MATHEMATICS

Chapter 11: Perimeter and Area

Important Questions

Multiple Choice Questions-

Question 1. Perimeter of a square =

(a) side × side

(b) 3 × side

(c) 4 × side

(d) 2 × side

Question 2. Perimeter of a rectangle of length Z and breadth 6 is

(a) l + b

(b) 2 × (l + b)

(c) 3 × (l + b)

(d) l × b

Question 3. Area of a square =

(a) side × side

(b) 2 × side

(c) 3 × side

(d) 4 × side

Question 4. Area of a rectangle of length l and breadth b is

(a) l × b

(b) l + b

(c) 2 × (l + b)

(d) 6 × (l + b)

Question 5. Area of a parallelogram =

(a) base × height

(b) $\frac{1}{2}$ × base × height

(c) $\frac{1}{3}$ × base × height

(d) $\frac{1}{4}$ × base × height

Question 6. Area of a triangle =

(a) base × height

(b) $\frac{1}{2}$ × base × height

(c) $\frac{1}{3}$ × base × height

(d) $\frac{1}{4}$ × base × height

Question 7. The circumference of a circle of radius r is

(a) πr

(b) 2πr

(c) πr^2

(d) $\frac{1}{4}$ πr^2

Question 8. The circumference of a circle of diameter d is

(a) πd

(b) 2πd

(c) $\frac{1}{2}$ πd

(d) πd^2

Question 9. If r and d are the radius and diameter of a circle respectively, then

(a) d = 2 r

(b) d = r

(C) d = $\frac{1}{2}$ r

(d) $d = r^2$

Question 10. The area of a circle of radius r is

(a) πr^2

(b) $2\pi r^2$

(c) 2πr

(d) $4\pi r^2$

Question 11. The area of a circle of diameter d is

(a) πd^2

(b) $2\pi d^2$

(c) $\frac{1}{4}\pi d^2$

(d) 2πd

Question 12. 1 cm^2 =

(a) 10 mm^2

(b) 100 mm^2

(c) 1000 mm^2

(d) 10000 mm^2

Question 13. 1 m^2 =

(a) 10 cm^2

(b) 100 cm^2

(c) 1000 cm^2

(d) 10000 cm^2

Question 14. 1 hectare =

(a) 10 m^2

(b) 100 m^2

(c) 1000 m^2

(d) 10000 m^2

Question 15. 1 are =

(a) 10 m^2

(b) 100 m^2

(c) 1000 m^2

(d) 10000 m^2

Very Short Questions:

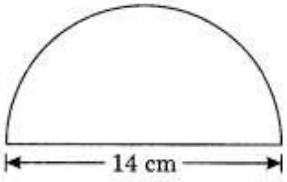
1. The side of a square is 2.5 cm. Find its perimeter and area.
2. If the perimeter of a square is 24 cm. Find its area.
3. If the length and breadth of a rectangle are 36 cm and 24 cm respectively. Find

   (i) Perimeter

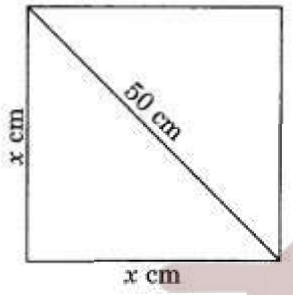
   (ii) Area of the rectangle.
4. The perimeter of a rectangular field is 240 m. If its length is 90 m, find:

   (i) it's breadth

   (ii) it's are
5. The length and breadth of a rectangular field are equal to 600 m and 400 m respectively. Find the cost of the grass to be planted in it at the rate of ₹ 2.50 per m^2.
6. The perimeter of a circle is 176 cm, find its radius.
7. The radius of a circle is 3.5 cm, find its circumference and area.
8. Area of a circle is 154 cm^2, find its circumference.
9. Find the perimeter of the figure given below.



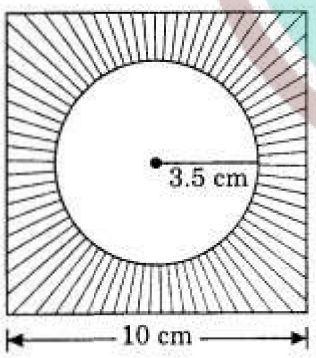
10. The length of the diagonal of a square is 50 cm, find the perimeter of the square.



