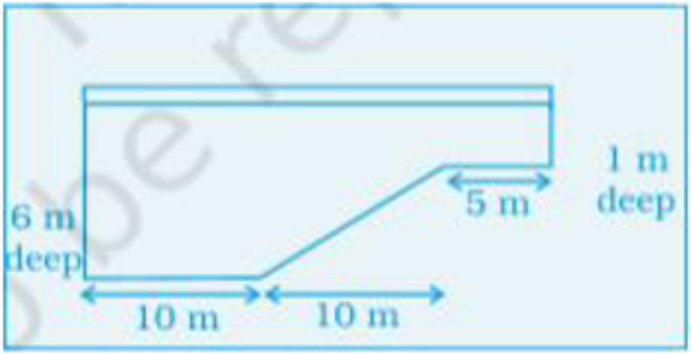

What is the surface area of the pool?

Watch Video Solution

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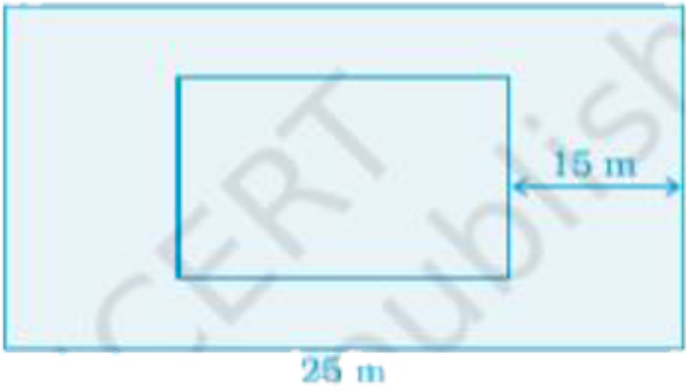

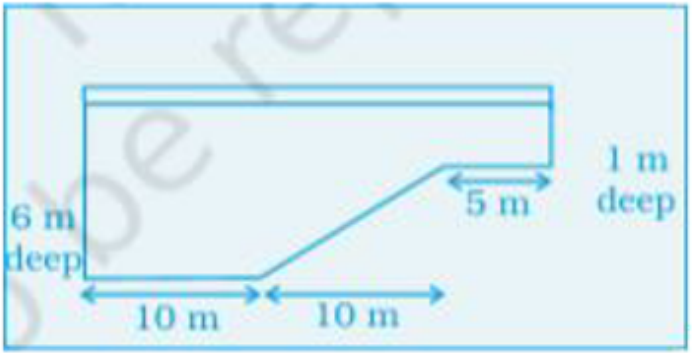

What is the surface area of the pool?

Watch Video Solution

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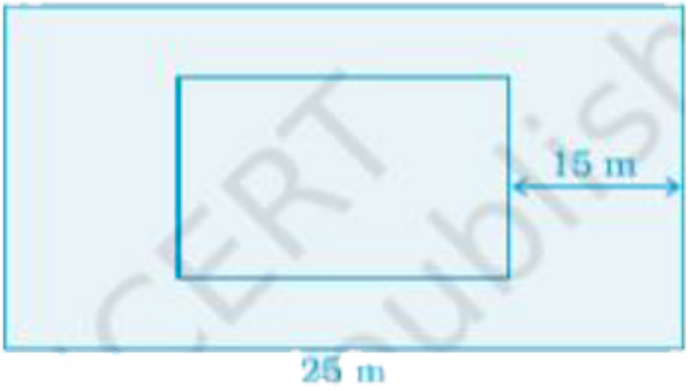

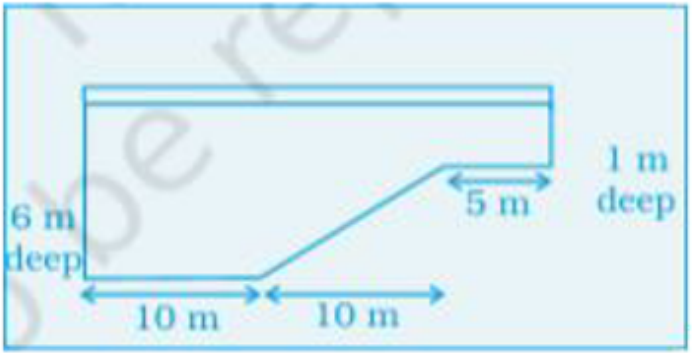

What is the surface area of the pool?

