Important Question Class 8 Maths Chapter 9 - Mensuration

Very Short Answer Question 1 Mark

2. Area of a trapezium = Half of the sum of the length of parallel sides × _____?

Ans: Perpendicular distance between them.

3. The area of a parallelogram whose base is 9cm$9\text{cm}$and altitude is 6cm6cm

(a) 45cm2$45\text{cm}^2$

(b) 54cm2$54\text{cm}^2$

(c) 48cm2$48\text{cm}^2$

(d) 84cm2$84\text{cm}^2$

Ans: Area of parallelogram = base × altitude

= 9cm ×6cm = 54cm2$9\text{cm} \times 6\text{cm} = 54\text{cm}^2$

Therefore, correct option is (b)

4. The volume of a cube whose edge is 6a$6a$ is

(a) 25a3$25\text{a}^3$

(b) 216a3$216\text{a}^3$

(c) 125a3$125\text{a}^3$

(d) None of these

Ans: Volume of cube = 6a3 = 216a3$6\text{a}^3 = 216\text{a}^3$

Therefore, the correct option is (c)

5. The sum of the areas of all six faces of a cuboid is the _____ of the cuboid.

(a) Volume

(b) Surface area

(c) Area

(d) Curved surface area

Ans: Sum of the areas of all six faces of cuboid is the surface area of cuboid which is given by 2(l b + b h + h l)$2(l\,b + b\,h + h\,l)$

Therefore, the correct option is (b)

6. The area of a. Rhombus is 240 cm2$240\text{cm}^2$ and one of the diagonals is 16 cm16cm Then other diagonal is

(a) 25cm25cm

(b) 30cm30cm

(c) 18cm18cm

(d) 35cm35cm

Ans: Area of Rhombus= 240cm2 = 12(d1×d2)$240\text{cm}^2 = \frac{1}{2}(d_1 \times d_2)$

= 2×240cm2 = 16cm×d2$2 \times 240\text{cm}^2 = 16\text{ cm} \times d_2$

⇒ ⇒ d2 = 2×240cm216cm = 30cm$d_2 = \frac{2 \times 240\text{cm}^2}{16\text{cm}} = 30\text{cm}$

Therefore, correct option is (b)

7. The volume of water tank is 3m33$3\text{m}^3$. Its capacity in litres is

(a) 3030

(b) 300300

(c) 30003000

(d) None of these

Ans:

1m3 = 1000litres$1\text{m}^3 = 1000\text{litres}$

V = 3m3 = 3(1000) = 3000litres$3\text{m}^3 = 3(1000) = 3000\text{litres}$

Therefore, correct option is (c)

Short Answer Questions 2 Mark

8. Find the area of a square, the length of diagonal is 22–√m2 $\sqrt{2}m$

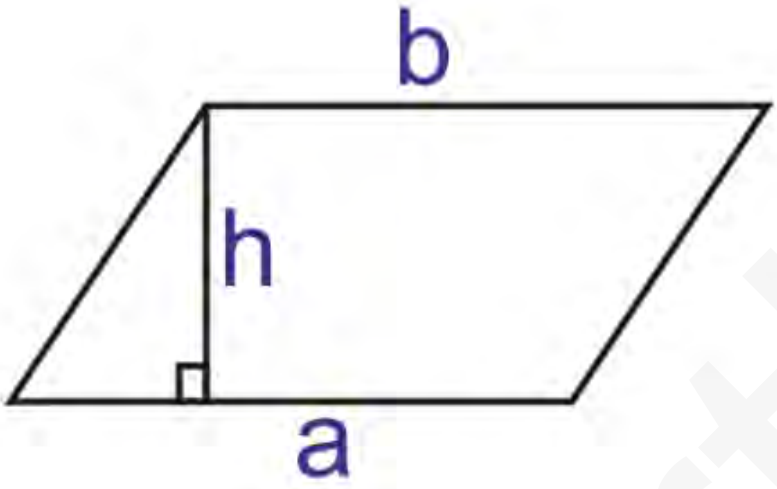
Ans: Area of Square = 12d2(∴d = 22–√m)$\frac{1}{2}\text{d}^2$ ($\therefore \text{d} = 2\sqrt{2}\text{m}$)

where d = diagonal length

Area of Square = 12(22–√m)2 = 12×4×2 m2 = 4m2$\frac{1}{2}(2\sqrt{2}\text{m})^2 = \frac{1}{2} \times 4 \times 2\ \text{m}^2 = 4\text{m}^2$

9. If the parallel sides of a parallelogram are 2cm2cmapart and their sum is 12cm12cm then find its area.

Ans:



Opposite sides of a parallelogram are equal

∴ a + b = 12$a + b = 12$

a + a = 12$a + a = 12$

2a = 12$2a = 12$

a = 6$a = 6$

Area of parallelogram = a×h = 6×2 = 12cm2$a \times h = 6 \times 2 = 12 cm^2$

10. The length, breadth and height of a cuboid are 20cm$20 cm$, 15cm$15 cm$ and 10cm$10 cm$ respectively. Find its total surface area.

