PERIMETER AND AREA



CONTENTS

- Introduction
- Perimeter of a Polygon
- Formulae for Square & Rectangle
- Area of a Triangle
- Triangles as Parts of Rectangle & Square
- Area of parallelogram
- Paths Around a Rectangle & a Square

INTRODUCTION

Closed Figures

A figure whose beginning and ending points are same is called a **closed figure**.

Rectilinear Figures

A figure which consists of line segments only is called a **rectilinear figure**.

Polygon

A polygon is a simple closed figure that consist of line segments only. Thus, a polygon is a closed rectilinear figure.

The following figures are examples of polygons :



Regular polygon

A regular polygon is a polygon in which all the sides are equal.



> PERIMETER OF A POLYGON

The sum of the length of all sides of a closed figure is called the **perimeter** of the figure.

Perimeter of some polygons are given in the table below :

Figure	Name of	Perimeter
	the figure	
\wedge .	Scalene	(a + b + c) Sum
a/ \b	Triangle	of the length of
		sides
С		
\wedge	Isosceles	(2a + b)
a/ a	Triangle	$2 \times \text{Length of}$
		equal sides +
b		Length of
		unequal side
\wedge	Equilateral	3a
a a	Triangle	$3 \times \text{Length of}$
		the side of
a		triangle
1	Rectangle	2(a + b)
D		2 (Sum of the
a		length and
		breadth)
	Parallelogram	2(a + b)
/ / ^b		2 (Length +
a		breadth)
а	Square	4a
		$4 \times \text{Length of}$
a a		the side of
		square
a		
a	Rhombus	4a
		$4 \times \text{Length of}$
" ^a		the side of
		rhombus
a		

Note :

The perimeter of a regular polygon = Number of sides × Length of one side

Power by: VISIONet Info Solution Pvt. Ltd Website : www.edubull.com

Mob no. : +91-9350679141

♦ EXAMPLES ♦

Ex.1 Find the perimeter of the following closed figure :



Sol. (i) Perimeter of quadrilateral ABCD

$$AB + BC + CD + DA$$

$$= 15 \text{ cm} + 7 \text{ cm} + 9 \text{ cm} + 12 \text{ cm} = 43 \text{ cm}$$

(ii) Perimeter of the triangle ABC

$$= AB + BC + CA$$

- = 8 cm + 10 cm + 6 cm = 24 cm
- (iii) Perimeter of a square

$$= 4 \times \text{length of a side}$$

- $= 4 \times 5 \text{ cm} = 20 \text{ cm}.$
- (iv) Perimeter of a parallelogram
 - = 2 (length + breadth)
 - = 2 (6 cm + 5 cm)
 - = 22 cm.
- **Ex.2** Find the perimeter of the following figures and identify which figure has the greater perimeter?



Sol. Perimeter of figure A, which is a square of side 8 $cm = 4 \times 8 cm = 32 cm$.

Similarly the perimeter of figure B, which is not a square, because two square pieces of side 1 cm are cut off along one side of the square

= 8 cm + 8 cm + (8 cm + 1 cm + 1 cm + 1 cm)

+ 1 cm) + 8 cm = 36 cm.

Clearly, figure B has the greater perimeter than figure A.

Note : When a shape is cut off from a given shape then the perimeter of the new shape so obtained is increased.

Sol. The garden is in shape of a rectangle. Its one of the sides (6 m) is not to be fenced. Therefore, the length of fence required is the perimeter of the garden excluding one side.

$$= 6 m + 3 m + 3 m$$

= 12 m

 \therefore The cost of fencing at the rate of -275 per meter.

= j− 3300.

> OTHER FORMULAE FOR SQUARE AND RECTANGLE

Square 🗞

Let ABCD be a square whose each side is of length 'x' units.



- (i) Area of square = $x \times x = x^2$ unit²
- (ii) Side of square = $\sqrt{\text{Area of square}} = \sqrt{x^2}$ units

Side of square = x units.