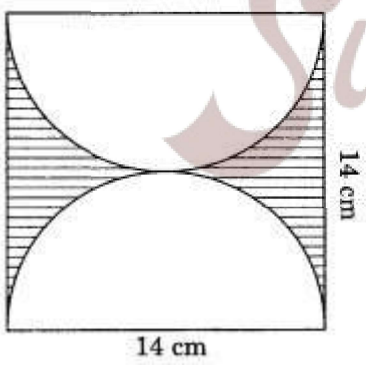
Short Questions :

1. A wire of length 176 cm is first bent into a square and then into a circle. Which one will have more area?

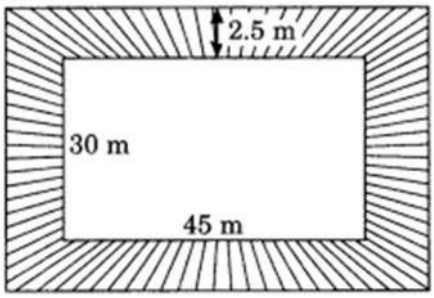
2. In the given figure, find the area of the shaded portion.



3. Find the area of the shaded portion in the figure given below.



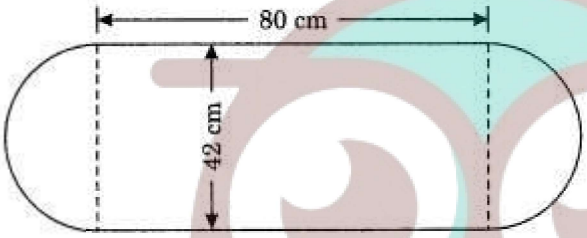
4. A rectangle park is 45 m long and 30 m wide. A path 2.5 m wide is constructed outside the park. Find the area of the path.



5. In the given figure, calculate:

(a) the area of the whole figure.

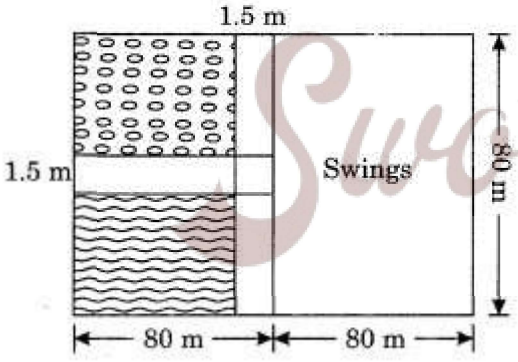
(b) the total length of the boundary of the field.



6. How many times a wheel of radius 28 cm must rotate to cover a distance of 352 m? (Take $\pi = \frac{22}{7}$)

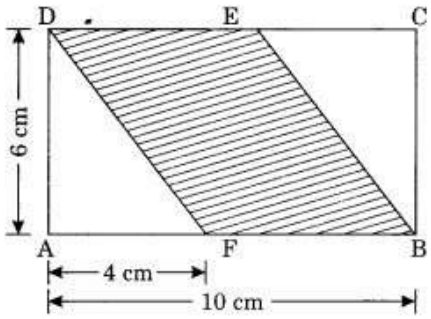
Long Questions :

1. A nursery school playground is 160 m long and 80 m wide. In it 80 m × 80 m is kept for swings and in the remaining portion, there are 1.5 m wide path parallel to its width and parallel to its remaining length as shown in Figure. The remaining area is covered by grass. Find the area covered by grass.

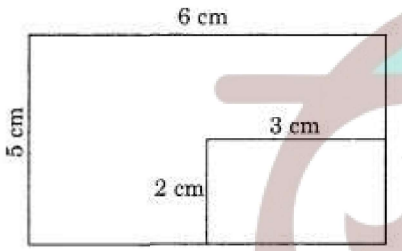


2. Rectangle ABCD is formed in a circle as shown in Figure. If AE = 8 cm and AD = 5 cm, find the perimeter of the rectangle.

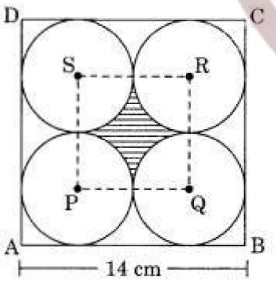
3. Find the area of a parallelogram-shaped shaded region. Also, find the area of each triangle. What is the ratio of the area of shaded portion to the remaining area of the rectangle?