Ans:

L = 20cm , B = 15cm , H = 10cm$L = 20 cm$, $B = 15 cm$, $H = 10 cm$

Surface area of cuboid = 2(lb + bh + hl)$2(lb + bh + hl)$

= 2(20×15+15×10+10×20)cm22 ($20 \times 15 + 15 \times 10 + 10 \times 20$) cm^2

= 2(300 + 150 + 200)cm22$(300 + 150 + 200) cm^2$

= 2(650)cm2 = 1300cm22$(650) cm^2 = 1300 cm^2$

11. Volume of Cube is 8000cm38000cm^3. Find its surface area.

Ans:

V= 8000cm38000cm^3

l3 = 8000cm3$l^3 = 8000\mathrm{cm}^3$

⇒l = 8000 cm3 ––––––––√3 ⇒ $l = \sqrt[3]{8000\ \mathrm{cm}^3}$

l = 20cm$l = 20\mathrm{cm}$

Surface Area of Cube = 6l26l^2

= 6(20cm)2 = 2400cm26$(20\mathrm{cm})^2 = 2400\mathrm{cm}^2$

12. Find the ratio of the areas of two circles whose radii is 7cm$7\mathrm{cm}$ and 14cm$14\mathrm{cm}$.

Ans:

r1 = 7cm$r_1 = 7\mathrm{cm}$

⇒ ⇒ A1 = π(7)2 = 49π$A_1 = \pi(7)^2 = 49\pi$

r2 = 14cm$r_2 = 14\mathrm{cm}$

⇒ ⇒ A2 = π(14)2 = 196π$A_2 = \pi(14)^2 = 196\pi$

A1:A2 = 49π:196π$A_1 : A_2 = 49\pi : 196\pi$

A1:A2 = 7:28$A_1 : A_2 = 7 : 28$

13. Find the diameter of the circle whose circumference is 230m$230\mathrm{m}$.

Ans: Circumference = 230m$230\mathrm{m}$

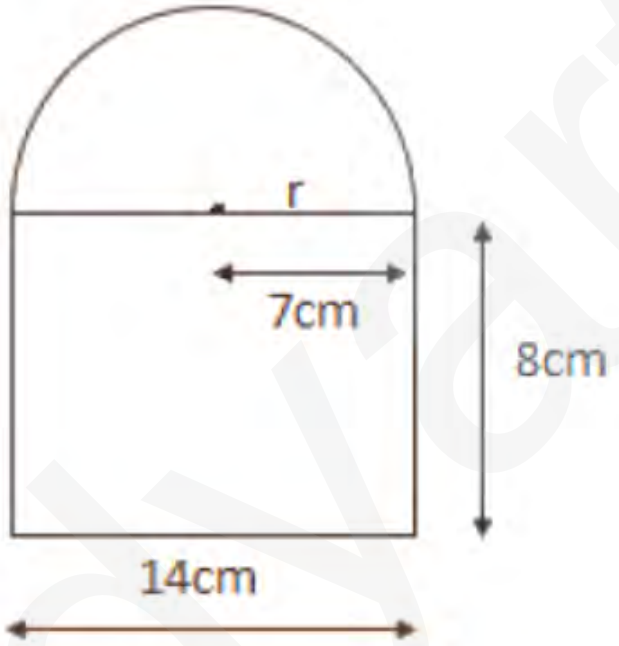
2πr = 230m$2\pi r = 230\mathrm{m}$

r = 2302π = 230×72×22 = 36.6m$r = \frac{230}{2\pi} = \frac{230 \times 7}{2 \times 22} = 36.6\mathrm{m}$

d = 2r = 2×36.6m = 73.18cm$d = 2r = 2 \times 36.6\text{m} = 73.18\text{cm}$

Question (14 – 18) 3 Mark

14. Find the area of the figure if the upper portion is a semicircle



Ans: Total area = Area of semicircle + Area of Rectangle

Area of semicircle = 12πr2$\frac{1}{2}\pi r^2$

With r = 12(lengthofrectangle) = 12×14=7r $= \frac{1}{2}(\text{lengthofrectangle}) = \frac{1}{2} \times 14 = 7$