(iii) Diagonal of square (AC = BD) = $\sqrt{BC^2 + DC^2}$

$$=\sqrt{x^2 + x^2} = \sqrt{2x^2} = x\sqrt{2}$$
 units.

Power by: VISIONet Info Solution Pvt. Ltd Website : www.edubull.com

Edubull

Rectangle

Let PQRS be a rectangle having length and breadth l and b respectively.



- (i) Area of rectangle = $(l \times b)$ unit².
- (ii) Length of rectangle

$$= \frac{\text{Area of rec tangle}}{\text{Breadth of rec tangle}} \text{ units.}$$

(iii) Breadth of rectangle = $\frac{\text{Areaof rectangle}}{\text{Lengthof rectangle}}$ units

(iv) Length of diagonal (PR = SQ)

$$= \sqrt{PQ^2 + RQ^2} = \sqrt{l^2 + b^2}$$
 units.

- **Wits of Area**
 - 1. $1 \text{ cm}^2 = 10 \text{ mm} \times 10 \text{ mm} = 100 \text{ mm}^2$
 - 2. $1 \text{ m}^2 = 100 \text{ cm} \times 100 \text{ cm} = 10,000 \text{ cm}^2$

Bigger units of Area 1 are = 100 m² 1 hectare = 10,000 m²

EXAMPLES

Ex.4 The length and breadth of a rectangular piece of land are 500 m and 300 m respectively. Find (i) its perimeter (ii) its area (iii) the cost of the land, if 1 m^2 of land costs \dot{f} 1000.

Sol. We have

Length of land (l) = 500 mBreadth of land (b) = 300 m

500 m

i) Perimeter =
$$2(l + b)$$

$$= 2 (500 + 300)$$
 n

 $= 2 \times 800 \text{ m}$

Perimeter = 1600 m

(ii) Area of land =
$$l \times b$$

$$= (500 \times 300) \text{ m}$$

$$= 150000 \text{ m}$$

(iii) : The cost of 1 m² of land =
$$\int 1000$$

 \therefore The cost of 150000 m² of land

 $= i 1000 \times 150000$

Sol. Length of rectangle
$$(l) = 10.5$$
 cm
Breadth of rectangle (b)
 $= 7.5$ dm $= (7.5 \times 10)$ cm $= 75$ cm
Area of rectangle $= l \times b$
 $= (10.5 \times 75)$ cm²
 $= 787.5$ cm².

Ex.6 The perimeter of a rectangular sheet is 100 cm. If the length is 35 cm, find its breadth. Also find its area.

Sol. We have, Length (l) = 35 cm. Breadth (b) = ?Perimeter = 100 cm. Perimeter of rectangle = 2(l + b) 100 = 2[35 + b] $100 \div 2 = 35 + b$ 50 = 35 + b 50 = 35 + b 50 - 35 = b 15 = bBreadth (b) = 15 cm. Now, area of rectangle = $l \times b$ $= 35 \times 15$ cm² = 525 cm².

Ex.7 Find the area of a square park whose perimeter is 320 m.

Perimeter of square = $4 \times \text{side}$ $320 \text{ m} = 4 \times \text{side}$ $320 \div 4 = \text{side}$ 80 m = sideSide of square = 80 mNow, area of square = $\text{side} \times \text{side}$

Sol.

 $= 80 \text{ m} \times 80 \text{ m}$

Hence, Area of square = 6400 m^2 .

Ex.8 The area of a square park is the same as of a rectangular park. If the side of the square park is 60 m and the length of the rectangular park is 90 m, find the breadth of rectangular park.

Sol. Side of square park = 60 mArea of square park = 60 m= side × side = $60 \text{ m} \times 60 \text{ m} = 3600 \text{ m}^2$. Length of rectangular park (l) = 90 m Breadth of rectangular park (b) = ? As, area of rectangular park = Area of square park (given) $l \times b = 3600$ $90 \times b = 3600$ $b = 3600 \div 90$

$$b = 40 \text{ m}$$

So, breadth of rectangular park = 40 m.

