



ST. MARY'S CO-ED SCHOOL, HARDA

[2020-21]

CLASS- VI

SUBJECT- MATHS

CHAPTER- 21

CONCEPT OF PERIMETER AND AREA

EXERCISE 21 – A

Question 1:

Find the perimeter of a rectangle in which:

- (i) length = 16.8 cm and breadth = 6.2 cm
- (ii) length = 2 m 25 cm and breadth = 1 m 50 cm
- (iii) length = 8 m 5 dm and breadth = 6 m 8 dm

ANSWER:

Perimeter of a rectangle = $2 \times (\text{Length} + \text{Breadth})$

(i) Length = 16.8 cm

Breadth = 6.2 cm

$$\begin{aligned}\text{Perimeter} &= 2 \times (\text{Length} + \text{Breadth}) \\ &= 2 \times (16.8 + 6.2) = 46 \text{ cm}\end{aligned}$$

(ii) Length = 2 m 25 cm

$$\begin{aligned}&= (200 + 25) \text{ cm} \quad (1 \text{ m} = 100 \text{ cm}) \\ &= 225 \text{ cm}\end{aligned}$$

Breadth = 1 m 50 cm

$$\begin{aligned}&= (100 + 50) \text{ cm} \quad (1 \text{ m} = 100 \text{ cm}) \\ &= 150 \text{ cm}\end{aligned}$$

$$\begin{aligned}\text{Perimeter} &= 2 \times (\text{Length} + \text{Breadth}) \\ &= 2 \times (225 + 150) = 750 \text{ cm}\end{aligned}$$

(iii) Length = 8 m 5 dm

$$\begin{aligned}&= (80 + 5) \text{ dm} \quad (1 \text{ m} = 10 \text{ dm}) \\ &= 85 \text{ dm}\end{aligned}$$

Breadth = 6 m 8 dm

$$\begin{aligned}&= (60 + 8) \text{ dm} \quad (1 \text{ m} = 10 \text{ dm}) \\ &= 68 \text{ dm}\end{aligned}$$

$$\begin{aligned}\text{Perimeter} &= 2 \times (\text{Length} + \text{Breadth}) \\ &= 2 \times (85 + 68) = 306 \text{ dm}\end{aligned}$$

Question 2:

Find the cost of fencing a rectangular field 62 m long and 33 m wide at Rs 16 per metre.

ANSWER:

Length of the field = 62 m

Breadth of the field = 33 m

Perimeter of the field = $2(l + b)$ units
 $= 2(62 + 33) \text{ m} = 190 \text{ m}$

Cost of fencing per metre = Rs 16

Total cost of fencing = $\text{Rs } (16 \times 190) = \text{Rs } 3040$

Question 3:

The length and the breadth of a rectangular field are in the ratio 5 : 3. If its perimeter is 128 m, find the dimensions of the field.

ANSWER:

Let the length of the rectangle be $5x$ m.

Breadth of the rectangle = $3x$ m

Perimeter of the rectangle = $2(l + b)$
 $= 2(5x + 3x) \text{ m}$
 $= (16x) \text{ m}$

It is given that the perimeter of the field is 128 m.

$\therefore 16x = 128 \Rightarrow x = \frac{128}{16} = 8$
 $\therefore \text{Length} = (5 \times 8) = 40 \text{ m}$
 $\text{Breadth} = (3 \times 8) = 24 \text{ m}$

Question 4:

The cost of fencing a rectangular field at Rs 18 per metre is Rs 1980. If the width of the field is 23 m, find its length.

ANSWER:

Total cost of fencing = Rs 1980

Rate of fencing = Rs 18 per metre

Perimeter of the field

$= \frac{\text{Total cost}}{\text{Rate}} = \frac{\text{Rs } 1980}{\text{Rs } 18/\text{m}} = (1980/18) \text{ m} = 110 \text{ m}$
 $\text{Total cost} = \text{Rs } 1980$
 $\text{Rate} = \text{Rs } 18/\text{m}$
 $(1980/18) \text{ m} = 110 \text{ m}$

Let the length of the field be x metre.

Perimeter of the field = $2(x + 23) \text{ m}$

$$\therefore 2(x+23)=110 \Rightarrow (x+23)=55 \Rightarrow x=(55-23)=32$$

Hence, the length of the field is 32 m.

Question 5:

The length and the breadth of a rectangular field are in the ratio 7 : 4. The cost of fencing the field at Rs 25 per metre is Rs 3300. Find the dimensions of the field.

