QB365 Question Bank Software Study Materials

Mensuration Important 2 Marks Questions With Answers (Book Back and Creative)

9th Standard

Maths

Total Marks : 60

2 Marks

30 x 2 = 60

1) Using Heron's formula, find the area of a triangle whose sides are

(i) 10 cm, 24 cm, 26 cm

(ii) 1.8 m, 8 m, 8.2 m

Answer : (i) sides: 10 cm, 24 cm, 26 m

Using Heron's formula

Area of the triangle = $\sqrt{s(s-a)(s-b)(s-c)}$ sq. units

s = $\frac{a+b+c}{2} = \left(\frac{10+24+26}{2}\right) cm = \frac{60}{2}$ = 30 cm

∴ Area = $\sqrt{30(30-10)(0-24)(0-26)}$

= $\sqrt{30 \times 20 \times 6 \times 4} = \sqrt{600 \times 24} = \sqrt{14400}$ = 120 cm^2

(ii) Sides: 1.8 m, 8m, 8.2 m

s = $\frac{1.8+8+8.2}{2} = \frac{18}{2}$ = 9

∴ Area = $\sqrt{s(s-a)(s-b)(s-c)}$

= $\sqrt{9(9-1.8)(9-8)(9-8.2)} = \sqrt{9 \times 7.2 \times 0.8}$

= $\sqrt{51.84}$ = 7.2 m^2

2) Find the area of an equilateral triangle whose perimeter is 180 cm.

Answer : Perimeter of an equilateral triangle = 180 cm

∴ one side (a) = $\frac{180}{3}$ = 60 m.

Area of an equilateral triangle = $\frac{\sqrt{3}}{4}$ a^2 sq.units

$= \frac{\sqrt{3}}{\cancel{4}} \times \overset{15}{\cancel{60}} \times 60$

= $900\sqrt{3}$ m^2

= 900 × 1.732 = 1558.8 m^2

3) An advertisement board is in the form of an isosceles triangle with perimeter 36m and each of the equal sides are 13 m. Find the cost of painting it at Rs. 17.50 per square metre.

Answer : Area of an isoeeles triangle

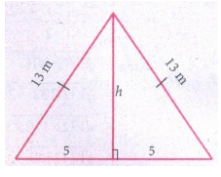
h = $\sqrt{13^2 - 5^2} = \sqrt{169 - 25} = \sqrt{144}$=12 m

∴ Area of the triangular board

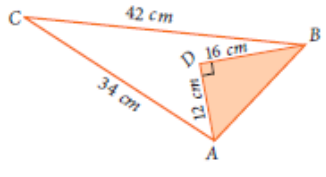
= $\frac{1}{2} \times bh = \frac{1}{2} \times 10 \times 12$ = 60 m^2

cost of painting 1m^2= Rs. 17.50

cost of painting 60m^2 = 60 × 17.50 = Rs. 1050



4) Find the area of the unshaded region.



Answer : By the Pythagoras theorem

$AB^2 = AD^2 + DB^2$

= 12^2+16^2 = 144 + 256 = 400

AB = 20 cm

$s = \frac{34+20+42}{2} = \frac{96}{2} = 48$

s = $\frac{}{2} = \frac{}{2}$ = 48

∴ Area of the Δ ABC = $\sqrt{s(s-a)(s-b)(s-c)}$

= $\sqrt{48(48-34)(48-20)(48-42)}$

= $\sqrt{48 \times 14 \times 28 \times 6} = \sqrt{112896}$

= $\sqrt{336 \times 336}$ = 336 sq.cm

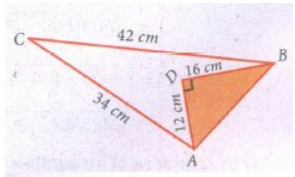
Area of the triangle ABD

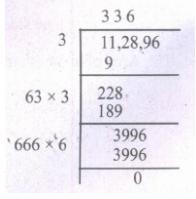
$= \frac{1}{2} b\,h = \frac{1}{\cancel{2}} \times \overset{6}{\cancel{12}} \times 16 = 96 \text{ cm}^2$

∴ Area of the unshaded region

= Area of Δ ABC - Area of Δ ABD

= 336 - 96 = 240 cm^2.





