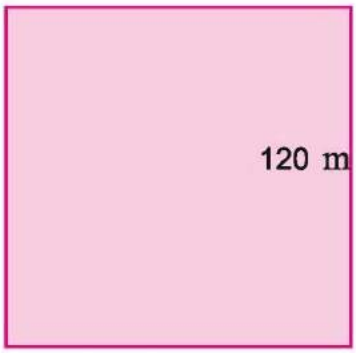
Chapter 16

PERIMETER AND AREA

16.1 Neelam and Rakesh made fencing of barbed wires around their field.

180 m
Neelam's Field
Fig. (i)



120 m
Rakesh's Field
Fig. (ii)

If cost of fencing is Rs.12 per meter then on whose field the cost of fencing would be maximum?

In which field, the cost of ploughing would be maximum at the rate of 100 rupees per square meter.

To find the total cost of fencing, we have to multiply the perimeter with the rate of fencing per meter.

Similarly to find the cost of ploughing we have to multiply the area (in square meter) with the rate of polughing per square meter.

Since Neelam's field is rectangular.

Hence perimeter of Neeelam's field $= 2 \times (l + b.)$
$= 2 \times (180+60)$
$= 2 \times 240$
$= 480$ m

While Rakesh's land is square

Hence perimeter of Rakesh's field $= 4 \times$ Side
$= 4 \times 120$

Again area of Neelam's field $= l. \times b.$
$= 180 \times 60$
$= 10800\ sq.m.$

Area of Rakesh's field $= (\text{Side})^2$
$= (120)^2$
$= 120 \times 120$
$= 14400\ sq.m.$

As area of Rakesh's field is more, the cost of ploughing would be more.

Do and Learn

1.The figures of plates showing registration number is given below. Calculate the perimeter by measuring length and breadth of plates of bus, taxi and private vehicles around

Bus	Taxi	Private vehicle
RJ19 PA 3807	RJ51 TA 1051	RJ271CO706

2. In the following case what do we require to find perimeter or Area?
   (i) Stitching the lace on the edges of dupatta.
   (ii) Putting the black soil in hockeys ground.
   (iii) Filling the ceiling of room.
   (iv) Fencing around the farm.

Exercise 16.1

1. Radha takes 2 round daily along the sides of a square park of side 60 meter. Then find out that how much distance is covered by her daily?
2. Suresh has a ribbon of length 78 cm. He wants to apply it on the edges of a rectangular photo frame of length 26 cm. Find the breadth of frame.
3. Ranu wants to spread a carpet in the hall of the drawing room whose length is 50 m. Find the area of the carpet for this hall whose breadth is half of the length.
4. Gurmeet sowed the crop of Moong in 4200 square meter part of his land. He wants to fence around the fied. If the breadth of the land is 30 meter then how much wire (in length) is needed for it ?
5. Area of Playground of school is 38400 square meter. If the ratio of length and breadth of playground is 3 : 2 then find the perimeter of playground.
6. The perimeter of a rectangle and a square are same, the length and breadth of rectangle is 25 cm. and 15 cm. respectively. Which figure has greater area ?
7. Find the perimeter of following figures.
   (i) Triangle whose sides are 2 cm., 3 cm., and 4 cm.
   (ii) Equilateral triangle with side 8 cm.
   (iii) Isosceles triangle whose two equal sides are each equal to 10 cm. and the third side is 7 cm.

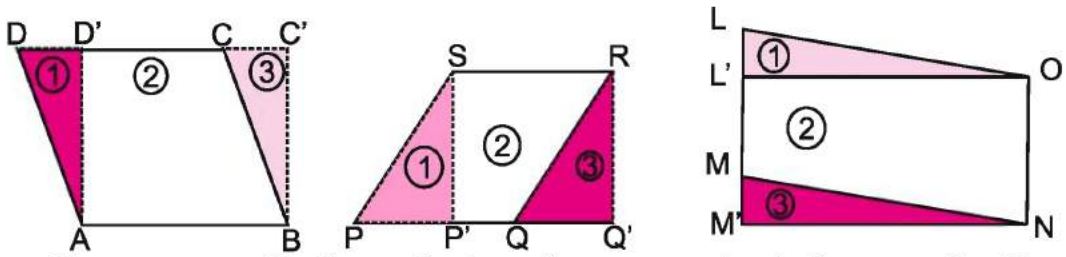
16.2 Area of a Parallelogram

We come across many shapes other than squares and rectangles around us. How will you find the area of a land which is parallelogram in shape?