ANSWER:

Total cost of fencing = Rs 3300

Rate of fencing = Rs 25/m

Perimeter of the field

$$= \frac{\text{Total cost}}{\text{Rate of fencing}} = \frac{\text{Rs } 3300}{\text{Rs } 25/\text{m}} = 132 \text{ m}$$

Let the length and the breadth of the rectangular field be $7x$ and $4x$, respectively.

$$\text{Perimeter of the field} = 2(7x + 4x) = 22x$$

It is given that the perimeter of the field is 132 m.

$$\therefore 22x = 132 \Rightarrow x = \frac{132}{22} = 6$$

$$\therefore \text{Length of the field} = (7 \times 6) \text{ m} = 42 \text{ m} \quad \text{Breadth of the field} = (4 \times 6) \text{ m} = 24 \text{ m}$$

$$\therefore 22x = 132 \Rightarrow x = 132 / 22 = 6$$

$$\therefore \text{Length of the field} = (7 \times 6) \text{ m} = 42 \text{ m} \quad \text{Breadth of the field} = (4 \times 6) \text{ m} = 24 \text{ m}$$

Question 6:

Find the perimeter of a square, each of whose sides measures:

- (i) 3.8 cm
- (ii) 4.6 cm
- (iii) 2 m 5 dm

ANSWER:

(i) Side of the square = 3.8 cm

$$\begin{aligned} \text{Perimeter of the square} &= (4 \times \text{side}) \\ &= (4 \times 3.8) = 15.2 \text{ cm} \end{aligned}$$

(ii) Side of the square = 4.6 cm
Perimeter of the square = $(4 \times \text{side})$
 $= (4 \times 4.6) = 18.4 \text{ cm}$

(iii) Side of the square = 2 m 5 dm
 $= (20+5) \text{ dm}$ (1 m = 10 dm)
 $= 25 \text{ dm}$
Perimeter of the square = $(4 \times \text{side})$
 $= (4 \times 25) = 100 \text{ dm}$

Question 7:

The cost of putting a fence around a square field at Rs 35 per metre is Rs 4480. Find the length of each side of the field.

ANSWER:

Total cost of fencing = Rs 4480
Rate of fencing = Rs 35/m
Perimeter of the field
 $= \frac{\text{Total cost}}{\text{Rate}} = \frac{\text{Rs } 4480}{\text{Rs } 35/\text{m}} = 128 \text{ m}$

Let the length of each side of the field be x metres.
Perimeter = $(4x)$ metres
 $\therefore 4x = 128 \Rightarrow x = \frac{128}{4} = 32$

Hence, the length of each side of the field is 32 m.

Question 8:

Each side of a square field measures 21 m. Adjacent to this field, there is a rectangular field having its sides in the ratio 4 : 3. If the perimeters of both the fields are equal, find the dimensions of the rectangular field.

ANSWER:

Side of the square field = 21m
Perimeter of the square field = $(4 \times 21) \text{ m}$
 $= 84 \text{ m}$

Let the length and the breadth of the rectangular field be $4x$ and $3x$, respectively.
Perimeter of the rectangular field = $2(4x + 3x) = 14x$

Perimeter of the rectangular field = Perimeter of the square field

$$\therefore 14x = 84 \Rightarrow x = 84/14 = 6$$

$$\therefore \text{Length of the rectangular field} = (4 \times 6) \text{ m} = 24 \text{ m}$$

$$\text{Breadth of the rectangular field} = (3 \times 6) \text{ m} = 18 \text{ m}$$

EXERCISE 21-B

Question 1:

Find the circumference of a circle whose radius is

(i) 28 cm

(ii) 10.5 cm

(iii) 3.5 m

ANSWER:

(i) Radius, $r = 28$ cm

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

$$= (2 \times 22/7 \times 28)$$

$$= 176 \text{ cm} \text{ Hence, the circumference of the given circle is 176 cm.}$$

Question 3:

Find the radius of a circle whose circumference is 176 cm.

ANSWER:

Let the radius of the given circle be r cm.

Circumference of the circle = 176 cm

$$\text{Circumference} = 2\pi r$$

$$\therefore 2\pi r = 176 \Rightarrow r = 176/2\pi \Rightarrow r = (176/2 \times 7/22) \Rightarrow r = 28$$

The radius of the given circle is 28 cm

$$\therefore 2\pi r = 176 \Rightarrow r = 176/2\pi \Rightarrow r = (176 \times 7/22) \Rightarrow r = 28$$

The radius of the given circle is 28 cm.