Power by: VISIONet Info Solution Pvt. Ltd Website : www.edubull.com **Ex.9** A door of length 2 m and breadth 1 m is fitted in a wall. The length of the wall is 4.5 m and breadth is 3.6 m. Find the cost of white-washing the wall, if the rate of white-washing the wall is j - 20 per m².





Area of door = $(2 \times 1) \text{ m}^2$ Area of door = 2 m^2 Area of wall including door = $(4.5 \times 3.6) \text{ m}^2$ = 16.2 m^2 Area of wall excluding door = $(16.2 - 2) \text{ m}^2$ Area of wall to be white-washed = 14.2 m^2 Cost of white washing the wall = Area of wall × cost of white-washing per m² = $i/(14.2 \times 20) = i/284$.

Ex.10 The cost of fencing a square field at 40 paise per metre is j-2000. Find the cost of watering the field at 80 paise per 100 m².

Sol. Total cost of fencing = $\frac{1}{2000}$

Rate of fencing = $j = \left(\frac{40}{100}\right)$ per m = $j = \frac{2}{5}$ per m.

Perimeter of field = $\frac{\text{Total cost of fencing}}{\text{Rate per metre}}$

$$=\frac{2000}{2/5}\,\mathrm{m}=\frac{2000\times5}{2}=5,000\,\mathrm{m}$$

Side of the square field = $\frac{5000}{4}$ m = 1250 m

Area of square field = $(1,250 \times 1,250)$ m² Area of square field = 15,62,500 m²

Cost of watering 100 m² =
$$j \cdot \left(\frac{80}{100}\right) = j \cdot \frac{4}{5}$$

Cost of watering 1 m² = $\int \left(\frac{4}{5} \times \frac{1}{100}\right)$

$$= j \cdot \left(\frac{4}{5} \times \frac{1}{100} \times 1562500\right) = j \cdot 12,500.$$

Ex.11 The sides of a rectangular park are in the ratio 5 : 4. If its area is 8,000 m², find the cost of fencing it at $\ddagger 3.50$ per metre.

Sol. Let the length and breadth of rectangular park are 5x and 4x respectively.

Area of rectangle = $l \times b$

So,

$$5x \times 4x = 8000$$

 $20x^2 = 8000$
 $x^2 = 8000 \div 20$
 $x^2 = 400$
 $x^2 = 20 \times 20 = (20)^2$
 \Rightarrow $x = 20$ m
So, length = $5 \times x = 5 \times 20 = 100$ m

Breadth = $4 \times x = 4 \times 20 = 80$ m.

Length i.e., Perimeter to be fenced

$$= 2 (l+b) m = 2 (100+80) m$$

$$= 2 \times 180 \text{ m} = 360 \text{ m}$$

 \therefore Cost of fencing = j - 3.50 per metre

- \therefore Total cost of fencing = $j 3.50 \times 360 = j 1,260$.
- **Ex.12** A wire is in the shape of a rectangle, its length is 32.9 m and breadth is 21.6 m. If the same wire is re-bent in the shape of a square, what will be the measure of each side? Also find which encloses more area.

Since the wire is in the shape of a rectangle.

Therefore, the total length of the wire

= Perimeter of the rectangle

Sol.

= 109 m.

The same wire is re-bent in the shape of a square. Therefore, the length of total wire = Perimeter of the square

 \Rightarrow 109 m = Perimeter of the square

So, the side of the square

$$= \frac{\text{Perimeter of the square}}{4} = \frac{109}{4} \text{ m} = 27.25 \text{ m}$$

The area of the square = $(27.25 \text{ m})^2 = 742.56 \text{ sq m}$ and area of the rectangular field enclosed by the wire of length 32.9 m and 21.6 m.

$$= 32.9 \text{ m} \times 21.6 \text{ m}$$

= 710.64 sq m.