5) A land is in the shape of rhombus. The perimeter of the land is 160 m and one of the diagonal is 48 m. Find the area of the land.

Answer : Perimeter of the rhombus land = 160 m

4a = 160 m

a = 40 m

One of the diagonal = 48 m

∴ Area of the land = 2 × Area of the Δ ABC

s = $\frac{40+40+48}{2} = \frac{128}{2}$ = 64 m

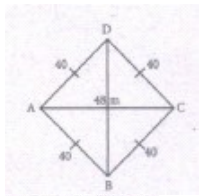
Area of Δ ABC = $\sqrt{s(s-a)(s-b)(s-c)}$

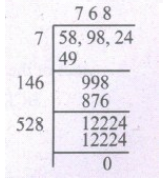
= $\sqrt{64(64-40)(64-40)(64-48)}$

= $\sqrt{64 \times 24 \times 24 \times 16} = \sqrt{589824}$

= 768 m^2

∴ Area of the land = 2 × 768 m^2 = 1536 m^2





6) The adjacent sides of a parallelogram measures 34 m, 20 m and the measure of the diagonal is 42 m. Find the area of parallelogram.

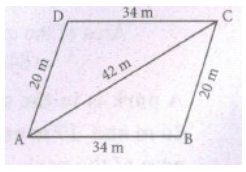
Answer : Area of the parallelogram = 2 × Area of the Δ ABC

s = $\frac{34+20+42}{2} = \frac{96}{2}$ = 48 m

Area of Δ ABC = $\sqrt{48(48-34)(48-20)(48-42)}$

= $\sqrt{48 \times 14 \times 28 \times 6} = \sqrt{112896}$ = 336 m^2

∴ Area of the parallelogram = 2 × 336 m^2 = 672 m^2.



7) Find the Total Surface Area and the Lateral Surface Area of a cuboid whose dimensions are length = 20 cm, breadth = 15 cm, height = 8 cm

Answer : **Cuboid Total surface**

(a) Area of a cuboid = 2 (lb + bh + hl) sq. units

= 2 (20 × 15 + 15 × 8 + 8×20)

= 2 (300 + 120 + 160) = 2 × 580 = 1160 cm^2

(b) Lateral surface area of a cuboid = 2h (l + b) sq. units

= 2 × 8 (20 + 15) = 16 × 35 = 560 cm^2

8) The dimensions of a cuboidal box are 6 m × 400 cm × 1.5 m. Find the cost of painting its entire outer surface at the rate of Rs. 22 per cm^2.

Answer : $l \times b \times h = 6\ m \times 400\ cm \times 1.5\ m$

$l = 6m, b = 4\ m, h = 1.5\ m$

Total surface area of the cuboid = Outer surface area

$= 2 (lb + bh + hl)$

$= 2 ((6 \times 4) + (4 \times 1.5) + (1.5 \times 6))$

$= 2 (24 + 6 + 9) = 2 (39)\ m^2$

Cost of painting 1 m^2 = Rs. 22

Cost of painting 78 m^2= 78 × 22 = Rs. 1716

9) The dimensions of a hall is 10 m × 9 m × 8 m. Find the cost of white washing the walls and ceiling at the rate of Rs. 8.50 per m^2.