Question 4:

Find the diameter of a wheel whose circumference is 264 cm.

ANSWER:

Let the radius of the circle be r cm.

$$\text{Diameter} = 2 \times \text{Radius} = 2r \text{ cm}$$

$$\text{Circumference of the wheel} = 264 \text{ cm}$$

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

$$\therefore 2\pi r = 264 \Rightarrow 2r = 264 \pi \Rightarrow 2r = (264 \times 7/22) \Rightarrow 2r = 84$$

Diameter of the given wheel is 84 cm.

Question 5:

Find the distance covered by the wheel of a car in 500 revolutions if the diameter of the wheel is 77 cm.

ANSWER:

$$\text{Radius of the wheel} = \text{Diameter of the wheel} / 2$$

$$r = 77 / 2 \text{ cm}$$

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

$$= (2 \times 22/7 \times 77/2) = 242 \text{ cm}$$

In 1 revolution the wheel covers a distance equal to its circumference.

$$\therefore \text{Distance covered by the wheel in 1 revolution} = 242 \text{ cm}$$

$$\therefore \text{Distance covered by the wheel in 500 revolutions} = (500 \times 242) \text{ cm} \\ = 121000 \text{ cm}$$

$$= 1210 \text{ m} \quad (100 \text{ cm} = 1 \text{ m})$$

$$= 1.21 \text{ km} \quad (1000 \text{ m} = 1 \text{ km})$$

Question 6:

The diameter of the wheel of a car is 70 cm. How many revolutions will it make to travel 1.65 km?

ANSWER:

Radius of the wheel(r)=Diameter of the wheel / 2

$$r=70/2\text{cm}=35\text{ cm}$$

$$\text{Circumference of the wheel} = 2\pi r = (2 \times 22/7 \times 35) = 220\text{ cm.}$$

In one revolution, the wheel covers the distance equal to its circumference.

$$\therefore 220\text{ cm distance} = 1\text{ revolution}$$

$$\therefore 1\text{ cm distance} = 1/220\text{ revolution}$$

$$\therefore 1\text{ km (or } 100000\text{ cm) distance} = 1 \times 100000/220\text{ revolution}$$

$$(\therefore 1\text{ km}=100000\text{ cm})$$

$$\therefore 1.65\text{ km distance} = 1.65 \times 100000/220\text{ revolutions}$$

$$= 750\text{ revolutions}$$

Question 1:

Find the area of a rectangle whose

(i) length = 46 cm and breadth = 25 cm

(ii) length = 9 m and breadth = 6 m

(iii) length = 14.5 m and breadth = 6.8 m

(iv) length = 12 m 5 cm and breadth = 60 cm

(v) length = 3.5 km and breadth = 2 km

ANSWER:

(i) Length = 46 cm

Breadth = 25 cm

$$\begin{aligned}\text{Area of the rectangle} &= (\text{Length} \times \text{Breadth}) \text{ sq units} \\ &= (46 \times 25) \text{ cm}^2 = 1150 \text{ cm}^2\end{aligned}$$

(ii) Length = 9 m

Breadth = 6 m

$$\begin{aligned}\text{Area of the rectangle} &= (\text{Length} \times \text{Breadth}) \text{ sq units} \\ &= (9 \times 6) \text{ m}^2 = 54 \text{ m}^2\end{aligned}$$

(iii) Length = 14.5 m

Breadth = 6.8 m

$$\begin{aligned}\text{Area of the rectangle} &= (\text{Length} \times \text{Breadth}) \text{ sq units} \\ &= (145/10 \times 68/10) \text{ m}^2 = 9860/100 \text{ m}^2 = 98.60 \text{ m}^2\end{aligned}$$

(iv) Length = 2 m 5 cm

$$\begin{aligned}&= (200+5) \text{ cm} \quad (1 \text{ m} = 100 \text{ cm}) \\ &= 205 \text{ cm}\end{aligned}$$

Breadth = 60 cm

$$\begin{aligned}\text{Area of the rectangle} &= (\text{Length} \times \text{Breadth}) \text{ sq units} \\ &= (205 \times 60) \text{ cm}^2 = 12300 \text{ cm}^2\end{aligned}$$

(v) Length = 3.5 km

Breadth = 2 km

$$\begin{aligned}\text{Area of the rectangle} &= (\text{Length} \times \text{Breadth}) \text{ sq units} \\ &= (3.5 \times 2) \text{ km}^2 = (35/10 \times 2)\end{aligned}$$

$$(35/10 \times 2) \text{ km}^2 = 7 \text{ km}^2$$

Question 2:

Find the area of a square plot of side 14 m.