Hence from above it is clear that the area of square is more than the area of rectangle while both have same perimeter.

Ex.13 A door of dimension 2.5 m \times 1.5 m is on the wall of dimension 12 m \times 8.5 m. Find the cost of painting the wall, if the rate of painting is j-3.75 per sq m.



Sol. The painting has to be done of the wall excluding the area of the door.

Area of the door = $l \times b$

= $2.5 \text{ m} \times 1.5 \text{ m} = 3.75 \text{ sq m}$

Now area of the wall including the door

 $= 12 \text{ m} \times 8.5 \text{ m} = 102 \text{ sq m}$

So, the area of the wall excluding the door

$$= 102 \text{ sq m} - 3.75 \text{ sq m} = 98.25 \text{ sq m}$$

Cost of painting the wall = -3.75×98.25

= $\dot{|}$ 368.44 (upto two decimal places)

= $\stackrel{.}{\vdash}$ 368 (approx).

- **Ex.14** The length and breadth of a rectangular field are in the ratio 3 : 1. If the area of the field is 675 sq m, find its length and breadth.
- Sol. Let the length and breadth of the rectangle is 3x and x respectively.

Then, the area of the rectangle = $3x \times x = 675$ sq m

$$\Rightarrow 3x^2 = 675 \text{ sq m}$$

$$\Rightarrow x^2 = \frac{675}{3} = 225 = 15 \times 15$$

 $\Rightarrow x \times x = 15 \times 15 \Rightarrow x = 15 m$

Thus, the length of the rectangle

$$= 3x = 3 \times 15 = 45 m$$

and the breadth of the rectangle = x = 15 m.

Sol.

(i) sq cm (ii) sq mm

(i) Since $1 \text{ sq } m = 100 \times 100 \text{ sq cm}$

 $6 \text{ sq } m = 6 \times 100 \times 100 \text{ sq } m$

= 60000 sq cm

(ii) Since 1 sq cm = 100 sq mm

 $60000 \text{ sq cm} = 60000 \times 100 \text{ sq mm}$

= 6000000 sq mm

Therefore 6 sq m = 60000 sq cm = 6000000 sq mm

Sol. (i) Since 100 sq mm = 1 sq cm

745000000 sq m m =
$$\frac{745000000}{100}$$
 sq cm

= 7450000 sq cm

(ii) Since 100×100 sq cm = 1 sq m

$$7450000 \text{ sq cm} = \frac{7450000}{100 \times 100} \text{ sq m} = 745 \text{ sq m}$$

Therefore 745000000 sq mm = 7450000 sq cm

= 745 sq m.



Area of triangle (
$$\Delta PQR$$
) = $\frac{1}{2} \times QR \times PS$

Area of
$$\triangle PQR = \frac{1}{2} \times QR \times PS$$
 unit²

♦ Area of a right triangle



Area of
$$\triangle ABC = \left(\frac{1}{2} \times BC \times AB\right) unit^2$$

or Area of $\triangle ABC$

 $=\frac{1}{2}$ × (Product of perpendicular legs) unit²

 Power by: VISIONet Info Solution Pvt. Ltd

 Website : www.edubull.com
 Mob no. : +91-9350679141



$$B \xrightarrow{a/b+b/2+b+b/2+} C$$

A

Area of $\triangle ABC = \frac{1}{2} \times BC \times AD$

Area of $\triangle ABC = \frac{1}{2} \times b \times AD$ (1)

In ∆ABD, $AB^{2} = AD^{2} + BD^{2}$ (using Pythagoras theorem) $(1)^2$

$$a^2 = AD^2 + \left(\frac{b}{2}\right)$$
 (in isosceles triangle altitude bisects

the base)

$$\sqrt{a^2 - \frac{b^2}{4}} = AD$$
 From (1), we have,
Area of $\triangle ABC = \left(\frac{1}{2} \times b \times \sqrt{a^2 - \frac{b^2}{4}}\right) unit^2$