Opposite sides of a parallelogram are equal and parallel.

Let us try

Draw three parallelograms of different measures.



Draw a perpendicular on the base from one vertex to the opposite side of the parallelogram.

Cut a triangle (1) formed by the vertex and perpendicular drawn from the vertex to the opposite side and join it to opposite parallel side shown as triangle (3). Both the triangles (1) and (3) are congruent by RHS rule.

Hence area of Δ 1= area of Δ 3.

Parallelogram	Base	Perpendicular on base from vertex to the side opposite to the	Cut out the triangle figure (1)	Triangle added on opposite side (3)	Figure made in new positions (2)+(3)	Relation between area of parallelogram and rectangle (1)+(2)=(2)+(3)
ABCD	CD	AD'	ΔAD'D	ΔBC'C	ABC'D'	ABCD = ABC'D'
PQRS	PQ	SP'	ΔSP'P	ΔRQ'Q	P'Q'RS	PQRS= P'Q'RS
LMNO	LM	OL'	ΔOL'L	ΔNM'M	L'M'NO	LMNO = L'M'NO

It is clear from the table:

Area of {figure (1) + figure (2)}= Area of {figure (2) + figure (3)}

(Because area of figure (1) and figure (3) are equal by RHS rule of a right triangle)

Hence area of parallelogram = Area of rectangle

= length × breadth

= base × perpendicular on base from the vertex of opposite side.

Area of parallelogram = (base × height) square unit.

Activity

- Take transparent paper/sheet.
- Cut the parallelograms of different sizes on it.
- Find the area of these on putting squared block sheet or graph paper.

- Separate a triangular figure by cutting perpendicularly from vertex on the side opposite to the base of parallelogram.
- Make a rectangle by putting the separated figure on the other side.
- Find the area of rectangle thus formed from the graph paper/squared block sheet.
- Compare the areas of parallelogram and rectangle.
- Here both the areas are same.

Example1 One side and corresponding height of a parallelogram is 5 cm. and 4 cm. respectively. Find the area of parallelogram.

Solution

Length of base = 5cm

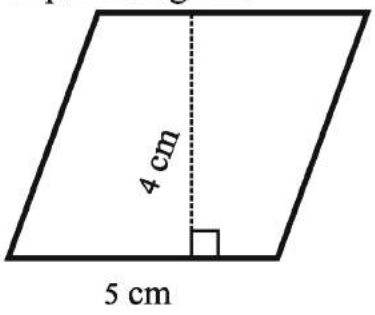
height = 4cm

Area of parallelogram = base × height

= b × h

= 5 × 4 square cm.

= 20 square cm.



Example 2 If area of a parallelogram is 56 square cm. and its base is 7 cm. then find its height x ?

Solution

Area of parallelogram = base × height

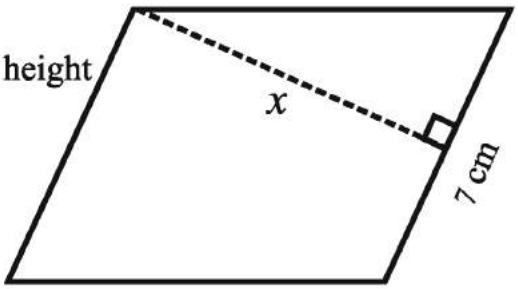
$56 = 7 \times x$

Or $7 \times x = 56$

Or $x = \frac{56}{7}$

Or x = 8 cm

Height of parallelogram is 8 cm.



Example 3 Length of two sides of parallelogram PQRS are 8 cm. and 5 cm. Corresponding height of base QR is 4 cm. Find:

(i) Area of parallelogram PQRS.

(ii) Corresponding height of base PQ.

Solution

(i) Area of parallelogram PQRS = base × height

= 8cm × 4 cm = 32 sq. cm.