ANSWER:

Side of the square plot = 14 m

$$\begin{aligned}\text{Area of the square plot} &= (\text{Side})^2 \text{ sq units} \\ &= (14)^2 \text{ m}^2 \\ &= 196 \text{ m}^2\end{aligned}$$

Question 3:

The top of a table measures 2 m 25 cm by 1 m 20 cm. Find its area in square metres.

ANSWER:

$$\begin{aligned}\text{Length of the table} &= 2 \text{ m } 25 \text{ cm} \\ &= (2 + 0.25) \text{ m} \quad (100 \text{ cm} = 1 \text{ m}) \\ &= 2.25 \text{ m}\end{aligned}$$

$$\begin{aligned}\text{Breadth of the table} &= 1 \text{ m } 20 \text{ cm} \\ &= (1 + 0.20) \text{ m} \quad (100 \text{ cm} = 1 \text{ m}) \\ &= 1.20 \text{ m}\end{aligned}$$

$$\begin{aligned}\text{Area of the table} &= (\text{Length} \times \text{Breadth}) \text{ sq units} \\ &= (2.25 \times 1.20) \text{ m}^2\end{aligned}$$

$$\begin{aligned}&= (225/100 \times 120/100) \text{ m}^2 \\ &= 2.7 \text{ m}^2\end{aligned}$$

Question 4:

A carpet is 30 m 75 cm long and 80 cm wide. Find its cost at Rs 150 per square metre.

ANSWER:

$$\begin{aligned}\text{Length of the carpet} &= 30 \text{ m } 75 \text{ cm} \\ &= (30 + 0.75) \text{ m} \quad (100 \text{ cm} = 1 \text{ m}) \\ &= 30.75 \text{ m}\end{aligned}$$

$$\begin{aligned}\text{Breadth of the carpet} &= 80 \text{ cm} \\ &= 0.80 \text{ m} \quad (100 \text{ cm} = 1 \text{ m})\end{aligned}$$

$$\begin{aligned}\text{Area of carpet} &= (\text{Length} \times \text{breadth}) \text{ sq units} \\ &= (30.75 \times 0.80) \text{ m}^2\end{aligned}$$

$$\begin{aligned}&= (3075/100 \times 80/100) \text{ m}^2 \\ &= 24.6 \text{ m}^2\end{aligned}$$

$$\text{Cost of } 1 \text{ m}^2 \text{ carpet} = \text{Rs } 150$$

$$\begin{aligned}\text{Cost of } 24.6 \text{ m}^2 \text{ carpet} &= \text{Rs } (24.6 \times 150) \\ &= \text{Rs } 3690\end{aligned}$$

Question 5:

How many envelopes can be made out of a sheet of paper 3 m 24 cm by 1 m 72 cm. If each envelope requires a piece of paper of size 18 cm by 12 cm?

ANSWER:

$$\text{Length of the sheet of paper} = 3 \text{ m } 24 \text{ cm} = 324 \text{ cm}$$

$$\text{Breadth of the sheet of paper} = 1 \text{ m } 72 \text{ cm} = 172 \text{ cm}$$

Area of the sheet = (Length $\times$ Breadth)
 $= (324 \times 172) \text{ cm}^2 = 55728 \text{ cm}^2$

Length of the piece of paper required to make 1 envelope = 18 cm
Breadth of the piece of paper required to make 1 envelope = 12 cm
Area of the piece of paper required to make 1 envelope = $(18 \times 12) \text{ cm}^2$
 $= 216 \text{ cm}^2$

No. of envelopes that can be made = Area of the sheet / Area of the piece of paper required to make 1 envelope

$\Rightarrow$ No. of envelopes that can be made

$$= 55728 / 216$$

$$= 258 \text{ envelopes}$$

Question 6:

A room is 12.5 m long and 8 m wide. A square carpet of side 8 m is laid on its floor. Find the area of the floor which is not carpeted.