EXAMPLES





Area of triangle = $\frac{1}{2}$ × Base × Height Sol.

$$\therefore \text{ Height} = 2 \times \frac{\text{Area}}{\text{Base}} = \frac{2 \times 600}{60} = 20 \text{ cm}$$

Power by: VISIONet Info Solution Pvt. Ltd Website : www.edubull.com

Mob no. : +91-9350679141

Edubull

TRIANGLES AS PARTS OF RECTANGLE AND SQUARE

ABCD is a rectangle with AD = BC = 5 cm and AB = DC = 7 cm, then



Area of rectangle ABCD = Area of \triangle ABD + Area of \triangle BDC

Area of rectangle ABCD = 2 (Area of \triangle ABD)

(:: Area of $\triangle ABD = Area \text{ of } \triangle BDC$)

 $\Rightarrow \frac{1}{2} \text{ Area of rectangle ABCD} = \text{Area of } \Delta \text{ABD}$

or $\frac{1}{2}$ Area of rectangle ABCD = Area of \triangle BDC.

and ABCD is square in given figure of side 5 cm, then



Area of square = (Area of ΔI + Area of ΔII + Area of ΔIII + Area of ΔIII + Area of ΔIV)

 $\frac{1}{4}$ (Area of square) = Area of each Δ .

(:: Area of all four Δ 's is equal)

AREA OF PARALLELOGRAM (||^{gm})

ABCD is a parallelogram in which AB \parallel CD, BC \parallel AD.

Area of parallelogram (ABCD)

= Base × Corresponding altitude Area of parallelogram ABCD = (BC × AM) unit² Area of parallelogram ABCD = (CD × AN) unit².

Thus,

(i) Area of a Parallelogram = $Base \times Height$

(ii) Base of a Parallelogram = $\frac{\text{Area}}{\text{Height}}$ (iii) Height of a Parallelogram = $\frac{\text{Area}}{\text{Area}}$

(iii) Height of a Parallelogram =
$$\frac{1}{Base}$$

Ex.19 The following rectangles is formed of congruent polygons. Find the area of each polygon.



Sol. (i) Clearly figure (A) has 6 identical figures. Therefore, area of rectangle = $6 \times$ Area of one polygon.

$$\Rightarrow$$
 Area of one polygon = $\frac{\text{Area of rec tangle}}{\frac{1}{2}}$

6

$$= \frac{10 \times 6}{6}$$
 sq cm = 10 sq cm.

$$= \frac{10 \times 6}{4}$$
 sq cm = 15 sq cm

(iii) Figure (C) has 2 identical figures. Therefore, area of one polygon

$$= \frac{\text{Area of rectangle}}{2}$$

$$= \frac{10 \times 6}{2} \text{ sq cm} = 30 \text{ sq cm}.$$

Ex.20 A square of sides 6 cm is divided into two parts as shown in the following figure. Observe the parts and find the area of each part.

Sol.

=

By tracing any part on a tracing paper and on putting it on other we find that both the parts are exactly identical i.e., congruent.

Therefore, the area of each part

$$\frac{\text{Area of square}}{2} = \frac{6 \times 6}{2} \text{ sq cm} = 18 \text{ sq cm}.$$

Hence, the area of each part = 18 sq cm.

Ex.21 Find the area of a parallelogram of base 8 cm, height 7 cm and breadth 6 cm.





Area = base \times height = 8 \times 7 sq cm = 56 sq cm Find the area of the following shapes : Ex.22



Sol. (i) Area of the parallelogram

$$= base \times height = 4\frac{2}{3}cm \times 1\frac{1}{2}cm$$
$$= \frac{14}{3} \times \frac{3}{2}sqcm = \frac{7 \times 1}{1 \times 1}sqcm = 7sqcm.$$

(ii) Area = base \times height = 7.2 cm \times 3.4 cm = 24.48 sq cm.