(ii) Base = 5cm

Height (SU) = y cm

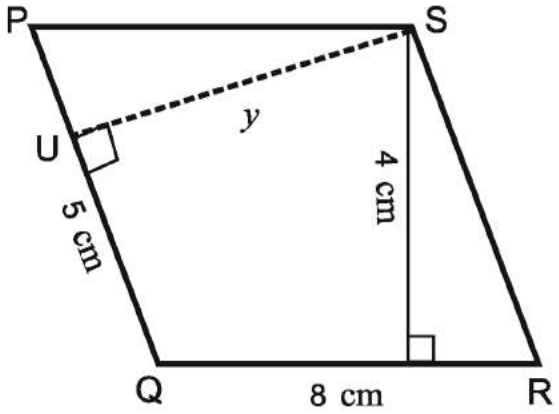
Area = 32 sq. cm

Area of parallelogram = base × height

or $32 = 5 \times y$

or $5 \times y = 32$

$y = \frac{32}{5} = 6.4$ cm



Hence corresponding height of base PQ = 6.4 cm

16.2.1 Path ways

Many situations are seen in our daily life in which path are present either in or out around a rectangular, square or circular park or path is made parallel to the length or breadth.

How to find area of path

1. Area of path made around rectangular, square or circular portion = Area of given portion along with path – Area of given portion without path.

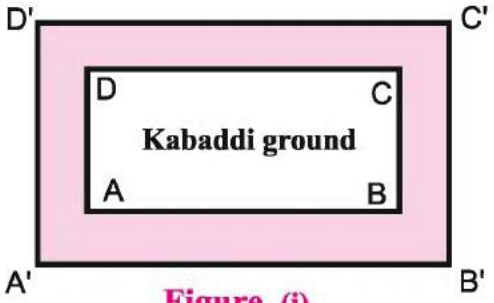


Figure (i)

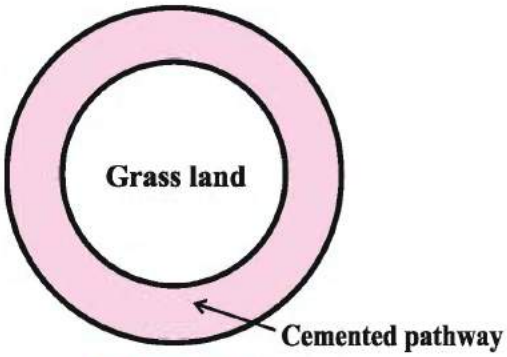
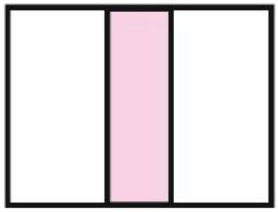
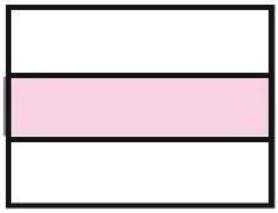


Figure (ii)

2. Area of path made on edges or centre parallel to length/breadth = length of parallel side × breadth of path.

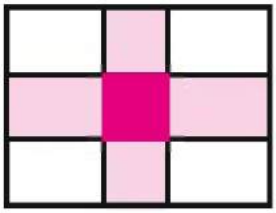


Path parallel to breadth



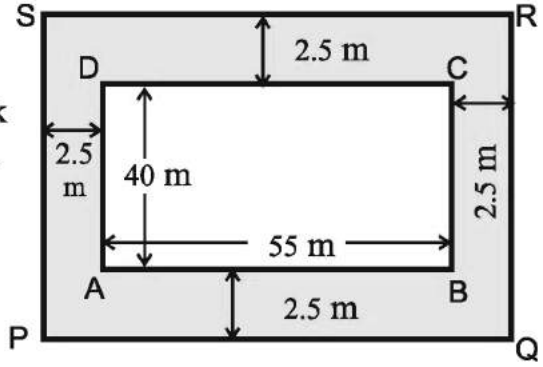
Path parallel to length

3. Area of paths parallel to length and breadth intersecting mutually = Area of path – Area of Common portion.



Path parallel to length and breadth.

Example 4 The length and breadth of a rectangular park is 55 m. and 40 m. respectively. A 2.5 wide path is made around the park outside. Find the area of the path.



Solution

In the figure, ABCD is a rectangular park and shaded area shows 2.5 m. wide path. We have to find.