Answer : Dimensions of a hall 10 m × 9 m × 8 m

$l = 10\ m$

$b = 9\ m$

$h = 8\ m$

White washing to be done for the area of the surface

$= 2 (lh + bh) + lb$

$= 2 (10 \times 8 + 9 \times 8) + 10 \times 9$

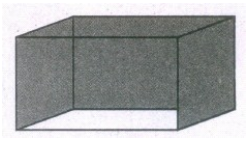
$= 2 (80 + 72) + 90 = 2 \times 152 + 90$

$= 304 + 90 = 394\ m^2$

Cost of white washing per m^2= Rs. 8.50

Cost of white washing 394 m^2 = 394 × 8.50

Total cost = Rs. 3349



10) Find the TSA and LSA of the cube whose side is

(i) 8 m

(ii) 21 cm

(iii) 7.5 cm

Answer : (i) side ofa cube = 8 m

TSA of the cube = $6a^2 = 6 \times 64 = 384\ m^2$

LSA of the cube = $4a^2 = 4 \times 64 = 256\ m^2$

(ii) side a = 21 cm

TSA= $6a^2 = 6 \times 21 \times 21 = 2646\ cm^2$.

LSA = $4a^2 = 4 \times 21 \times 21 = 1764\ cm^2$.

(iii) side a = 7.5 cm

TSA = $6a^2 = 6 \times 7.5 \times 7.5\ cm^2 = 337.5\ cm^2$

LSA = $4a^2 = 4 \times 7.5 \times 7.5\ cm^2 = 225\ cm^2$.

11) If the total surface area of a cube is 2400 cm^2 then, find its lateral surface area.

Answer : $6a^2 = 2400\ cm^2$

$\Rightarrow a^2 = \frac{2400}{6}$

$\therefore 4a^2 = \frac{4 \times 2400}{6}$

$= 1600\ cm^2$.

12) A cubical container of side 6.5 m is to be painted on the entire outer surface. Find the area to be painted and the total cost of painting it at the rate of Rs. 24 per m^2.

Answer : a = 6.5 m

$6a^2 = 6 \times 6.5 \times 6.5 = 253.5\ m^2$

Area to be painted = 253.5 m^2

Cost of painting 1 m^2 = Rs. 24

∴ Cost of painting 253.5 m^2= 253.5 ×24 = Rs. 6084

13) Three identical cubes of side 4 cm are joined end to end. Find the total surface area and lateral surface area of the new resulting cuboid.

Answer : a = 4 cm

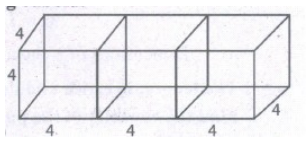
TSA of the cuboid = 2 (lb+ bh+ hl)

l = 12 cm, b = 4 cm, h = 4 cm

∴ TSA = 2 (12 × 4 + 4 × 4 + 4 × 12)

= 2 (48 + 16 + 48) = 2 × 112 = 224 cm^2

LSA = 2 h (l + b) = 2 ×(12 + 4) = 8 × 16 = 128 cm^2.



14) Find the volume of a cuboid whose dimensions are

(i) length = 12 cm, breadth = 8 cm, height = 6 cm

(ii) length = 60 m, breadth = 25 m, height = 1.5 m

Answer : (i) l = 12 cm

b = 8 cm

h= 6 cm

Volume of the cuboid = lbh

= 12 × 8 × 6 cm^3 = 576 cm^3

(ii) l = 60 m

b = 25 m

h = 1.5 m

Volume of the cuboid = l b h = 60 × 25×1.5 m^3 = 2250 m^3

15) The length, breadth and height of a chocolate box are in the ratio 5:4:3. If its volume is 7500 cm^3, then find its dimensions.

Answer : Let 1 ratio = x then 5:4:3

⇒ 5x: 4x: 3x

5x × 4x × 3x = 60x^3 = 7500 cm^3

$$x^3 = \frac{\cancel{7500}\ \cancel{375}\ 125}{\cancel{60}\ \cancel{3}} = 125\ cm^3$$

x = 5 cm

∴ 5x = 5 × 5 = 25 cm

4x = 4 × 5 = 20 cm

3x = 3 × 5 = 15 cm

∴ Dimensions of a chocolate box are 25 cm × 20 cm × 15 cm.

16) The length, breadth and depth of a pond are 20.5 m, 16 m and 8 m respectively. Find the capacity of the pond in litres.

