NOTES

CLASS 8
MATHS

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MENSURATION

I IMPORTANT CONCEPTS ;

- Area of a parallelogram = Base X Height
- Area of triangle = $\frac{1}{2}$ X base X height
- Area of trapezium = $\frac{1}{2}$ X (sum of parallel sides) X Height
- Area of a rhombus = product of diagonals
- Surface area of

(i) A cuboid = 2[lb + bh + lh]
(ii) A cube = $6l^2$
(iii) A cylinder = $2\pi r(r + h)$

- Volume of

(i) Cuboid = l x b x h
(ii) Cube = l^3
(iii) Cylinder = $\pi r^2 h$

$1m^3$ = 1000 litres

II Some iilustrations/ examples

- **MCQs**

(1)The volume of cube whose edge is 3x is

a) $27x^3$ **b) $9x^3$** **c) $6x^3$** **D $3x^3$**

Volume=(3x)^3 =**$27x^3$**

(2) The perimeter of trapezium is 52 cm and its each non parallel sides is equal to 10cm with its height 8 cm. Its area is

a) $124cm^2$ b) $118cm^2$ c)$128cm^2$ d) $112cm^2$

Sum of two parallel sides = perimeter of trapezium - sum of non - parallel sides
= 52 – 20 =32 cm

Area of trapezium = 1/2 x32 x 8 = $128cm^2$

(3) A metal sheet 27cm x 8cm x 1cm is melted into a cube . The side of cube is

a) 8cm b) 6cm c)24cm d)20cm

Soln. side of cube = $\sqrt[3]{volume}$ = $\sqrt[3]{27X8X1}$ = $\sqrt[3]{3^3 2^3 1^1} = 3X2X1 = 6cm$

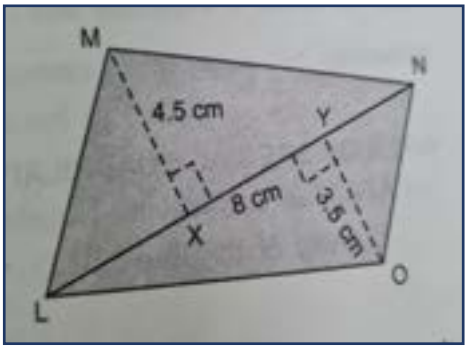
(4) The ratio of radii of two cylinders is 1: 2 and heights are in the ratio 2: 3 . The ratio of their volumes is

a) 1:6 b)1:9 c)1;3 d)2:9

Vol. of cylinder 1 : vol of cylinder 2
= $\pi (1x)^2 (2y) : \pi (2x)^2 (3y)$ = 1:6

- **SHORT ANSWER TYPE QUESTIONS**

1. Find the area of the quadrilateral LOMN



Soln.

Area of quadrilateral LOMN = Area of Δ LNM + Area of Δ LON

=1/2 x LN x MX +1/2 x LN x YO =1/2 x LN x (MX + OY)

= ½ x 8 x (4.5 + 3.5) =32 cm²

2. An aquarium is in the form of a cuboid whose external measures are 80cm x 30cm x 40cm . The base, side faces and back faces are to be covered with a coloured paper. Find the area of the paper needed.

Soln. Area of the base = $l \times b$ = 80 × 30 = 2400 cm2

Area of the side face = $b \times h$ = 30 × 40 = 1200 cm²

Area of the back face = $l \times h$ = 80 × 40 = 3200 cm²

Required area = Area of the base + area of the back face + (2 × area of a side face)

= 2400 + 3200 + (2 × 1200) = 8000 cm²

3 . 160m³ of water is to be used to irrigate a rectangular field whose area is 800m² . What will be the height of water level in the field?

Soln. Volume of water=160m³, area of field =800m²

Volume of water = volume of cuboid formed on the field by water

160 = area of base x height=800 x h

H = 160 / 800 = 0.2

Required height = 0.2 m

LONG ANSWER TYPE QUESTIONS

1. Radius of a cylinder is r and the height is h. Find the change in the volume if the
   a) Height is doubled b) height is doubled and radius is halved c) radius is halved height remains the same.