Area of semicircle = 12×227×7×7=77cm2$\frac{1}{2} \times \frac{22}{7} \times 7 \times 7 = 77\text{cm}^2$

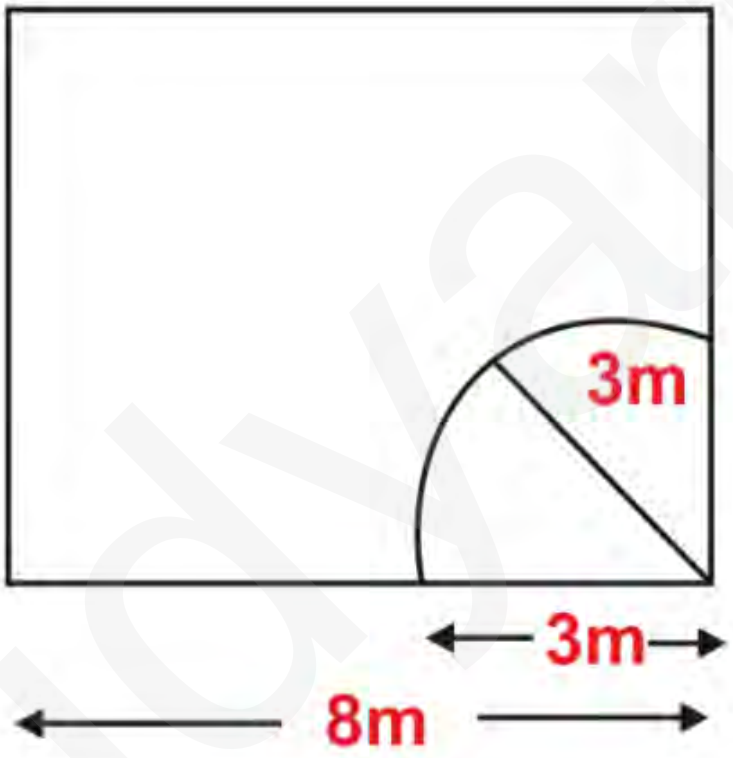
Area of rectangle = length × breadth

= 14×8 = 112cm2$14 \times 8 = 112\text{cm}^2$

Total area = (77 + 112)cm2 = 189cm2$(77 + 112)\text{cm}^2 = 189\text{cm}^2$

15. A goat is tied to one corner of a square field of side 8m$8\text{m}$by a rope 3m3m long. Find the area it can graze? Also find the area the goat cannot graze.

Ans:



Length of side of a square = 8m8m

Area of square = (8m)2 = 64m2$(8\text{m})^2 = 64\text{m}^2$

Length of rope = 3m3m = rr (radius of circle)

As the goat is tied to a corner of square plot it can only graze 14th$\frac{1}{4}\text{th}$ of circle of radius equal to length of rope inside the plot.

Area covered (or grazed) by goat = πr24$\frac{\pi r^2}{4}$

$$= 227\times(3)24 = 22\times928\frac{22}{7} \times \frac{(3)^2}{4} = \frac{22 \times 9}{28}$$

$$= 7.07\text{m}27.07\text{m}^2$$

Area the goat cannot graze = Area of square – Area grazed by goat

$$= 64 - 7.07 \ = \ 56.93\text{m}264 - 7.07 \ = \ 56.93\text{m}^2$$

16. If xx units are added to the length of the radius of a circle, what is the number of units by which the circumference of the circle is increased?