- Ex.23 The base of a parallelogram is thrice its height. If the area is 867 sq cm, find the base and height of the parallelogram.
- Area of a parallelogram = Base \times Height = $b \times h$ Sol. \therefore b × h = 867 sq cm (Given) Also, it is given that base is thrice the height of the parallelogram. Let the height = b; then base = 3b. So, $(b \times 3b) = 867$ sq cm $\Rightarrow 3b^2 = 867$ sq cm $\Rightarrow b^2 = \frac{867}{3}$ sq cm = 289 sq cm \Rightarrow b × b = 17 cm × 17 cm \Rightarrow b = 17 cm Thus, height $\mathbf{h} = \mathbf{b} = 17 \text{ cm}$; **base b** = $3b = 3 \times 17 = 51$ cm

PATHS AROUND A RECTANGLE AND A SQUARE

Area of the path = Area of rectangle EFGH – Area of rectangle ABCD.



EXAMPLES





Sol. Area of the path

Now, area of rectangular grass lawn ABCD

$$= 30 \text{ m} \times 20 \text{ m} = 600 \text{ sq n}$$

Area of EFGH =
$$\{(30 + 4) \times (20 + 4)\}$$

 $= 34 \text{ m} \times 24 \text{ m} = 816 \text{ sq m}$

Therefore,

Area of the path = 816 sq m - 600 sq m = 216 sq m

Note : Area of the remaining park, when two roads cross each other and are parallel to the sides of the rectangle.

In the given figure, ABCD is the rectangular park and EFGH and PQRS are the two roads parallel to the sides of the rectangle and crossing at the centre.



Such situation give rise to two type of problems:

- 1. To find area of the roads.
- 2. To find area of the remaining park.
- 1. Area of the roads

= Area of rectangle EFGH + Area of rectangle PQRS - Area of the shaded portion at the centre of the park.

We subtract the area of the shaded portion because it has been calculated two times.

Area of the remaining park = Area of the 2. park – Area of the roads.

Power by: VISIONet Info Solution Pvt. Ltd Website : www.edubull.com Mob no. : +91-9350679141

Sol.

- **Ex.25** The side of a square flower bed is 1 m 80 cm. It is enlarged by digging a strip 20 cm wide all around it. Find :
 - (i) the area of the enlarged flower bed.
 - (ii) the increase in area of the flower bed.



- **Sol.** Let us represents the square flower bed figure by ABCD and the path around it by the shaded portion.
 - (i) The area of the enlarged flower bed

$$=$$
 Side \times Side

$$=(180+40)(180+40)$$

$$= 220 \times 220$$

= 48400 sq cm [Change sq cm into sq m]

$$=\frac{48400}{100\times100}=\frac{484}{100}=4.84$$
 sq m

- (ii) Now, increase in area of the flower bed
 - = Area of the enlarged flower bed
 - Area of the square flower bed

$$=(180+40)^2-(180)^2$$

- $= 220 \times 220 180 \times 180$
- = 48400 32400 = 16000 sq cm

$$= \frac{16000}{100 \times 100}$$
 [Change sq cm into sq m]
= $\frac{160}{100} = 1.6$ sq m

- **Ex.26** There is a rectangular field of length 94 m and breadth 32 m. Three roads each of width 2 m pass through the field such that two roads are parallel to the breadth and the third is parallel to the length. Find the area of the field :
 - (i) Covered by three roads,
 - (ii) not covered by the roads.