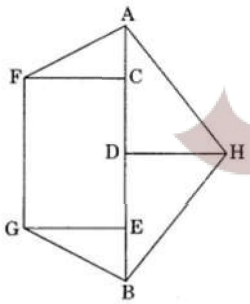
4. A rectangular piece of dimension 3 cm × 2 cm was cut from a rectangular sheet of paper of dimensions 6 cm × 5 cm. Find the ratio of the areas of the two rectangles.



5. In the given figure, ABCD is a square of side 14 cm. Find the area of the shaded region. (Take $\pi = \frac{22}{7}$)



6. Find the area of the following polygon if AB = 12 cm, AC = 2.4 cm, CE = 6 cm, AD = 4.8 cm, CF = GE = 3.6 cm, DH = 2.4 cm.



Answer Key-

Multiple Choice questions-

1. (c) 4 × side
2. (b) 2 × (l + b)
3. (a) side × side
4. (a) l × b
5. (a) base × height
6. (b) $\frac{1}{2}$ × base × height
7. (b) 2πr
8. (a) πd
9. (a) d = 2 r
10. (a) πr^2
11. (c) $\frac{1}{4}\pi d^2$
12. (b) 100 mm^2
13. (d) 10000 cm^2
14. (d) 10000 m^2
15. (b) 100 m^2

Very Short Answer :

1. Side of the square = 2.5 cm

   Perimeter = 4 × Side = 4 × 2.5 = 10 cm

   Area = (side)2 = (4)2 = 16 cm^2
2. Perimeter of the square = 24 cm

   Side of the square = $\frac{24}{4}$ cm = 6 cm

   Area of the square = $(Side)^2 = (6)^2$ cm^2 = 36 cm^2
3. Length = 36 cm, Breadth = 24 cm

   (i) Perimeter = 2(l + b) = 2(36 + 24) = 2 × 60 = 120 cm

   (ii) Area of the rectangle = l × b = 36 cm × 24 cm = 864 cm^2
4. (i) Perimeter of the rectangular field = 240 m

   2(l + b) = 240 m

   l + b = 120 m

   90 m + b = 120 m

b = 120 m – 90 m = 30 m

So, the breadth = 30 m.

(ii) Area of the rectangular field = l × b = 90 m × 30 m = 2700 m^2

So, the required area = 2700 m^2

5. Length = 600 m, Breadth = 400 m

Area of the field = l × b = 600 m × 400 m = 240000 m^2

Cost of planting the grass = ₹ 2.50 × 240000 = ₹ 6,00,000

Hence, the required cost = ₹ 6,00,000.

6. The perimeter of the circle = 176 cm

$$2\pi r = 176$$

$$2 \times \frac{22}{7} \times r = 176$$

$$\therefore r = \frac{176 \times 7}{2 \times 22} = 4 \times 7 = 28 \text{ cm}$$

7. Radius = 3.5 cm

Circumference = 2πr

$$= 2 \times \frac{22}{7} \times 3.5 = 22 \text{ cm}$$

$$\text{Area} = \pi r^2$$

$$= \frac{22}{7} \times 3.5 \times 3.5$$

$$= \frac{77}{2} = 38.5 \text{ cm}^2$$

8. Area of the circle = 154 cm^2

$$\pi r^2 = 154$$

$$\frac{22}{7} \times r^2 = 154$$

$$r^2 = 154 \times \frac{7}{22}$$

$$r^2 = 7 \times 7$$

$$r^2 = (7)^2$$

$$r^2 = (7)^2$$

$$\Rightarrow \quad r = 7 \text{ cm}$$

$$\text{Circumference of the circle} = 2\pi r$$

$$= 2 \times \frac{22}{7} \times 7 = 44 \text{ cm}$$

9. Perimeter of the given figure = Circumference of the semicircle + diameter

= πr + 2r

$= \frac{22}{7} \times 7 + 2 \times 7$

= 22 + 14

= 36 cm

Hence, the required perimeter = 36 cm.