Ans: Let the radius of the circle be 'rr' units

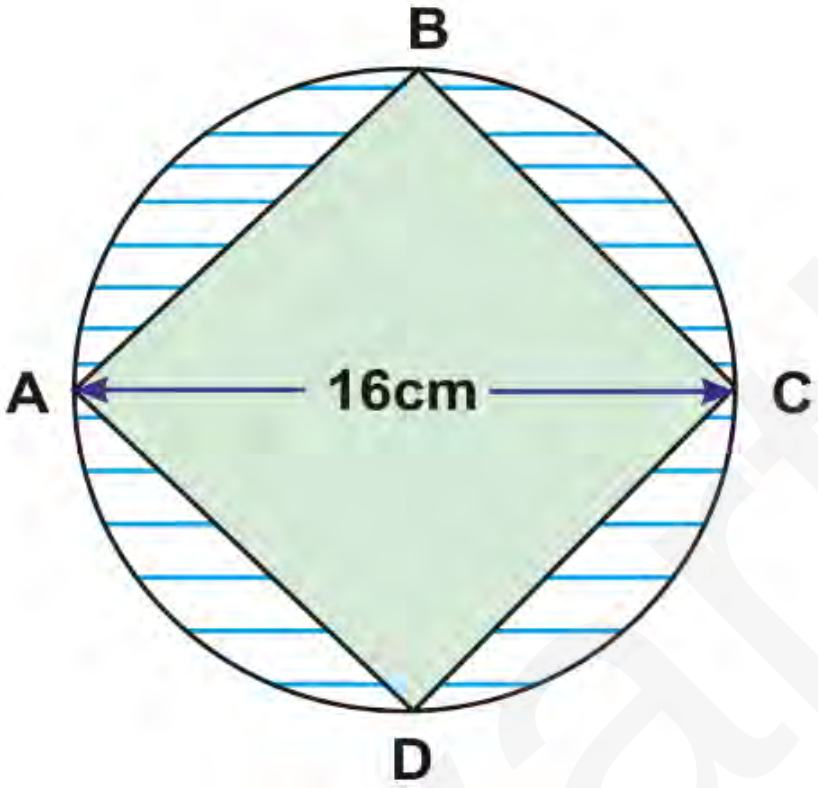
The circumference of the circle will be 2πr2πr units

If the radius is increased by 'xx' units, the new radius will be (r + x)$(\text{r} + \text{x})$ units.

New circumference will be 2π(r + x) = 2πr + 2πx2$\pi(\text{r} + \text{x}) \ = \ 2\pi\text{r} + 2\pi\text{x}$

Circumference increased by 2πx2πx units.

17. Find the area of the shaded portion if diameter of circle is 16cm16cm and ABCD is a square.



Ans: Area of shaded portion = (Area of circle with radius =8cm8cm) – (Area of square with diagonal length = 16cm16cm)

= πr2 - 12d2πr^2 - $\frac{1}{2}d^2$

= 227×(8)2−12(16)2$\frac{22}{7} \times (8)^2 - \frac{1}{2}(16)^2$

= 22×647−128$\frac{22 \times 64}{7} - 128$

= 201.1 - 128 = 73.1cm2$201.1 - 128 = 73.1\text{cm}^2$

18. How many cm3cm^3 of juice can be poured in a cuboidal can whose dimensions are 15cm×10cm×25cm$15\text{cm} \times 10\text{cm} \times 25\text{cm}$. How many cubical packs of 25cm3$25\text{cm}^3$ volume can be made?

Ans: Volume of cuboid = Length × × Breadth × × Height

= 15cm×10cm×25cm$15\text{cm} \times 10\text{cm} \times 25\text{cm}$

Volume of juice in cuboidal can = 3750cm3$3750\text{cm}^3$

Each volume of cubical packet = 25cm3$25\text{cm}^3$

Number of such cubical packets made from the volume of juice in cuboidal can

n = volumeofjuiceincuboidalcaneachcubicalpackvolume$n = \frac{\text{volumeofjuiceincuboidalcan}}{\text{eachcubicalpackvolume}}$

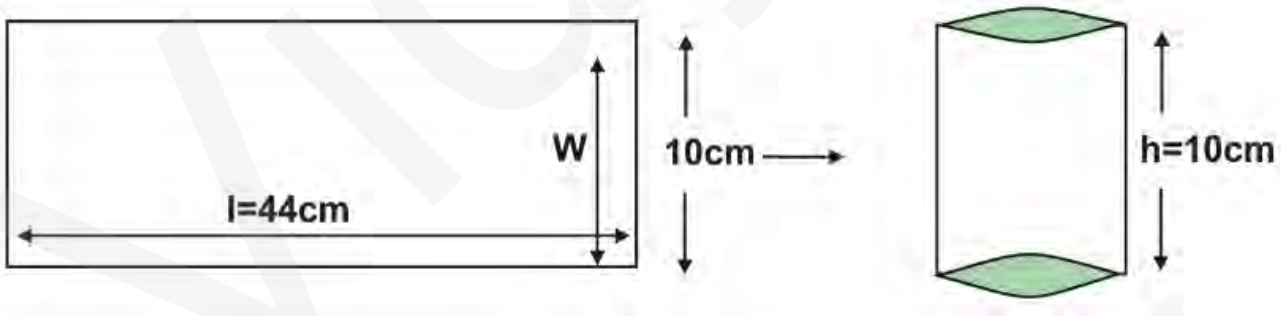
n = 3750cm325cm3$n = \frac{3750\text{cm}^3}{25\text{cm}^3}$

n = 150$n = 150$ packets

Question (19 – 25) 5 Mark

19. A rectangular piece of paper66cm66cmlong and10cm10cmbroad is rolled along the length to form a cylinder. What is the radius of the base and calculate volume of cylinder?