Watch Video Solution

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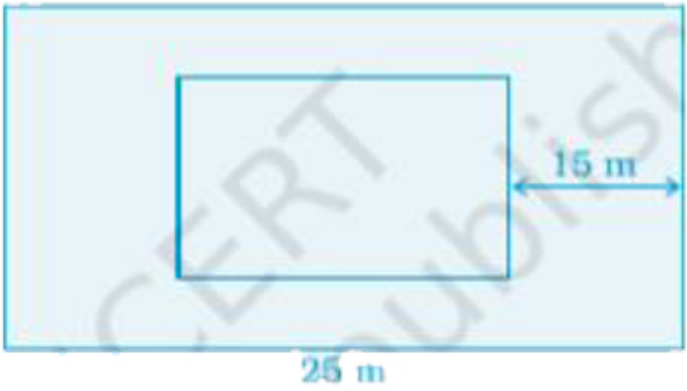

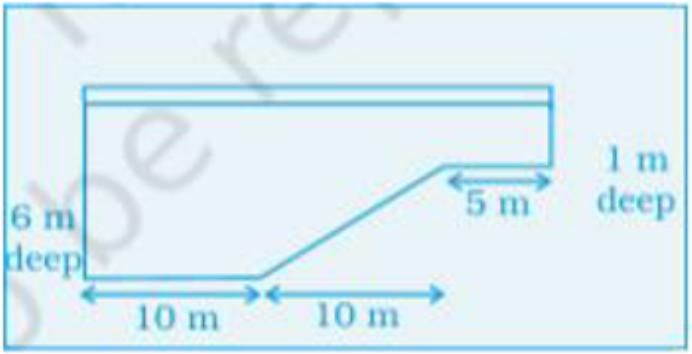

What is the surface area of the pool?

Watch Video Solution

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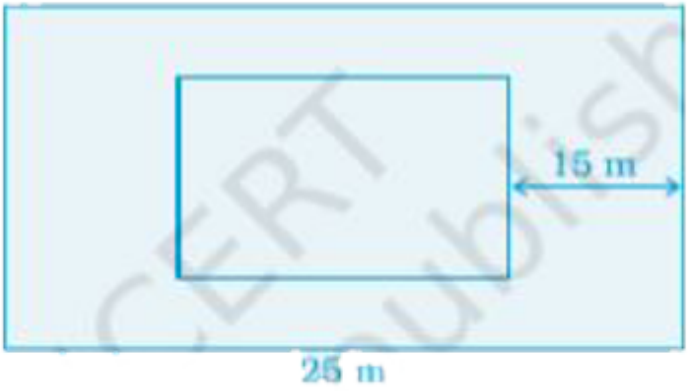

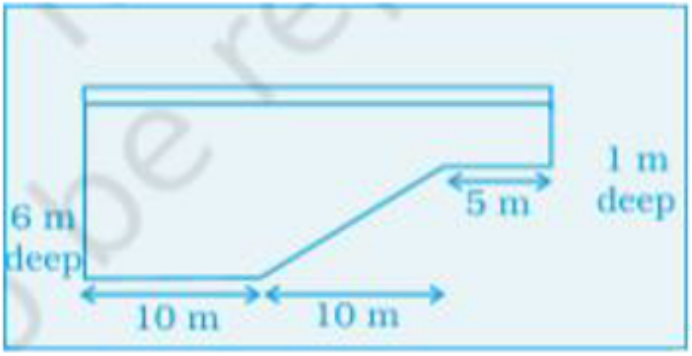

What is the surface area of the pool?