10. Let each side of the square be x cm.

$x^2 + x^2 = (50)^2$ [Using Pythagoras Theorem]

$2x^2 = 2500$

$x^2 = 1250$

2	1250
5	625
5	125
5	25
5	5
	1

$x = \sqrt{1250} = \sqrt{2 \times 5 \times 5 \times 5 \times 5}$

$x = 5 \times 5 \times \sqrt{2} = 25\sqrt{2}$

The side of the square = $25\sqrt{2}$ cm

Perimeter of the square = 4 × side = $4 \times 25\sqrt{2} = 100\sqrt{2}$ cm

Short Answer :

1. Length of the wire = 176 cm

Side of the square = 176 ÷ 4 cm = 44 cm

Area of the square = $(\text{Side})^2 = (44)^2$ cm^2 = 1936 cm^2

Circumference of the circle = 176 cm

$$2\pi r = 176 \text{ cm}$$

$$2 \times \frac{22}{7} \times r = 176 \text{ cm}$$

$$r = \frac{176 \times 7}{2 \times 22} = 28 \text{ cm}$$

$\therefore$ Area of the circle = πr^2

$$= \frac{22}{7} \times 28 \times 28 = 2464 \text{ cm}^2$$

Since 2464 cm^2 > 1936 cm^2

Hence, the circle will have more area.

2. Area of the square = $(\text{Side})^2$ = 10 cm × 10 cm = 100 cm^2

Area of the circle = πr^2

= $\frac{22}{7}$ × 3.5 × 3.5

= $\frac{77}{2}$ cm^2

= 38.5 cm^2

Area of the shaded portion = 100 cm^2 – 38.5 cm^2 = 61.5 cm^2

3. Area of the rectangle = l × b = 14 cm × 14 cm = 196 cm^2

Radius of the semicircle = $\frac{14}{2}$ = 7 cm

Area of two equal semicircle = $2 \times \frac{1}{2}\pi r^2$

= πr^2

= $\frac{22}{7}$ × 7 × 7

= 154 cm^2

Area of the shaded portion = 196 cm^2 – 154 cm^2 = 42 cm^2

4. Length of the rectangular park = 45 m

Breadth of the park = 30 m

Area of the park = l × 6 = 45m × 30m = 1350 m^2

Length of the park including the path = 45 m + 2 × 2.5 m = 50 m

Breadth of the park including the path = 30 m + 2 × 2.5 m = 30m + 5m = 35m

Area of the park including the path = 50 m × 35 m = 1750 m^2

Area of the path = 1750 m^2 – 1350 m^2 = 400 m^2

Hence, the required area = 400 m^2.

5. Area of the rectangular portions = l × b = 80 cm × 42 cm = 3360 cm^2

Area of two semicircles = $2 \times \frac{1}{2}\pi r^2 = \pi r^2$

= $\frac{22}{7} \times 21 \times 21$

= 22 × 3 × 21

= 1386 cm^2

Total area = 3360 cm^2 + 1386 cm^2 = 4746 cm^2

Total length of the boundary of field = (2 × 80 + πr + πr) cm

= $(160 + \frac{22}{7} \times 21 + \frac{22}{7} \times 21)$

= (160 + 132) cm

= 292 cm

Hence, the required (i) area = 4746 cm^2 and (ii) length of boundary = 292 cm.

6. Radius of the wheel = 28 cm

Circumference $= 2\pi r = 2 \times \frac{22}{7} \times 28 = 176$ cm

Distance to be covered = 352 m or 352 × 100 = 35200 m

Number of rotation made by the wheel to cover the given distance $= \frac{35200}{176} = 200$

Hence, the required number of rotations = 200.

Long Answer :

1. Area of the playground = l × b = 160 m × 80 m = 12800 m^2

Area left for swings = l × b = 80m × 80m = 6400 m^2

Area of the remaining portion = 12800 m^2 – 6400 m^2 = 6400 m^2

Area of the vertical road = 80 m × 1.5 m = 120 m^2

Area of the horizontal road = 80 m × 1.5 m = 120 m^2

Area of the common portion = 1.5 × 1.5 = 2.25 m^2

Area of the two roads = 120 m^2 + 120 m^2 – 2.25 m^2 = (240 – 2.25) m^2 = 237.75 m^2

Area of the portion to be planted by grass = 6400 m^2 – 237.75 m^2 = 6162.25 m^2

Hence, the required area = 6162.25 m^2.

