

WORK SHEET

INTERNATIONAL INDIAN SCHOOL, RIYADH

Example 3: The length of the diagonal of a square is $7\sqrt{2}$ cm. Find the length of its side and also the area of the square.

We have, diagonal of a square = $7\sqrt{2}$ cm

$$\Rightarrow a\sqrt{2} = 7\sqrt{2} \text{ cm, where } a \text{ is a side of a square.}$$

$$\Rightarrow a = \frac{7\sqrt{2}}{\sqrt{2}} = 7 \text{ cm}$$

$$\Rightarrow a = 7 \text{ cm}$$

$$\text{Area of the square} = a^2 = (7 \text{ cm})^2 = 49 \text{ cm}^2.$$

Example 4: The length, breadth and height of a room are 10 m, 12 m and 8 m respectively. Find the length of the diagonal of the room.

Length = 10 m; Breadth = 12 m; Height = 8 m

$$\text{Length of the diagonal} = \sqrt{l^2 + b^2 + h^2}$$

$$= \sqrt{(10)^2 + (12)^2 + (8)^2} \text{ m} = \sqrt{308} \text{ m} = 17.549 \text{ m.}$$

Example 5: In Example 4, find the cost of whitewashing the four walls of it at the rate of ₹ 0.50 per m^2 .

$$\text{Area of the four walls} = 2h(l + b) \text{ sq unit}$$

$$= 2 \times 8 \times (10 + 12) \text{ m}^2 = 352 \text{ m}^2$$

$$\therefore \text{Cost of whitewashing at the rate of ₹ 0.50 per } \text{m}^2 = ₹ (352 \times 0.50) = ₹ 176.$$

Exercise 11.2

AREA & PERIMETER

- Find the area of the squares whose sides are.
 - 6.2 cm
 - 4.8 cm
 - 6.5 m
- Find the area of the rectangle whose length and breadth are as follows.
 - 4.5 cm, 5 cm
 - 7 dm, 6.3 dm
 - 4.6 m, 8 m
- The perimeter of a rectangle is 24 m and the area is 27 sq m. Find its length and breadth.
- The length of the diagonal of a square is $8\sqrt{2}$ cm. Find the length of its side and also the area of the square.
- Find the side of a square having area 3600 sq metre.
- The sides of a park are in the ratio 4 : 3. If its area is 1728 m^2 , find the cost of fencing it at the rate of ₹ 3 per metre.
- A rectangular floor has dimensions 125 cm \times 250 cm. Find the total number of square tiles of 5 cm required to cover the floor.
- Find the length of the diagonal of a room having dimensions 8 cm, 6 cm and 10 cm as length, breadth and height respectively.

9. Find the length of the longest rod that can be fitted into a cuboid having dimensions 1 m, 0.5 m and 0.75 m as length, breadth and height respectively.
10. The area of a rectangle is equal to the area of five similar squares. If the area of the rectangle is 125 m^2 , then find the length of each side of a square.
11. If a square of side 10 cm is folded into two equal halves, then find the area of the rectangle formed.
12. If the ratio of the length to the breadth is 6 : 5 and area of the rectangle is 1080 sq metre, then find its length and breadth.
13. The area of the four walls is 192 m^2 . The length and breadth of the room are 4 m and 4 m. Find the height of the wall.
14. The perimeter of a rectangle is 40 m. Find the area of a square having same perimeter.
15. If the dimensions of a conference hall are 40 m long, 30 m wide and 35 m high, then find the cost of whitewashing the four walls at the rate of ₹ 2.50 per m^2 .
16. Find the cost of whitewashing of the room of dimensions $15 \text{ m} \times 12 \text{ m} \times 10 \text{ m}$ at the rate of ₹ 2.50 per m^2 .

Areas of Paths

Let us learn to find the areas of rectangular paths made around (inside or outside) a rectangle. And also we shall learn to find areas of central paths, simply by using the formulae of rectangles and squares.

Solved Examples

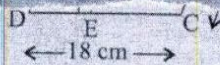


Fig. 11.16

5. One side of a parallelogram is 22 cm and the corresponding altitude is 12 cm. If the height of the altitude to the adjacent side is 11 cm, find the length of the adjacent side.
6. Find the area of a parallelogram, one of whose sides is 8 cm and its distance from the opposite side is 6 cm.
7. The area of a parallelogram is 126 cm^2 . If one side of a parallelogram is 14 cm, then find its distance from the opposite side.
8. The base of a parallelogram is 3 times its height. If the area of the parallelogram is 108 cm^2 , find the height and base of the parallelogram.

Area of a Triangle

In figure 11.17, ABC is a triangle, AE is the altitude corresponding to the base BC. Now draw $AD \parallel BC$ through A and $DC \parallel AB$ through C, and let them intersect at point D. Therefore, ABCD is a parallelogram having AC as its diagonal. We know that the diagonal of a parallelogram divides it into two congruent triangles.