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

   a) New height = h^1 =2h

      Volume of cylinder = $\pi r^2 h^1 = \pi r^2 (2h) = 2\pi r^2 h$=double the original

   b) h^1 =2h ,r^1 = ½ r

      Volume of cylinder = $\pi(r^1)^2 h^1 = \pi(\frac{1}{2})^2(2h) = \pi(1/4)r^2 2h = \frac{1}{2}\pi r^2 h$ =half of original volume

   c) $r^1 = 1/2r$

      vol. of cylinder = $\pi(r^1)^2 h = \pi(1/4)\, r^2 h = 1/4\, \pi r^2 h$ = one – fourth of original volume

2. A company is selling its suitcases according to surface area . A suitcase can be bought at the rate of Rs. 0.05 per cm² . If the size purchased by Ramita is 80cm X 47cm X 24cm , find the cost paid by Ramita for 100 suitcases.

   Soln. total sur.area of one suitcase = 2(lb +bh + hl) = 2(80 x48 + 48 x 24 +80 x 24)

   =2(2840+1152 +1920) =2(6912) = 13824cm²

   Surface area of 100 suitcases = 13824 x 100 = 1382400cm²

   Cost of 100 suitcases = 0.05 x 1382400 = Rs. 69120

- **CASE STUDY BASED QUESTIONS**

  Anup after retirement thought to stay in village's house. After going there he found there was shortage of water in village , so he thought of constructing a well. He hired some labourers and guided them that well should be 7m in diameter and 20m deep.

  Based on the above information answer the following questions

1. What will be the shape of the well ?
   Ans. Cylindrical
2. What will be the radius of the well?
   Ans. Radius = ½ diameter = 3.5 m
3. What volume of earth will be dug out?
   Ans. Volume of cylinder = $\pi r^2 h = \frac{22}{7} X\ 3.5X3.5\ X\ 20 =\ 770 m^2$

III **QUESTIONS FOR PRACTICE**

MCQs

1. The area of parallelogram is given by
   a)base x height b)1/2 x base x height c)2 x base x height d) none of these

2. Area of trapezium is given by
   a) 2 x height x (sum of parallel sides) b)height x (sum of parallel sides)
   c)1/2 x height x(sum of parallel sides) d)1/2 x (sum of parallel sides)

3. Total surface of right circular cylinder
   a) $\pi r^2 h$ b)2 $\pi r^2 h$ c)$2\pi r h^2$ d)$2\pi r(r+h)$
4. The area of rhombus is given by
   a) ½ x sum of diagonals b) ½ x product of diagonals c)product of diagonals
   d) 2x product of diagonals
5. The edge of cube is 1m . Its surface area is given by
   a) $1m^2$ b)$4m^2$ c)$6m^2$ d)$3m^2$
6. The edge of cube is 2m . its volume is given by
   a) $6m^3$ b)$8m^3$ c)$6m^2$ d)none of these
7. The sum of the parallel sides of trapezium is 8 cm. if its height is 2 cm, then its area is Given by :
   a) $8cm^2$ b) $16cm^2$ c)$32cm^2$ d)none of the above
8. In a parallelogram, base = height = 1cm . What its area ?
   a)$1cm^2$ b) $2cm^2$ c) $3cm^2$ d)$4cm^2$
9. What is the curved surface area of a cylinder whose radius = $\frac{7}{2}$ cm and height = 7 cm?
   a) 154 cm^2 b) $308cm^2$ c) $77cm^2$ d)none of these
10. How many small cubes with edge of 20cm each can be just accommodated in a cubical Box of 2m edge ?
    a)10 b)100 c) 1000 d) 10000