2. DE (Radius) = AE + AD = 8 cm + 5 cm = 13 cm

DB = AC = 13 cm (Diagonal of a rectangle are equal)

In right ΔADC,

$AD^2 + DC^2 = AC^2$ (By Pythagoras Theorem)

$\Rightarrow (5)^2 + DC^2 = (13)^2$

$\Rightarrow 25 + DC^2 = 169$

$\Rightarrow DC^2 = 169 - 25 = 144$

$\Rightarrow DC = \sqrt{144} = 12$ cm

Perimeter of rectangle ABCD = 2(AD + DC)

= 2(5 cm + 12 cm)

= 2 × 17 cm

= 34 cm

3. Here, AB = 10 cm

AF = 4 cm

FB = 10 cm – 4 cm = 6 cm

Area of the parallelogram = Base × Height = FB × AD = 6 cm × 6 cm = 36 cm^2

Hence, the required area of shaded region = 36 cm^2.

Area $\Delta DEF = \frac{1}{2} \times b \times h$

$= \frac{1}{2} \times AF \times AD$

$= \frac{1}{2} \times 4 \times 6$

= 12 cm^2

Area $\Delta BEC = \frac{1}{2} \times b \times h$

$= \frac{1}{2} \times GC \times BC$

$= \frac{1}{2} \times 4 \times 6$

= 12 cm^2

Area of Rectangle ABCD = l × b = 10 cm × 6 cm = 60 cm^2

Remaining area of Rectangle = 60 cm^2 – 36 cm^2 = 24 cm^2

Required Ratio = 36 : 24 = 3 : 2

4. Length of the rectangular piece = 6 cm

Breadth = 5 cm

Area of the sheet = l × b = 6 cm × 5 cm = 30 cm^2

Area of the smaller rectangular piece = 3 cm × 2 cm = 6 cm^2

Ratio of areas of two rectangles = 30 cm^2 : 6 cm^2 = 5 : 1

5. $PQ = \frac{1}{2} AB = \frac{1}{2} \times 14 = 7$ cm

PQRS is a square with each side 7 cm

Radius of each circle $= \frac{7}{2}$ cm

Area of the quadrants of each circle $= \frac{1}{4} \times \pi r^2$

Area of the four quadrants of all circles

$$= 4 \times \frac{1}{4}\pi r^2 = \pi r^2 = \frac{22}{7} \times \frac{7}{2} \times \frac{7}{2}$$

$$= \frac{77}{2} \text{ cm}^2 = 38.5 \text{ cm}^2$$

Area of the square PQRS = Side × Side = 7 cm × 7 cm = 49 cm^2

Area of the shaded portion = 49 cm^2 – 38.5 cm^2 = 10.5 cm^2

Hence, the required area = 10.5 cm^2.

6. BE = AB – AE

= 12 cm – (AC + CE)

= 12 cm – (2.4 cm + 6 cm)

= 12 cm – 8.4 cm

= 3.6 cm

$$= \frac{1}{2} \times 3.6 \times 3.6 = 6.48 \text{ cm}^2$$

$$\text{Area of } \Delta ABH = \frac{1}{2} \times b \times h = \frac{1}{2} \times AB \times DH$$

$$= \frac{1}{2} \times 12 \times 2.4 \text{ cm} = 14.4 \text{ cm}^2$$

$$\text{Area of } \Delta ACF = \frac{1}{2} \times b \times h = \frac{1}{2} \times CF \times AC$$

$$= \frac{1}{2} \times 3.6 \times 2.4 = 4.32 \text{ cm}^2$$

$$\text{Area of the rectangle FCEG} = l \times b$$

$$= CE \times CF$$

$$= 6 \text{ cm} \times 3.6 = 21.6 \text{ cm}^2$$

$$\text{Area of } \Delta GEB = \frac{1}{2} \times b \times h = \frac{1}{2} \times BE \times GE$$

$$= \frac{1}{2} \times 3.6 \times 3.6 = 6.48 \text{ cm}^2$$

$$\text{Area of } \Delta ABH = \frac{1}{2} \times b \times h = \frac{1}{2} \times AB \times DH$$

$$= \frac{1}{2} \times 12 \times 2.4 \text{ cm} = 14.4 \text{ cm}^2$$

Area of the polygon AFGBH = Area of ΔACF + Area of rectangle FCEG + Area of ΔGEB + Area of ΔABH

= 3.6 cm^2 + 4.32 cm^2 + 21.6 cm^2 + 6.48 cm^2 + 14.4 cm^2

= 50.40 cm^2

Hence, the required area = 50.40 cm^2.