Ans:



When the rectangular piece is rolled in the form of a cylinder then the length became the circumference of the base of cylinder

C = 66$66$,

2πr = 662$\pi r = 66$

πr = 662 = 33$\pi r = \frac{66}{2} = 33$

r = 33×722 = 10.5cm$r = \frac{33\times7}{22} = 10.5\text{cm}$

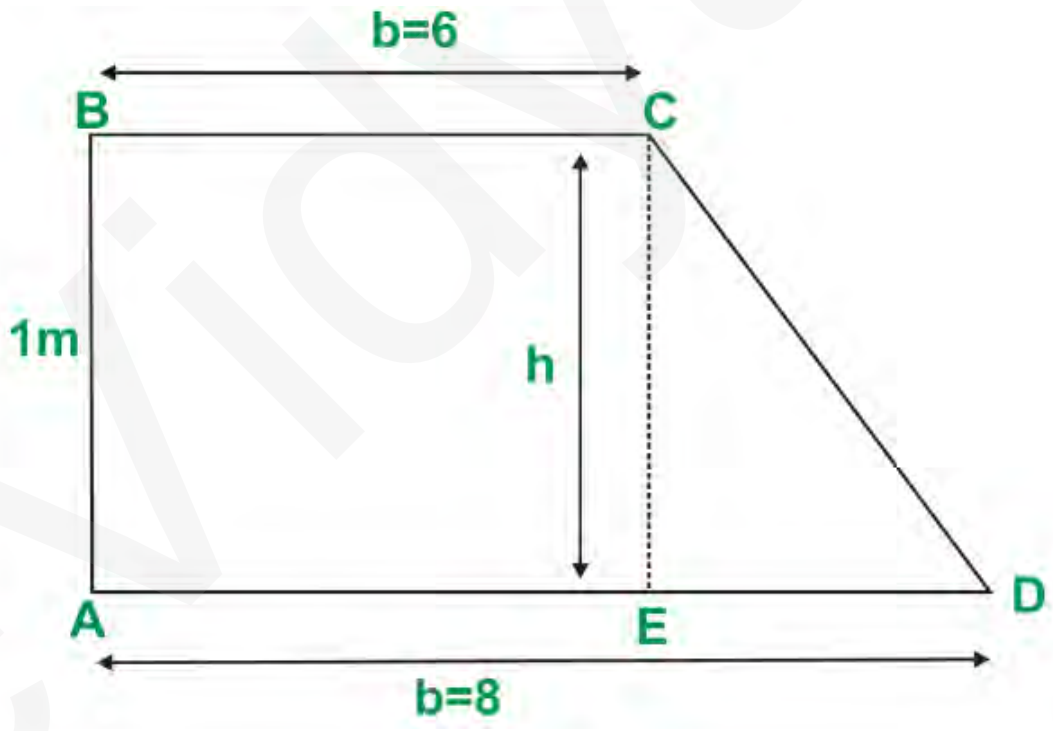
Volume of Cylinder with radius = 10.5cm10.5cm ang height = 10cm10cm

V = πr2h = 227×(10.5)2×10$V = \pi r^2 h = \frac{22}{7} \times (10.5)^2 \times 10$

= 3465cm3$3465\text{cm}^3$

20. ABCD has area equal to 2828. BC is parallel to AD. BA is perpendicular to AD. If BC is 6 6 and AD is 88, then what is CD?

Ans: The shape of the given figure is a trapezium



Area of Trapezium = 12(sum of parallel sides)×height$\frac{1}{2}(\text{sum of parallel sides}) \times \text{height}$

Given area of ABCD = 2828, BC = 6688, CD = ?