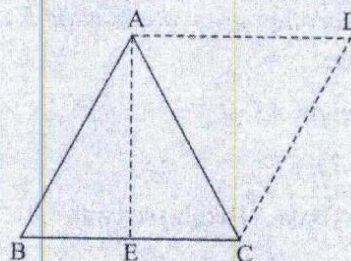


Fig. 11.17

$$\therefore \text{Area of } \triangle ABC = \text{Area of } \triangle ADC$$

Thus,

Area of the parallelogram = (Base \times Height) sq units

$$\Rightarrow \text{Base} = \frac{\text{Area of parallelogram}}{\text{Height}} \text{ units}$$

$$\Rightarrow \text{Height} = \frac{\text{Area of parallelogram}}{\text{Base}} \text{ units}$$

Solved Examples

Example 1: Find the area of a parallelogram one of whose sides is 20 cm and the corresponding altitude is 15 cm.

One side = 20 cm, Height = 15 cm

$$\therefore \text{Area of parallelogram} = \text{Base} \times \text{Height} = 20 \text{ cm} \times 15 \text{ cm} = \mathbf{300 \text{ sq cm.}}$$

Example 2: In figure 11.15, ABCD is a parallelogram where $BP \perp DC$ (extended) and $CQ \perp AD$. If $DC = 18$ cm, $AD = 12$ cm and $BP = 8$ cm, find CQ .

In parallelogram ABCD, we have base (DC) = 18 cm, and altitude (BP) = 8

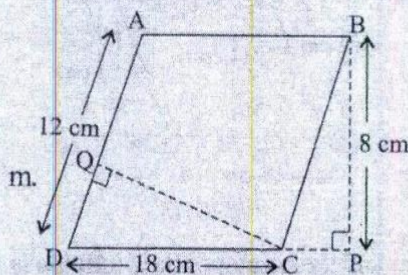


Fig. 11.15

$$\text{Area of a parallelogram} = \text{Base} \times \text{Height} = 18 \text{ cm} \times 8 \text{ cm} = 144 \text{ cm}^2$$

Now, taking AD as the base and CQ as the height

$$\text{Area of a parallelogram} = \text{Base} \times \text{Height} = AD \times CQ$$

$$\Rightarrow 144 \text{ cm}^2 = 12 \text{ cm} \times CQ$$

$$\Rightarrow CQ = \frac{144 \text{ cm}^2}{12 \text{ cm}} = \mathbf{12 \text{ cm.}}$$

Example 3: The base of a parallelogram is 5 cm and height is 3.5 cm. Find the area of the parallelogram.

$$\text{Area of a parallelogram} = (\text{Base} \times \text{Height}) \text{ sq units} = 5 \text{ cm} \times 3.5 \text{ cm} = \mathbf{17.5 \text{ sq cm.}}$$

Example 4: The base and height of a parallelogram are in ratio 3 : 2. If the area of the parallelogram is 54 m^2 , find the height and base.

We have, ratio of base to height = 3 : 2

Let base = $3x$ and height = $2x$

$$\therefore \text{Area of the parallelogram} = (\text{Base} \times \text{Height}) \text{ sq units}$$

$$\Rightarrow 3x \times 2x = 54 \text{ m}^2$$

Exercise 11.7

1. Find the area covered by a circular plate whose radius is 4.9 cm.
2. The area of a circular park is 525 sq m. Find the cost of levelling the field at ₹ 5 per m^2 .
3. Find the area of a circle whose radius is 28 cm.
4. Find the radius of the circular park if area of the park is 7546 sq m.
5. Find the area of a circle whose diameter is 7.7 cm.
6. In figure 11.32, the circular field is surrounded by a flower garden of 10 m width. If the radius of the circular field is 65 m, then find the area of the flower garden.

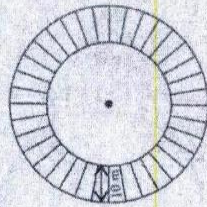


Fig. 11.32

7. Find the area of the shaded region of the concentric circles of radii 9 cm and 5 cm respectively as shown in figure 11.33.

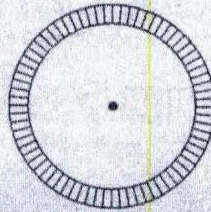


Fig. 11.33

8. The area enclosed by two concentric circles is 330 sq cm. If the radius of the smaller circle is 8 cm, then find the radius of the bigger circle.
9. The cost of turfing the circular field at the rate of ₹ 9 per sq m is ₹ 5544. Find the diameter of the field.
10. In Fig. 11.34, ABCD is a square. If a circle of radius 14 cm is inscribed in it, then find the area of the shaded region.

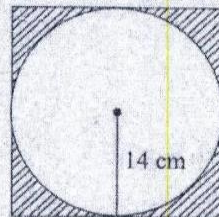


Fig. 11.34

11. The diameter of a circular park is 80 metres. A 4 m wide road runs outside around it. Find the cost of constructing the road at ₹ 10 per sq metre.

12. The shape of a park is in the form of a rectangle of length 18 cm and breadth 14 cm. If a circle is inscribed in it, then find the area of the shaded portion as shown in figure 11.35.