Area of rectangular field PQRS included path – Area of rectangular park ABCD

Length of park with path (PQ) = Length of park (AB) + 2 × Breadth of path

$= 55\text{ m} + 2 \times 2.5\text{m}$

$= 55\text{ m} + 5\text{ m} = 60\text{ m}$

Breadth of park with path (PS)

= Breadth of park (AD) + 2 × Breadth of path

$= 40\text{ m} + 2 \times 2.5\text{ m}$

$= 40\text{ m} + 5\text{m} = 45\text{ m}$

Area of rectangular park PQRS = Length × Breadth

$= 60\text{ m} \times 45\text{ m}$

$= 2700$ sq. m

Area of rectangular park ABCD = Length × Breadth

$= 55\text{ m} \times 40\text{ m}$

$= 2200$ sq. m

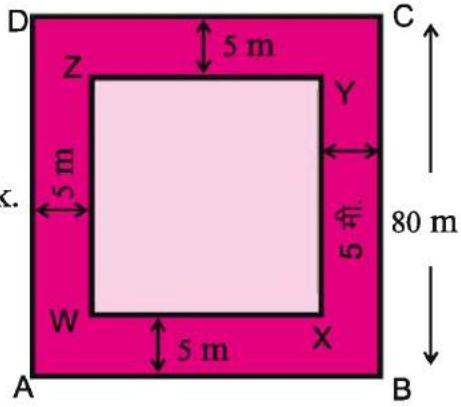
∴ Area of path = Area of rectangular park PQRS with path – Area of rectangular park ABCD

= 2700 sq. m. – 2200 sq. m = 500 sq.m

Example 5 A 5 meter wide path is present to the inner side of the boundary of a square park of side 80 meter. Find the area of this path. Find the expense of covering that path with red soil at the rate of Rs. 180 per square meter.

Solution

ABCD shows a square park of side 80 m. in the figure and the shaded part shows 5 m. wide path to the inner side of the park.



Area of path

$$= \begin{pmatrix}\text{Area of square}\\ \text{park ABCD}\end{pmatrix} - \begin{pmatrix}\text{Area of square park}\\ \text{WXYZ without path}\end{pmatrix}$$

Side of a park WX without path = Side AB of park -2×breadth of path

$= 80\text{m} - 2 \times 5\text{m}$

$= 80\text{ m} - 10\text{ m}$

$= 70\text{ m}$

Area of square park ABCD $= (\text{side})^2 = (80\text{ m})^2 = 6400$ sq. m.

Area of square park WXYZ $= (\text{side})^2 = (70\text{ m.})^2 = 4900$ sq. m.

Area of path = Area of square park ABCD – Area of square park WXYZ

= 6400 sq. m. – 4900 sq. m. = 1500 sq. m.

If cost of covering 1 sq. mt. with red soil = Rs. 180

Cost of covering 1500 sq. mt. with red soil = 180 × 1500

= Rs. 2,70,000

Example6 The length of a rectangular grassland is 75 m and breadth is 55 m In the centre two paths of 3 m wide parallel to the length and breadth of the ground are situated in such a way that they intersect each other at right angles. Find the area of the path?

Solution

Area of path parallel to length (WXYZ) = Length × Breadth

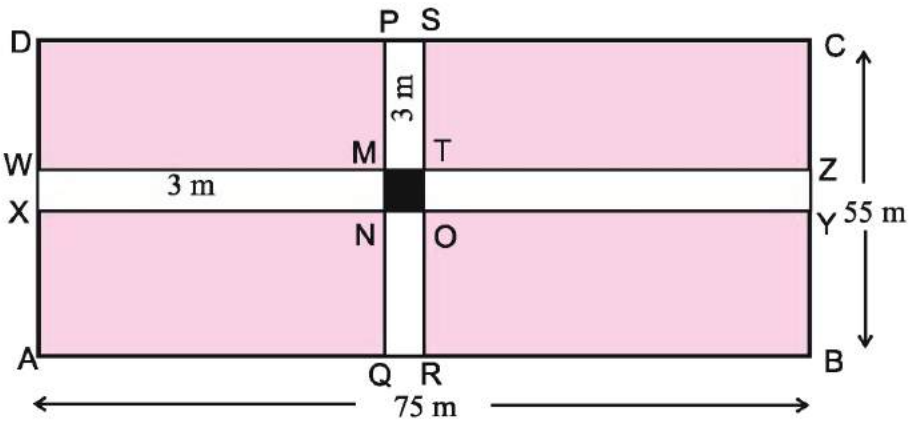
= 75 m × 3 m

= 225 sq. m

Area of path parallel to width (PQRS) = Length × Breadth

= 55 mt. × 3 m

= 165 sq. m



Area of common path square MNOT (situated on both paths) = side×side

= 3 m. × 3 m.