Answer : l= 20.5 m b = 16 m h = 8 m

∴ Capacity = Volume =I x b x h

= (20.5 × 16 ×8) m^3 = 2624 m^3

1m^3 = 1000 litres

∴ 2624 m^3 = 2624000 litres.

17) The dimensions of a brick are 24 cm × 12 cm × 8 cm. How many such bricks will be required to build a wall of 20 m length, 48 cm breadth and 6 m height?

Answer : I = 24 cm b = 12 cm h = 8 cm

Volume of the brick = I x b x h = (24 × 12 × 8) cm^3= 2304 cm^3

Wall dimensions are:

L = 20 m = 2000 cm

B = 48 cm

H = 6 m = 600 cm

No. of brieks required to build the wall = $\frac{Volume\ of\ the\ wall}{Volume\ of\ a\ bricks}$

$$= \frac{LBH}{lbh} = \frac{1000 \quad 4 \quad 50\ 25}{2000 \times 48 \times 600} = 1000 \times 25$$
$$24 \times 12 \times 8$$
$$6 \qquad 4\ 2$$

No. of brieks required = 25000

18) The volume of a container is 1440 m^3. Th e length and breadth of the container are 15 m and 8 m respectively. Find its height.

Answer : V = l × b × h = 1440 m^3

$$15 \times 8 \times h = 1440 \qquad 24\ 12$$
$$12 \qquad 72$$
$$288$$
$$h = 1440 \times \frac{1}{15} \times \frac{1}{8} = 12\ m$$
$$3 \qquad 2$$

height = 12 m

19) Find the volume of a cube each of whose side is

(i) 5 cm

(ii) 3.5 m

(iii) 21 cm

Answer : (i) side of a cube (a) = 5 cm

Volume of a cube V = a^3 = 5 × 5 × 5 = 125 cm^3

a = 3.5 m

V = a^3 = 3.5 × 3.5 × 3.5 m^3 = 42.875 m^3

a = 21 cm

V = a^3 = 21 × 21 × 21 cm^3 = 9261 cm^3.

20) A cubical milk tank can holds 125000 litres of milk. Find the length of its side in metres.

Answer : V = a^3 = 125000 litres

= 125 m^3

a = $\sqrt[3]{125m^3} = \sqrt[3]{5 \times 5 \times 5}$

∴ length of its side = 5 m.

21) External dimensions of a closed wooden cuboidal box are 30 cm × 25 cm × 20 cm. If the thickness of the wood is 2 cm all around, find the volume of the wood contained in the cuboidal box formed.

Answer : V = 30 × 25 × 20 cm^3

External box volume = 15000 cm^3

Thickness of the wood = 2 cm all around

∴ Volume of the inner cuboid = 26 × 21 × 16 = 8736 cm^3

The volume of the wooden part

Required Volume = Volume of the external box - Volume of the inner box

= 15000 - 8736

= 6264 cm^3.

22) A cuboid has total surface area of 40m^2 and its lateral surface area is 26 m^2, Find the area of its base.

Answer : Area of its base = $\frac{TSA-LSA}{2}$

= $\frac{40-26}{2}$ m^2

= 7 m^2

23) The volume of a cuboid is 440 cm^3 and the area of its base is 88 cm^2, find its height.

Answer : I × b × h = 440 cm^3

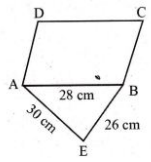
h = $\frac{440}{88}$ = 5 cm

24) How many 3 metre cubes can be cut from a cuboid measuring 18 m × 12 m × 9 m?

Answer : $\frac{\overset{4}{\cancel{18}}\times\overset{1}{\cancel{12}}\times\cancel{9}}{\cancel{3}\times\cancel{3}\times\cancel{3}} = 72$

25) A triangle and a parallelogram have the same base and the same area. If the sides of the triangle are 26 cm, 28 cm and 30 cm and the parallelogram stands on the base 28 cm, find the height of the parallelogram.

Answer :



In the figure ABCD is a parallelogram and ABE is the triangle which stands on the base AB.