ANSWER:

Length of the room = 12.5 m
Breadth of the room = 8 m
Area of the room = (Length $\times$ Breadth)
 $= (12.5 \times 8) \text{ m}^2 = 100 \text{ m}^2 = (12.5 \times 8) \text{ m}^2 = 100 \text{ m}^2$
Side of the square carpet = 8 m
Area of the carpet = $(\text{Side})^2$
 $= 8^2 \text{ m}^2$
 $= 64 \text{ m}^2$

Area of the floor which is not carpeted = Area of the room – Area of the carpet
 $= (100 - 64) \text{ m}^2$
 $= 36 \text{ m}^2$

Question 7:

A lane, 150 m long and 9 m wide, is to be paved with bricks, each measuring 22.5 cm by 7.5 cm. Find the number of bricks required.

ANSWER:

Length of the road = 150 m = 15000 cm

Breadth of the road = 9 m = 900 cm

Area of the road = (Length×Breadth)
=15000×900 cm²=13500000 cm²

=Length of the brick = 22.5 cm

Breadth of the brick = 7.5 cm

Area of one brick = (Length×Breadth)
=(22.5×7.5) cm²=168.75 cm²

Number of bricks = Area of the road/Area of one brick

=13500000/168.75

=80000 bricks

Question 8:

A room is 13 m long and 9 m broad. Find the cost of carpeting the room with a carpet 75 cm broad at the rate of Rs 65 per metre.

ANSWER:

Length of the room = 13 m

Breadth of the room = 9 m

Area of the room = (13×9) m² = 117 m²

Let length of required carpet be x m.

Breadth of the carpet = 75 cm

= 0.75 m (100 cm = 1 m)

Area of the carpet = (0.75 × x) m²
= 0.75x m²

For carpeting the room:

Area covered by the carpet = Area of the room

⇒0.75x=117

⇒x=117/0.75

$$\Rightarrow x = 117 \times \frac{4}{3}$$

$$\Rightarrow x = 156 \text{ m}$$

$$\Rightarrow 0.75x = 117$$

$$\Rightarrow x = 117 / 0.75$$

$$\Rightarrow x = 117 \times \frac{4}{3}$$

$$\Rightarrow x = 156 \text{ m}$$

So, the length of the carpet is 156 m.

Cost of 1 m carpet = Rs 65

Cost 156 m carpet = Rs (156 × 65)
= Rs 10140

Question 9:

The length and the breadth of a rectangular park are in the ratio 5 : 3 and its perimeter is 128 m. Find the area of the park.

ANSWER:

Let the length of the rectangular park be $5x$.

$\therefore$ Breadth of the rectangular park = $3x$

Perimeter of the rectangular field = $2(\text{Length} + \text{Breadth})$
 $= 2(5x + 3x)$
 $= 16x$

It is given that the perimeter of rectangular park is 128 m.

$\Rightarrow 16x = 128 \Rightarrow x = 128 / 16 \Rightarrow x = 8$ Length of the park

$= (5 \times 8) \text{ m} = 40 \text{ m}$

Breadth of the park $= (3 \times 8) = 24 \text{ m}$

Area of the park = (Length × Breadth) sq units

$= (40 \times 24) \text{ m}^2 = 960 \text{ m}^2$

Question 10:

Two plots of land have the same perimeter. One is a square of side 64 m and the other is a rectangle of length 70 m. Find the breadth of the rectangular plot. Which plot has the greater area and by how much?

ANSWER:

Side of the square plot = 64 m

Perimeter of the square plot = $(4 \times \text{Side})$ m

$$= (4 \times 64)$$

$$m = 256$$

Area of the square plot = $(\text{Side})^2$

$$= 64^2 \text{ m}^2$$

$$= 4096 \text{ m}^2$$

Let the breadth of the rectangular plot be x m.

Perimeter of the rectangular plot = $2(l+b)$ m

$$= 2(70+x) \text{ m}$$

Perimeter of the rectangular plot = Perimeter of the square plot (Given)

$$\Rightarrow 2(70+x) = 256$$

$$\Rightarrow 140 + 2x = 256$$

$$\Rightarrow 2x = 256 - 140$$

$$\Rightarrow 2x = 116$$

$$\Rightarrow x = 116/2 = 58$$

So, the breadth of the rectangular plot is **58 m**.

Area of the rectangular plot = $(\text{Length} \times \text{Breadth}) = (70 \times 58) \text{ m}^2 = 4060 \text{ m}^2$

Area of the square plot – Area of the rectangular plot

$$= (4096 - 4060)$$

$$= 36 \text{ m}^2$$

Area of the square plot is 36 m^2 greater than the rectangular plot.