- **Sol.** The figure, gives us the complete picture of the rectangular field. ABCD is the park in which IJKL, MNOP and EFGH represents the three cross roads of 2 m wide each and which are parallel to the sides of the field.
 - (i) Now, area of the field = length × breadth = $94 \times 32 = 3008$ sq m
 - (ii) Area of the road MNOP = (32×2) sq m = 64 sq m

Area of the road IJKL =
$$(32 \times 2)$$
 sq m

= 64 sq m

- Again, area of the road EFGH
- $= (94 \times 2)$ sq m = 188 sq m

Area of two shaded portion QRST and UVWX =

 $(2 \times 2) + (2 \times 2) = 4 + 4 = 8$ sq m

- This means total area of the roads
 - = 188 + 64 + 64 8 = 188 + 128 8
 - = 188 + 120 = 308 sq m
- Thus, area of the remaining portion of the field
 - = Area of the field Area of the roads
 - = (3008 308) sq m = 2700 sq m

Therefore, the area of the field not covered by the roads = 2700 sq m

- **Ex.27** Through a rectangular field of dimensions $90 \text{ m} \times 60 \text{ m}$, two roads are constructed which are parallel to the two sides and cut each other at right angles through the centre of the field. If the width of each road is 3m, find :
 - (i) the area covered by the roads.
 - (ii) the cost of constructing the roads at the rate of j-110 per sq m.



- **Sol.** In figure, ABCD represents the rectangular field and rectangles EFGH and MNOP represents the roads.
 - (i) Area of roads = Area of MNOP + Area of EFGH - Area of IJKL

= {
$$(60 \times 3) + (90 \times 3) - (3 \times 3)$$
} sq m

- = (180 + 270 9) sq m = (450 9) sq m
- = 441 sq m
- (ii) The cost of constructing the roads at the rate of i = 110 per sq m
 - $= \dot{F} (441 \times 110) = \dot{F} 48510.$

Power by: VISIONet Info Solution Pvt. Ltd		
Website : www.edubull.com	Mob no. : +91-9350679141	

- **Ex.28** A rectangular field measuring 40 m by 35 m is to be surrounded externally by a path which is 3 m wide. Find the cost of grassing the path at the rate of i = 10 per square meter.
- **Sol.** Let EFGH be rectangular field, and let ABCD be the external boundaries of the Path.



Length of EFGH = EH = FG = 40 m Breadth of EFGH = EF = HG = 35 m Area of EFGH = $40 \times 35 \text{ m}^2 = 1400 \text{ m}^2$ In rectangle ABCD,

Length (AD = BC) = 40 + 3 + 3 = 46 m

Breadth (AB = DC) = 35 + 3 + 3 = 41 m

Area of ABCD = $46 \times 41 \text{ m}^2$

Area of ABCD = $1,886 \text{ m}^2$

Area of path = Area of ABCD - Area of EFGH

= 1,886 - 1,400

Area of path = 486 m^2

 \therefore Cost of grassing 1 m² = \models 10

 \therefore Cost of grassing the whole path

$$= j (10 \times 486) = j 4,860$$

Ex.29 A rectangular plot is 100 m long and 80 m broad. It has a 2 m wide path all around inside the rectangular plot. Find the area of the path and the cost of leveling it at $\frac{1}{2} 3.70/\text{m}^2$.

Sol.



Let PQRS be a rectangular plot and let ABCD be the inside boundary of the path.

Then length PS = 100 mbreadth SR = 80 m Area of plot PQRS = $100 \times 80 \text{ m}^2$ = 8000 m^2

Width of path = 2 m

:. AD = (100 - 2 - 2)m = (100 - 4)m = 96 mAB = (80 - 2 - 2)m = (80 - 4)m = 76 m

Area of rectangle ABCD = $96 \times 76 \text{ m}^2$ = 7296 m² Area of level path

= Area of PQRS – Area of ABCD

 $= (8000 - 7296) \text{ m}^2 = 704 \text{ m}^2$

Cost of levelling the path = $j (3.70 \times 704)$

Hence, the area of the path is 704 m² and the cost of levelling the path is \dot{f} 2604.80.

Ex.30 Find the following :

(i) In the adjoining figure, PQRS is a rectangle with sides 8 cm and 6 cm. Find the area of Δ PQS and Δ QSR.