For the triangle ABE, a = 30 cm, b = 28 cm, c= 26 cm

$S = \frac{a+b+c}{2} = \frac{30+28+26}{2} = 42$ cm

Area of the $\triangle ABE = \sqrt{s(s-a)(s-b)(s-c)}$

$= \sqrt{42 \times 12 \times 14 \times 16}$

$\sqrt{2 \times 7 \times 3 \times 2 \times 2 \times 3 \times 2 \times 7 \times 4 \times 4} = 336$ cm^2

Area of the parallelogram = base $\times$ height

336 = 28 $\times$ height

Height of the parallelogram = $\frac{336}{28} = 12$ cm

26) Find the length of the side of a cube whose total surface area is 216 sq. cm.

Answer : Let a be the side of the cube

Given that TSA = 216 sq.cm

$6a^2 = 216$

$a^2 = \frac{216}{6} = 36$

$a = \sqrt{36}$

$= 6$ cm

27) A cube has a total surface area of 384 sq. cm. Find its volume.

Answer : Let a be the side of the cube.

Given that TSA = 384 sq. cm

$6a^2 = 384$

$a^2 = \frac{384}{6} = 64$

$a = \sqrt{64} = 8$

Hence volume = a^3

$= 8^3 = 512$ cm^3

28) A cuboidal water tank is 6 m long, 5 m wide and 4.5 m deep. How many litres of water tank can it hold? (1 m^3 = 10000)

Answer : Here l = 6 m

b = 5 m

h = 4 m

Volume of the tank = lbh

= 6 $\times$ 5 $\times$ 4.5

= 135 m

= 135 $\times$ 1000

= 1,35,000 litres

Hence the tank can hold 1,35,000 litres of water

29) A cuboidal vessel is 10 m long and 8 m wide. How high must it be made to hold 380 cubic metres of a liquide

Answer : Here l = 10m b = 8m h =?

Volume of the vessel = lbh

$380 = 10 \times 8 \times h$

$80\ \mathrm{h} = 380$

$\mathrm{h} = \frac{380}{80}$

= 4.75

Hence the tank must be made 4.75 m high

30) Find the L.S.A, TSA. and volume of the, cuboids having the length, breadth and height respectively as

i) 5 cm, 2 cm, 11 cm

ii) 15 dm, 10 dm, 8 dm

iii) 2 m, 3 m, 7 m

iv) 20 m, 12 m, 8m

Answer : i) 5 cm, 2 cm, 11 cm

Given l = 5, b = 2, h = 11

LSA of cuboid = 2h (l + b)

$= 2 \times 11 \times 7$

= 154 cm^2

TSA of cuboid = 2 (lb $\times$ bh $\times$hl)

= 2[10 + 22 + 55]

= 174cm^2

volume of cuboid = l $\times$ b $\times$ h

= 5$\times$2$\times$11

= 110cm^3

ii) 15 dm, 10 dm, 8 dm

Given l = 15, b = 10, h = 8

LSA = 2h(l+b)

$= 2 \times 8 \times 25 = 400 dm^2$

TSA = 2(lb+bh+lh)

= 2(150 + 80 + 120)

= 2 (350)

= 700 dm^2

Volume = lbh

=15$\times$10$\times$8

= 1200 dm^3

iii) 2m, 3 m, 7m

Given l = 2, b = 3, h = 7

LSA = 2h (1 + b)

= 2 $\times$ 7 $\times$ 5

= 70 m

TSA = 2(lb + bh + lh)

= 2 (6 + 21 + 14)

= 2 (41)

= 82 m^2

Volume = lbh

= 2$\times$3 $\times$7

= 42 m^3

iv) 20 m, 12 m, 8m

Given l = 20, b = 12, h = 8

LSA = 2 h (l+b)

= 2 $\times$8 $\times$ 32

= 512 m^2

TSA = 2 (lb + bh + lh)

= 2 (240 + 96 + 160)

= 2 (496)

= 992 m^2