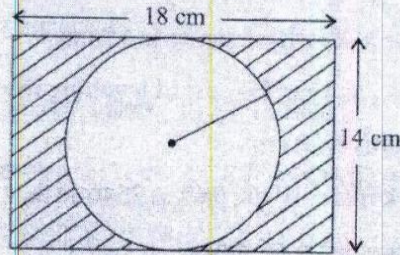


Fig. 11.35

13. Find the area of the shaded portion of figure 11.36.

[Hint: Consider $\sqrt{3} = 1.732$]

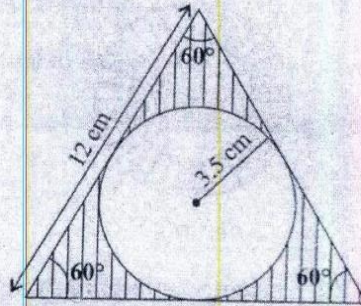


Fig. 11.36

QUICK RECALL

- Perimeter of a rectangle = $2(l + b)$
- Perimeter of a square = $4 \times \text{side}$
- Perimeter of a triangle = sum of all the three sides
- Circumference of a circle = πd or $2\pi r$
- Area of a rectangle = $l \times b$
- Area of a square = side \times side
- Diagonal of a rectangle = $\sqrt{l^2 + b^2}$
- Diagonal of a square = $\sqrt{2} \times (\text{side})^2$
- Area of four walls of a room = $2(l + b) \times h$
- Area of a triangle = $\frac{1}{2} \times \text{base} \times \text{corresponding height}$
- Area of an equilateral triangle = $\frac{\sqrt{3}}{4} \times (\text{side})^2$
- Hero's formula for area of triangle = $\sqrt{s(s-a)(s-b)(s-c)}$ where $s = \frac{a+b+c}{2}$ and a, b, c are the three sides of the triangle.



- Area of parallelogram = base \times height
- Area of trapezium = $\frac{1}{2} \times$ (sum of parallel sides) \times distance between the parallel sides
- Area of rhombus = $\frac{1}{2} \times$ product of the lengths of its diagonals
- Area of a circle = πr^2
- Area of a ring = $\pi(R^2 - r^2) = \pi(R - r)(R + r)$ where 'R' is the outer radius and 'r' is the inner radius.

Objective Type Questions

I. Multiple Choice Questions.

- If the area of a triangle with base 'b' is equal to the area of a square 's' which is on the same base then the altitude of the triangle is:

(i) $\frac{b}{2}$ (ii) $\sqrt{2}b$ (iii) b (iv) 2b
- The circumference of two concentric circles are 150 cm and 106 cm respectively. The difference between their radii is:

(i) 3.5 cm (ii) 44 cm (iii) 7 cm (iv) 16 cm
- A wheel makes 1000 revolution in covering a distance of 66 km. The radius of the wheel is:

(i) 21 m (ii) 66 m (iii) 10.5 m (iv) none of these
- One side of a rhombus is 10 cm and one of its diagonal is 16 cm. The area of the rhombus is:

(i) 96 cm² (ii) 192 cm² (iii) 52 cm² (iv) 160 cm²
- The area of a parallelogram is 620 cm² and one of its sides is 20 cm. The corresponding altitude will be:

(i) 16 cm (ii) 20 cm (iii) 31 cm (iv) 62 cm
- The area of a rectangle is given by:

(i) Length - Breadth (ii) Length + Breadth

(iii) Length \times Breadth (iv) $\frac{\text{Length}}{\text{Breadth}}$
- 1 km² is equal to:

(i) 10 hectares (ii) 1000 hectares (iii) 100 hectares (iv) none of these
- The measurement of the boundary of a plane figure is known as its:

(i) area (ii) perimeter (iii) both (i) and (ii) (iv) none of these

9. Area of a square is given by

- (i) $(\text{side})^3$ (ii) $(\text{side})^2$ (iii) $\sqrt{(\text{side})}$ (iv) none of these

10. The magnitude of the region enclosed by a plane figure is called its

- (i) perimeter (ii) area (iii) both (i) and (ii) (iv) none of these

II. Fill in the blanks.

11. The area of a parallelogram is equal to _____.

12. Perimeter of an equilateral triangle is _____.

13. The _____ of a circle is equal to $2\pi r$.

14. The magnitude of the plane region enclosed by a simple closed figure is called the _____ of that figure.

15. 1 hectare = _____ ares = _____ m^2 .

16. Perimeter of a rectangle is equal to _____.

17. Perimeter of a square is equal to _____.

18. $1 \text{ cm}^2 =$ _____ mm^2 .

19. $1 \text{ dam}^2 =$ _____ m^2 .

20. 1 are is equal to _____ m^2 .

III. Tick (✓) for 'True' and (X) for 'False'.

21. The standard unit of area is square unit.

22. The area of trapezium is given by $\frac{1}{2}(b_1 + b_2) \times h$.

23. One revolution of a wheel is equal to the circumference of the wheel.

24. The diagonals of a square are not equal in length.

25. The perimeter of a circle is called circumference.

26. For a square of side 4 cm, perimeter and area are both equal.

27. 1 hectare = 100 ares.

28. Area is measured in cubic units.

29. The area of a square of side 8 m is 128 m^2 .

30. $1 \text{ m}^2 = 10000 \text{ cm}^2$.