(ii) In the adjoining figure, RENT is a square with side 10 cm. Find the area of triangles OTR, OTN, ONE and ORE



Sol. (i) Clearly, diagonal QS divides the rectangle PQRS into two triangles PQS and QSR of same area.

So, area of $\triangle PQS = \frac{1}{2}$ (Area of rectangle PQRS) = $\left(\frac{1}{2} \times 8 \times 6\right) \text{ cm}^2 = 24 \text{ cm}^2$

Also area of $\triangle QSR = 24 \text{ cm}^2$.

(ii) Clearly, four triangles TOR, ROE, NOE and TON, each of same area, are formed in square RENT.

So, area of
$$\triangle TOR = \frac{1}{4}$$
 (Area of the square)
= $\frac{1}{4}$ (10 × 10) cm² = 25 cm²

Also, area of $\triangle ROE$ = area of $\triangle NOE$ = Area of $\triangle TON$ = 25 cm².

 Power by: VISIONet Info Solution Pvt. Ltd

 Website : www.edubull.com
 Mob no. : +91-9350679141

Find the area of each of the following triangles.



Ex.33

Sol.

Ex.32

Sol.





Power by: VISIONet Info Solution Pvt. Ltd	
Website : www.edubull.com	Mob no. : +91-9350679141

Ex.34 PQRS is a parallelogram, QM is the height from Q to SR and QN is the height from Q to PS. If SR = 12 cm and QM = 7.6 cm, find

- (i) The area of the parallelogram PQRS.
- (ii) QN, if PS = 8 cm.



Sol. (i) Area of $||gm = Base \times Height$

$$=$$
 SR \times QM

 $= 12 \times 7.6$ cm

$$= 91.2 \text{ cm}^2$$

(ii) Also, Area of $||gm = PS \times QN|$

$$91.2 = 8 \times QN$$

 $91.2 \div 8 = QN$

QN = 11.4 cm.



Ex.35 \triangle ABC is isosceles with AB = AC = 7.5 cm and

BC = 9 cm. The height AD from A to BC, is 6 cm. Find

the area of $\triangle ABC$. What will be the height from C to AB?

IMPORTANT POINTS TO BE REMEMBERED

- 1. The sum of lengths of all sides of a plane figure or the length of its boundary is called the perimeter of the figure.
- 2. Perimeter is the distance around a closed figure whereas area is the part of plane occupied by the closed figure.
- 3. Perimeter of rectangle = 2 (length + breadth) or P = 2 (l + b)
- 4. Perimeter of square = $4 \times \text{side or } P = 4 \times l$
- 5. Area of rectangle = Length \times Breadth or A = $l \times b$

6. Length of rectangle =
$$\frac{\text{Area}}{\text{Breadth}}$$
 or $l = \frac{\text{A}}{\text{b}}$

- 7. Breadth of rectangle = $\frac{\text{Area}}{\text{Length}}$ or $b = \frac{A}{l}$
- 8. Area of square = side × side or $A = l \times l$

9. Area of triangle = $\frac{1}{2}$ (Area of the parallelogram generated from it) = $\frac{1}{2}$ × base × height

10. Standard units of area and their relations are :

 $100 \text{ mm}^2 = 1 \text{ cm}^2$ $100 \text{ cm}^2 = 1 \text{ dm}^2$ $100 \text{ dm}^2 = 1 \text{ m}^2$ $100 \text{ m}^2 = 1 \text{ are}$ $10000 \text{ cm}^2 = 1 \text{ m}^2$ 100 ares = 1 hectare100 hectares = 1 sq km $1 \text{ hectare} = 10000 \text{ m}^2.$

Power by: VISIONet Info Solution Pvt. Ltd		
Website : www.edubull.com	Mob no. : +91-9350679141	58

Power by: VISIONet Info Solution Pvt. Ltd Website : www.edubull.com

Mob no. : +91-9350679141