28 = A = 12(6 + 8)h$28 = A = \frac{1}{2}(6+8)h$

h = 28×214 = 4units$h = \frac{28\times 2}{14} = 4\text{units}$

To find CD: let DE perpendicular to AD (construction done)

In triangle CED,

ED = AD – AE

ED = 8 - 68 - 6

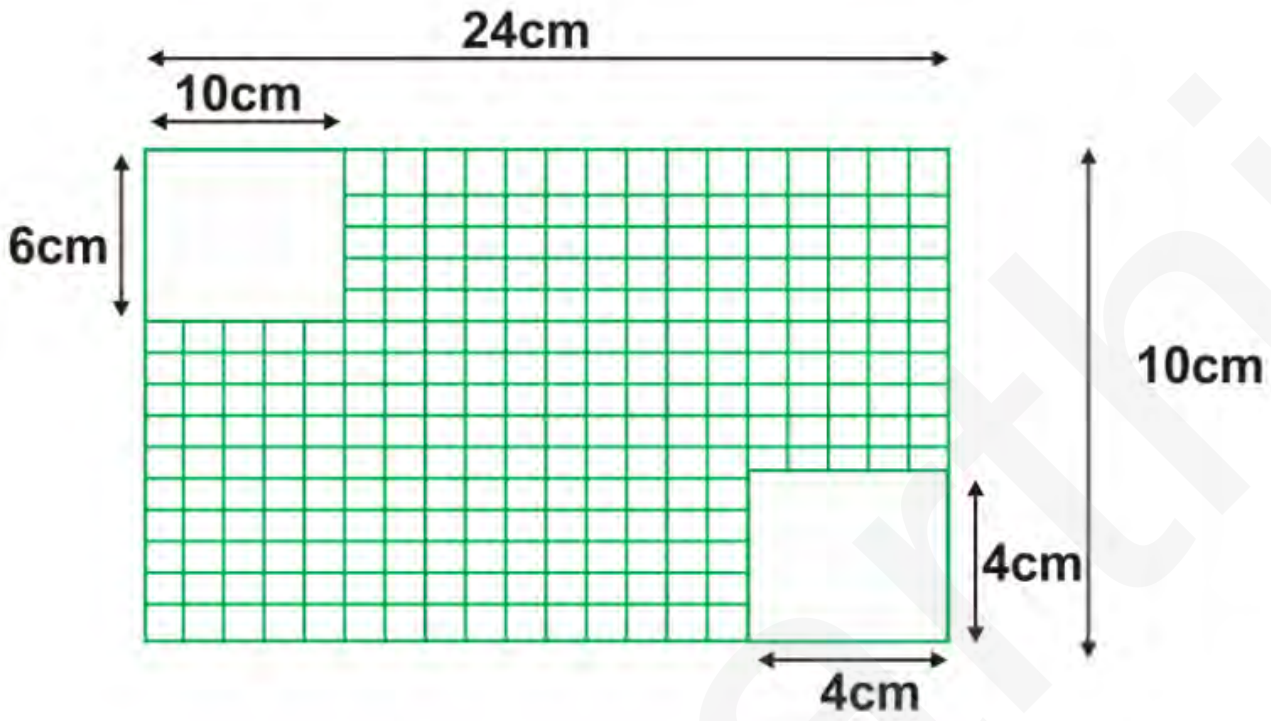
ED = 22

CD2 = CE2 + ED2$CD^2 = CE^2 + ED^2$

CD2 = (4)2 + (2)2 = 16 + 4 = 20$CD^2 = (4)^2 + (2)^2 = 16 + 4 = 20$

CD = 20−−√ = 25–√$CD = \sqrt{20} = 2\sqrt{5}$

21. From the adjoining figure find the area of shaded portion



Ans: From the figure,

Area of shaded portion = [Area of rectangle with l = 24$l = 24$, b = 10$b = 10$] – [Area of rectangle with b = 6$b = 6$, l = 10$l = 10$+ Area of square with side = 4$4$]

Area of big rectangle = l×b$l \times b$

= 24×10 = 240cm2$24 \times 10 = 240\text{cm}^2$

Area of small rectangle = l×b$l \times b$

= 6×10 = 60cm2$6 \times 10 = 60\text{cm}^2$

Area of squares = 4×4 = 16cm2$4 \times 4 = 16\text{cm}^2$

Therefore, Area of shaded portion = 240 - (60 + 16)$240 - (60 + 16)$

= 240 - 76 = 164cm2$240 - 76 = 164\text{cm}^2$

22. A flooring tile has a shape of a parallelogram whose base is 28cm28cm and the corresponding height is 20cm20cm. How many such tiles are required to cover a floor of area 2800m2$2800\text{m}^2$.