= 9 sq. m..

Area of square MNOT i.e. 9 sq.mt. is included in both the paths.

Therefore area of complete path = Area of WXYZ + Area of PQRS – Area of square MNOT

= (225 + 165 - 9) sq. m.

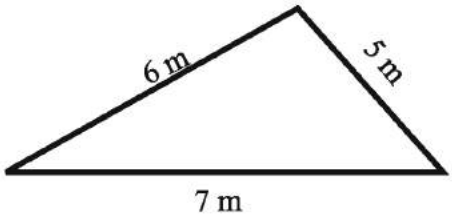
= (390 - 9) sq. m.

= 381 sq. m.

We have seen in the figure of above example that shaded part is located on both the paths. Therefore area of shaded path is subtracted.

16.3 Area of triangle

We have to find the expenditure of planting grass in a triangular park. How do we find the area of triangular park?



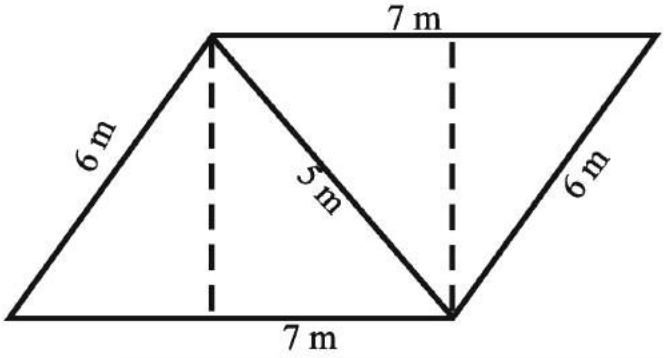
Diagonal of a parallelogram divides it into two triangles.

Let's think: Measurement of park is given in meters.

The scale taken as 1 m. = 1 cm. on the cardsheet by making two congruent triangles of 6 cm. , 7 cm. and 5 cm. Add both triangles in such a way that sides of equal measure reach near by and make a parallelogram.

$\because$ Area of triangle $= \frac{1}{2}$ (Area of parallelogram)

$\therefore$ **Area of triangle** $= \frac{1}{2}$ **(Base × height) square unit**



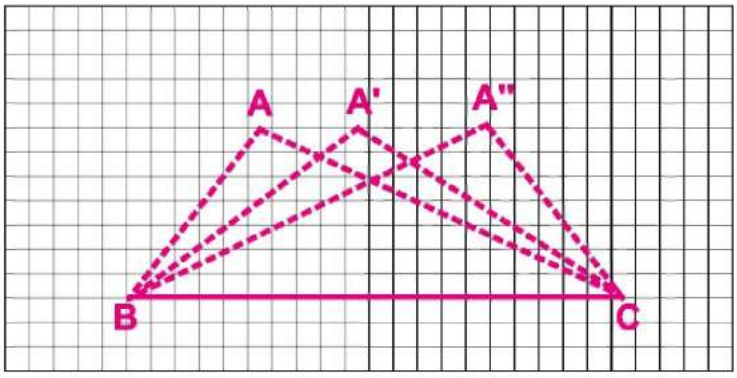
Do and Learn

Draw parallelograms of different measures. Cut them along any diagonal and make two triangles.

- Are both the triangles congruent in every situation?
- Area of two congruent triangles always equal?
- Is the converse of it always true?

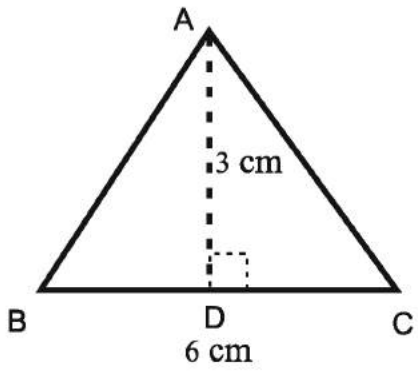
Let's try by doing:

Take a graph paper and draw different triangles on it by taking base and height of the same measure.