SHORT ANSWER TYPE QUESTIONS

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

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

3) 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

4) The internal measures of a cuboidal room are 12 m × 8 m × 4 m. Find the total cost of whitewashing all four walls of a room, if the cost of white washing is Rs. 5 per m^2

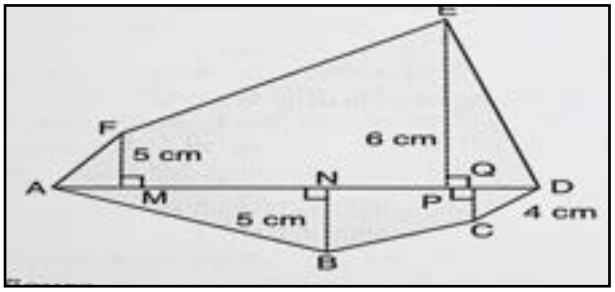
5) Find the height of a cylinder whose radius is 7 cm and the total surface area is 968 cm^2

6) Find the volume of a cube whose surface area is 600 cm².
7). Rukhsar painted the outside of the cabinet of measure 1 m × 2 m × 1.5 m. How much surface area did she cover if she painted all except the bottom of the cabinet.
8) A godown is in the form of a cuboid of measures 60 m × 40 m × 30 m. How many cuboidal boxes can be stored in it if the volume of one box is 0.8 m³ ?
9) Given a cylindrical tank, in which situation will you find surface area and in which situation volume.
(a) To find how much it can hold.
(b) Number of cement bags required to plaster it
10) Find the height of the cylinder whose volume is 1.54 m3 and diameter of the base is 140 cm?

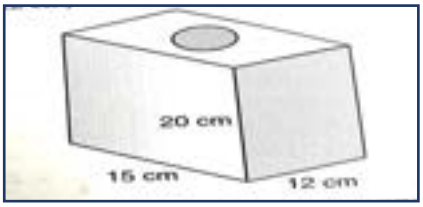
LONG ANSWER TYPE QUESTIONS

1) If each edge of a cube is tripled,
(i) how many times will its surface area increase?
(ii) how many times will its volume increase?

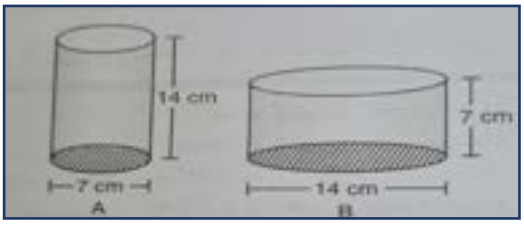
2) Find the area of the polygon ABCDEF , if AD= 18cm, AQ= 14cm ,AP = 12cm ,AN = 8cm, AM= 4cm, and FM,EP, QC and EN are perpendiculars to AD.



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

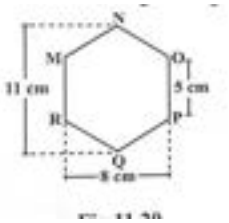


4) A swimming pool is 200m x 50m and has an average depth of 2m. by the end of a summer day, the water level drops by 2cm . How many cubic metres of water is lost on the day ?
5) Diameter of cylinder A is 7 cm, and the height is 14 cm. Diameter of cylinder B is 14 cm and height is 7 cm. Without doing any calculations can you suggest whose volume is greater? Verify it by finding the volume of both the cylinders. Check whether the cylinder with greater volume also has greater surface area



6) There is a hexagon MNOPQR of side 5 cm (Fig given below). Aman and Ridhima

divided it in two different ways. Find the area of hexagon in both the ways





Ridhima' method



Aman's method:

CASE STUDY BASED QUESTIONS

1) A box contains a cylinder and a cube . The height and radius of cylinder are 7cm and 14cm respectively. It has been observed that side of cube is half of the radius of cylinder.
   Based on the above information answer the following questions
   a)Find the side of the cube
   b)Find the curved surface area of cylinder?
   c) which has greater volume cube or cylinder? Why?