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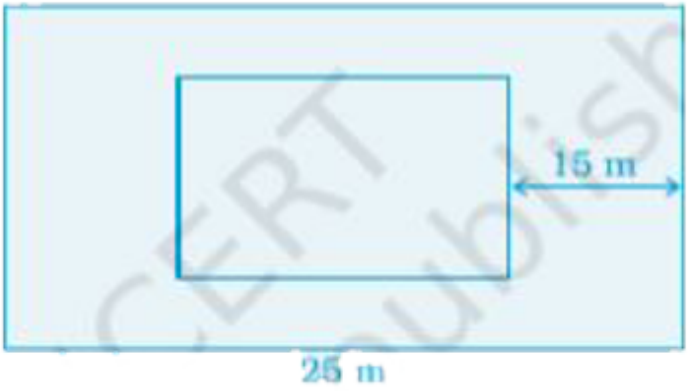

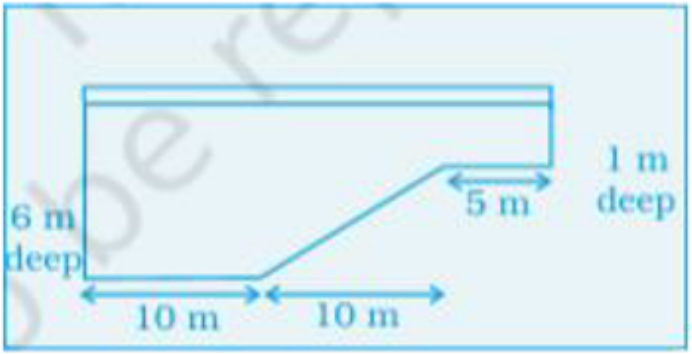

What is the surface area of the pool?

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9. The following table shows the dimensions of cuboids such that, their volumes remain the same. Extend the table with as many more dimensions such that all the cuboids thus formed have the same volume. Complete the table and write your conclusion on surface area and volume of each cuboid.

Dimensions of cuboid (in units)	Surface Area (sq. unit)	Volume (cube unit)
15, 10, 8		1200
6, 10, 20		1200
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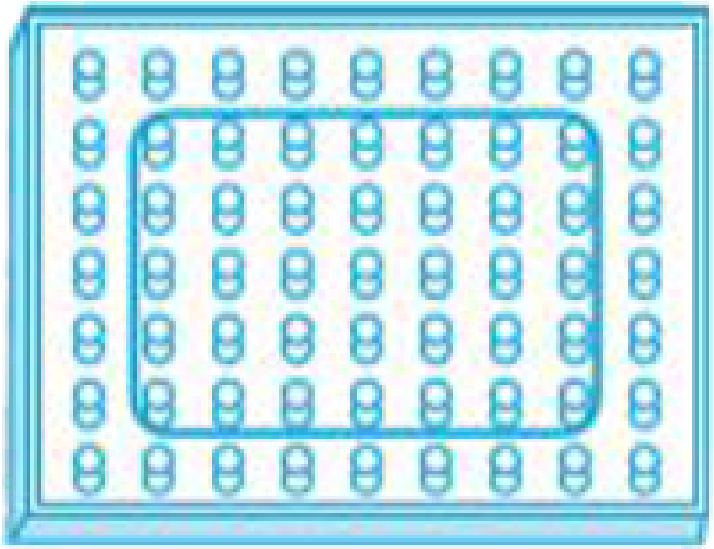
10. The figure shown is a geoboard in which a rectangle has been outlined using a rubberband.



Draw a similar figure whose area is 50% larger than this figure.