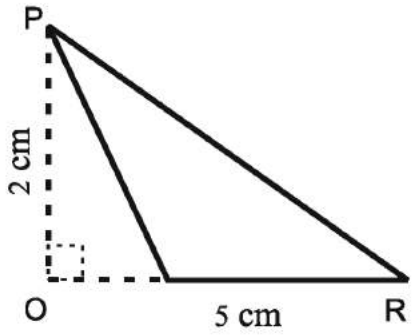


- Take three triangles of measure ABC, A'BC, and A"BC, and observe.
- Number of squares surrounded by three squares are same, which means that area of all three triangles are same.
- Can they completely cover each other? Cut and see them.

Example 7 Find the area of triangles shown in the figure.



(i)



(ii)

Solution Shape (i) Area of triangle (ABC) $= \frac{1}{2} \times$ Base $\times$ Height

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

$= \frac{1}{2} \times 6\text{ cm} \times 3\text{ cm} = 9$ sq. cm

Shape (ii) Area of triangle (PQR) $= \frac{1}{2} \times$ Base $\times$ Height

$= \frac{1}{2} \times QR \times PO$

$= \frac{1}{2} \times 5\text{cm} \times 2\text{ cm} = 5$ sq. cm

Example 8 If area of triangle PQR is 52 square cm. and height PS = 8 cm. then find base QR.

Solution

Height of PS in the given shape = 8 cm

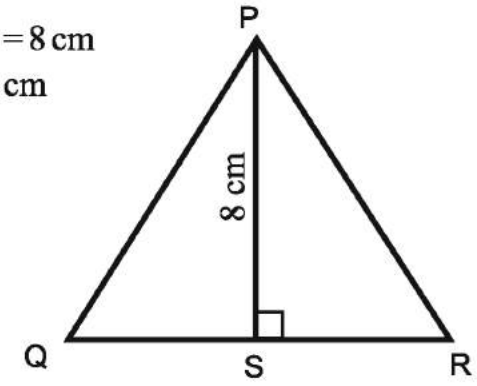
Area of triangle PQR = 52 sq. cm

Base QR of triangle PQR = ?

Area of triangle PQR $= \frac{1}{2} \times$ Base $\times$ Height

$= \frac{1}{2} \times QR \times PS$

52 sq. cm $= \frac{1}{2}$ QR $\times$ 8cm



$$QR = \frac{52 \times 2 \text{ cm}^2}{8 \text{ cm}}$$

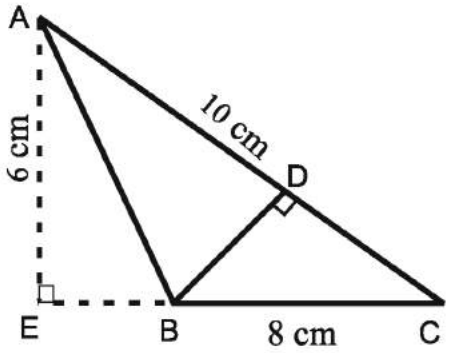
$$= 13 \text{ cm}$$

Base QR $= 13$ cm

Example 9 In a triangle ABC, AC = 10 cm., BC = 8 cm., and AE = 6 cm., then Find out

(i) Area of triangle ABC

(ii) Length of BD



Solution

(i) In triangle ABC, base BC = 8cm

Height AE = 6cm

Area of triangle ABC $= \frac{1}{2} \times$ base $\times$ height

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

$= \frac{1}{2} \times 8 \text{ cm} \times 6 \text{ cm}$

$= 24$ sq. cm

(ii) Base AC = 10cm, height (BD) = ?, area = 24 sq. cm

$$\text{Area of triangle} = \frac{1}{2} \times \text{base} \times \text{height}$$

$$\text{Area of triangle} = \frac{1}{2} \times AC \times BD$$

$$24 \text{ sq. cm} = \frac{1}{2} \times 10 \times BD$$

$$BD = \frac{24 \times 2 \text{ cm}}{10} = 4.8 \text{ cm}$$

Example 10 Ratio of base and height of triangle PQR is 3:2. If its area is 108 square cm. then find out its base and height.