Ans: Given, Base = 28cm28cm , height = 20cm20cm

Area of floor = 2800m2$2800\text{m}^2$

= 2800×104cm2 = 28×106cm2$2800 \times 10^4\text{cm}^2 = 28 \times 10^6\text{cm}^2$

Area of each parallelogram tile = base × height

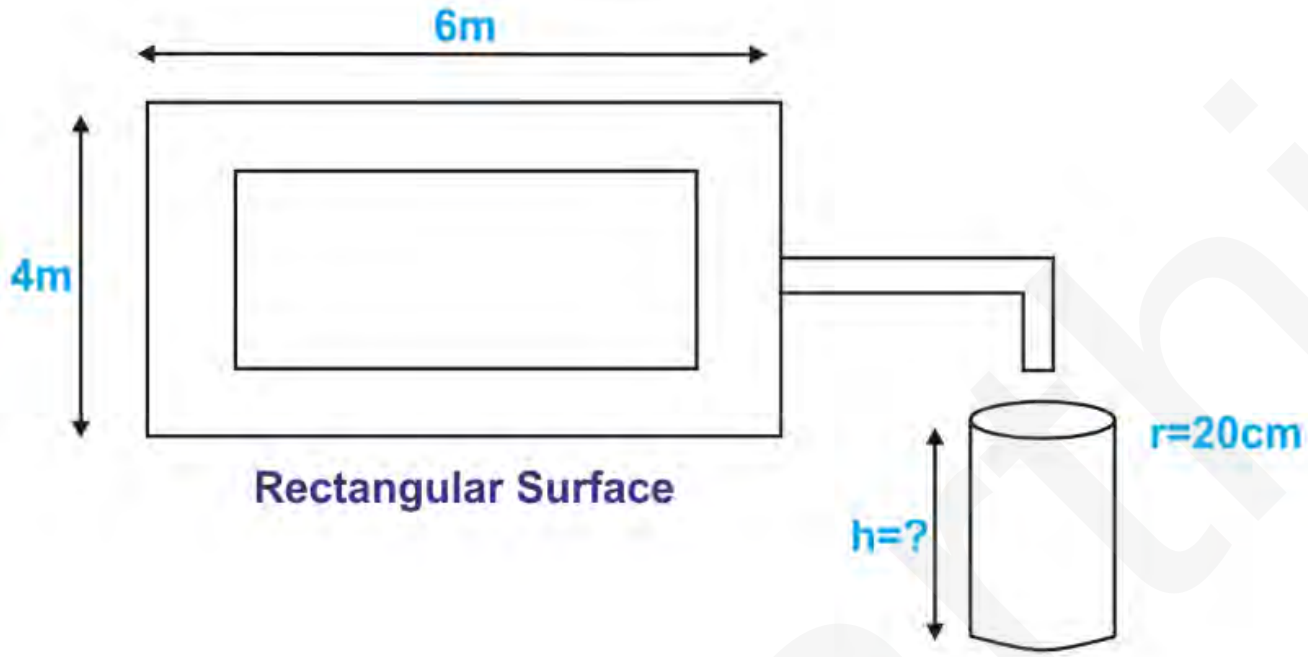
= 28×20 = 560cm2$28 \times 20 = 560\text{cm}^2$

Number of tiles required = AreaoffloorAreaoftiles = 28×106560$\frac{\text{Areaoffloor}}{\text{Areaoftiles}} = \frac{28 \times 10^6}{560}$ =

1052 = 1000002 = 50000$\frac{10^5}{2} = \frac{100000}{2} = 50000$

23. Rain water which falls on a flat rectangular surface of length 6m6m and breadth 4m4m is transferred into a cylindrical vessel of internal radius 20cm20cm. What will be the height of water in the cylindrical vessel if the rain fall is 1cm1cm (Take π = 3.14$\pi = 3.14$)

Ans:



Since the water in the rectangular surface is transferred to the cylindrical vessel.

Length of surface = 6m = 600cm$6\text{m} = 600\text{cm}$

Breadth of surface = 4m = 400cm$4\text{m} = 400\text{cm}$

Height of water level = 1cm1cm

Volume of water on the surface = l×b×hl × b × h

=600 × 400 × 1=240000 cm3

$$= 600 \times 400 \times 1$$
$$= 240000\ \text{cm}^3$$

Let 'hh' be the height of the cylindrical vessel, r = 20cm$r = 20\text{cm}$ (radius of cylindrical vessel)