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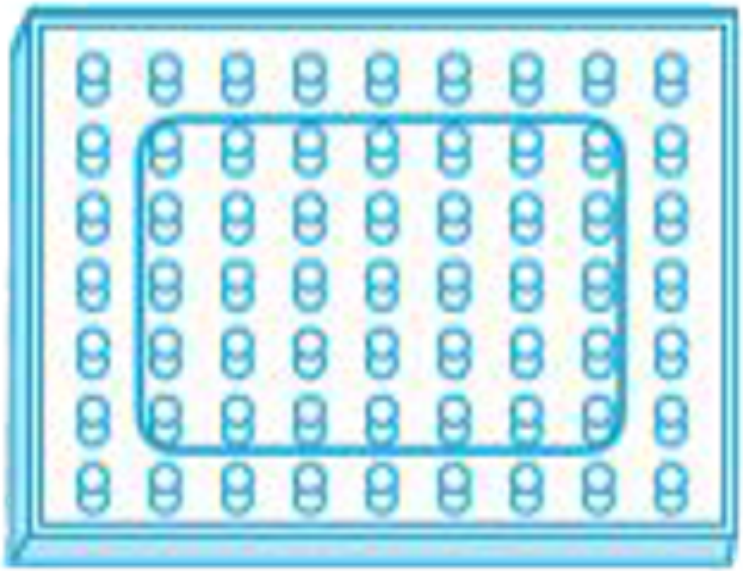
11. The figure shown is a geoboard in which a rectangle has been outlined using a rubberband.



Draw a similar figure whose area is 25% larger than this figure.

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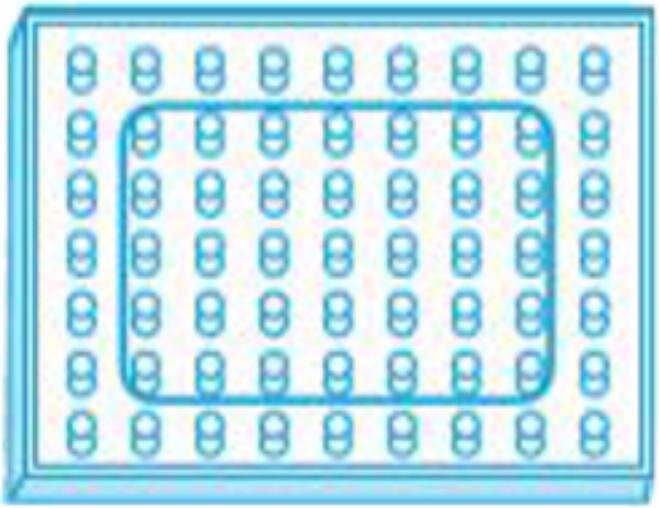
12. The figure shown is a geoboard in which a rectangle has been outlined using a rubberband.



Suppose that the figure shown is 75% of another figure. What would the other figure look like?

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13.

r	h	r	h	o	m	b	u	s	z
a	t	h	a	m	o	b	s	u	q
b	t	r	a	p	e	z	ı	u	m
c	y	l	ı	n	d	e	r	b	c
t	z	w	v	a	m	q	r	e	u
ı	j	l	t	q	n	g	b	a	b
k	b	d	f	v	s	g	t	r	o
s	z	q	c	ı	r	c	l	e	ı
a	w	h	m	a	n	k	p	e	d

Find the names of the solids from the given word maze whose areas or volumes are given below by colouring the boxes using the given

colour code.

	Area/Volume	Colour Code
1.	$\frac{1}{2}\ d_1 \times d_2$	red
2.	$l\ b\ h$	blue
3.	$\pi r^2 h$	yellow
4.	πr^2	green
5.	$\frac{1}{2} bh$	orange
6.	$\frac{1}{2}\ (a + b) \times h$	pink

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Think And Discuss

1. A cylindrical pillar is 50 cm in diameter and 3.5 m in height. Find the cost of painting the curved surface of the piller at the rate of Rs10 per sq. m.

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2. The length , breadth and height of box are 2m , 1.5 m and 80 cm respectively . What would be the cost of canvas to cover it up fully , if one square metre of canvas costs Rs. 25.00 ?

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