2) A company packages its milk powder in cylindrical containers whose base has a diameter of 16.8 cm and height 20.5 cm. company places a label 1.5cm from the top and the bottom around the curve surfaces of the containers as shown

On the basis of the above information anser the following questions

a) Find the radius of the base of the container
b) Find the height of the label
c) Find the area of the label

ANSWERS

MCQS

1)a 2)c 3) d 4)b 5)c 6)b 7)a 8)a 9)b 10)c

SHORT ANSWER QUESTIONS

1)7cm 2)252m² 3)24cm², 6cm 4)Rs 800 5)15cm 6)1000cm² 7)11m² 8)90000
9)volume ,surface area 10)1m

LONG ANSWER QUESTIONS

1)9 times, 27 times 2)127cm² 3)1390.72 cm² 4)200m³ 5)surface area of both cylinders are equal , vol. of B is greater than vol. of A 6)64cm²

CASE STUDY BASED QUESTION

1) a) 7cm b)616cm² c)cylinder(calculate)
2) a)8.4cm b)17.5cm c)924cm²

CLASS – VIII Topic- Mensuration MM-20

I Very Short answer type questions 5

1. Find the area of a rhombus whose diagonals are 8cm and 11cm.
2. Find the volume of cube whose edge is 2a.
3. Find the volume of cylinder of radius 1cm and height 7cm.
4. Find the height of cuboid whose surface area is 180cm². and volume is 900cm³
5. What is the surface area of a cylinder of radius r and height h.

II Write the formula for the following: 7

1. Area of trapezium
2. Volume of cuboid
3. Area of 4 walls of cuboidal room
4. Curved surface area of cylinder
5. Lateral surface area of cube
6. Area of 4 walls and ceiling of a room
7. Area of parallelogram

III Short answer type questions (Any 4) 8

1. A cuboid of dimensions 60cm X54cm X 30cm. How many small cubes with side 6cm can be placed in the given cuboid?
2. The diagonal of a quadrilateral shaped field is 24 m and the perpendiculars dropped on it from the remaining opposite vertices are 8 m and 13 m. Find the area of the field.
3. Sonam painted the outside of the cabinet of measure 1 m × 2 m × 1.5 m. How much surface area did she cover if she painted all except the bottom of the cabinet
4. The area of a rhombus is 240 cm2 and one of the diagonals is 16 cm. Find the other diagonal.
5. 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?

CLASS – VIII Topic- Mensuration MM-30

I Write the formula of the following : 3+3+4

1) Volume of
   a) Cube
   b) Cuboid
   c) Cylinder
2) Total surface area of
   a) Cube
   b) Cuboid
   c) Cylinder
3) a) lateral surface area of cuboid
   b) curved surface area of cylinder
   c) Area of rhombus
   d) Area of trapezium

II Short answer type questions 2X5=10

1)What is the curved surface area of a cylinder whose radius = $\frac{7}{2}$ cm and height = 14cm?

2)The area of a trapezium shaped field is 480 m^2 , the distance between two parallel sides is 15 m and one of the parallel side is 20 m. Find the other parallel side

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

4) Find the side of a cube whose surface area is 600 cm^2

5) The lateral surface area of a hollow cylinder is 4224 cm2 . It is cut along its height and formed a rectangular sheet of width 33 cm. Find the perimeter of rectangular sheet? .

III) Long answer type questions 3+3+4=10

1) If each edge of a cube is doubled,
(i) How many times will its surface area increase?
(ii) How many times will its volume increase?

2) Mohan wants to buy a trapezium shaped field. Its side along the river is parallel to and twice the side along the road. If the area of this field is 10500 m2 and the perpendicular distance between the two parallel sides is 100 m, find the length of the side along the river.

3) The internal measures of a cuboidal room are 12 m × 8 m × 4 m. Find the total cost of whitewashing all four walls and ceiling of a room, if the cost of white washing is Rs. 5 per m^2. Also find the volume of the air occupied



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