Volume of cylindrical vessel = πr2h$\pi r^2 h$

= π(20)2×h$\pi(20)^2 \times h$

Volume of water on surface = Volume of water in cylindrical vessel

24000 = π(20)2×h$24000 = \pi(20)^2 \times h$

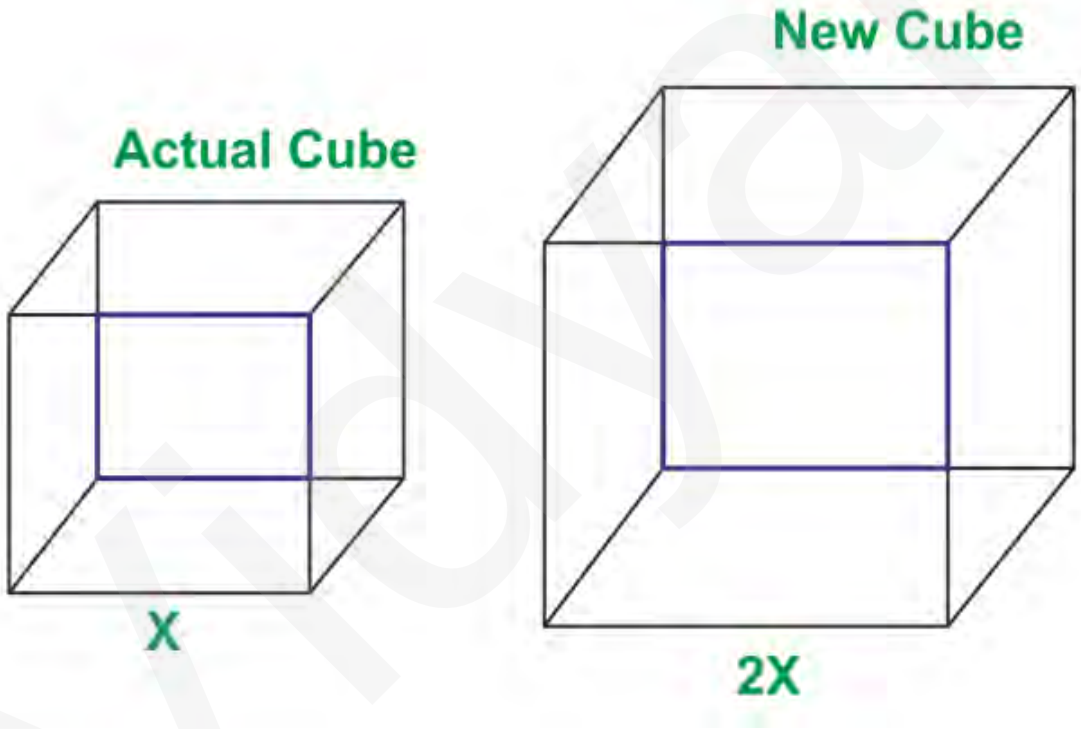
h = 24000π×20×20 = 191.08cmh $= \frac{24000}{\pi \times 20 \times 20} = 191.08\text{cm}$

24. If each edge of a cube is doubled

(a) how many times will its surface area increases

(b) how many times will its volume increases

Ans:



For side of 'x' units, surface area s1 = 6x2$s_1 = 6x^2$

When side of cube is doubled (2x2x units)

Surface area s2 = 6(2x)2$s_2 = 6(2x)^2$

s2 = 6×4(x)2 = 4(6x2) = 4s1$s_2 = 6 \times 4(x)^2 = 4(6x^2) = 4s_1$

Surface area increases by 44 times.

Volume for edge of 'xx' units v1 = x3$v_1 = x^3$

Volume of cube when edge is doubled (2x)$(2x)$, v2 = (2x)3$v_2 = (2x)^3$

v2 = 8(x)3 = 8v1$v_2 = 8(x)^3 = 8v_1$

Therefore, volume increases by 8 times.

25. A box with measures 80cm×48cm×24cm$80\text{cm} \times 48\text{cm} \times 24\text{cm}$ is to be covered with a tarpaulin cloth how many metres of tarpaulin cloth of width 96cm96cm is required to cover 50 50 such boxes?

Ans: The box with l = 80cm,b = 48cm,h = 24cm$l = 80\text{cm}, b = 48\text{cm}, h = 24\text{cm}$

Total surface area = 2(lb + bh + hl)$2(\text{lb} + \text{bh} + \text{hl})$

= 2[(80×48) + (48×24) + (80×24)]$2[(80 \times 48) + (48 \times 24) + (80 \times 24)]$

= 2[3840 + 1152 + 1920]$2[3840 + 1152 + 1920]$

= 2[6912] = 13824cm2$2[6912] = 13824\text{cm}^2$

Length of cloth required = (Areaofboxbreadth)×50$(\frac{\text{Areaofbox}}{\text{breadth}}) \times 50$

= (1382496)×50 = 144×50$(\frac{13824}{96}) \times 50 = 144 \times 50$

= 7200cm = 72m$7200\text{cm} = 72\text{m}$