Solution According to figure ratio of base QR and height PQ, in the triangle PQR is 3: 2.

Base QR of triangle $= 3 \times x$

Altitude PQ of triangle $= 2 \times x$

Area = 108 sq. cm

Area of triangle $= \frac{1}{2} \times$ base $\times$ height $= \frac{1}{2} \times QR \times PQ$

108 sq. cm $= \frac{1}{2} \times 3x \times 2x$

108 sq. cm $= 3x^2$

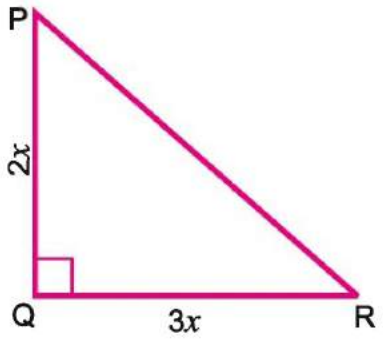
or $3x^2 = 108$

or $x^2 = 36$

or $x = 6$

Base QR of triangle $= 3 \times x$
$= 3 \times 6$
$= 18$ cm

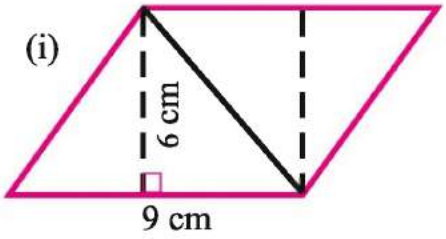
Height PQ of triangle $= 2 \times x$
$= 2 \times 6$
$= 12$ cm



Exercise 16.2

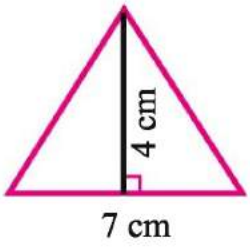
1. Find the area of parallelogram and triangle by observing the following figures.

(i)

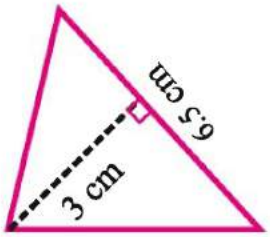


(ii)

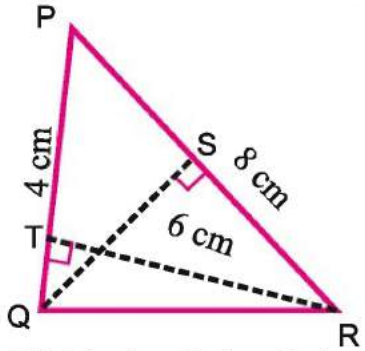
(ii)



(iv)

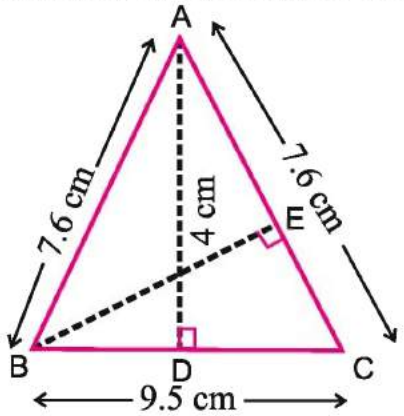


2. The height of a parallelogram is one fourth of its base. If its area is 144 sq. cm. then find its base and height.
3. The areas of triangular field of Kali and rectangular field of Hamida are same. The length and breadth of Hamida's field are 20 cm. and 15 cm. respectively. The length of base of Kali's field is 25 cm., then find out its height?
4. If triangle PQR (attached Figure) PQ = 4 cm., PR = 8 cm., RT = 6 cm, then find out –
   (I) Area of triangle PQR
   (ii) Length of QS



5. Base of a triangle is 8 cm. If altitude of triangle is two times of its base, then find out the area of triangle.

6. ABC is an isosceles triangle in which AB=AC=7.6 cm. and BC=9.5 cm (attached fig.). The perpendicular AD from A on side BC is 4 cm. Find area of triangle ABC and measure of perpendicular BE from B on side AC.



7. Ratio of base and height of a parallelogram is 5 : 2. If area is 640 square cm. then find base and height.

8. Shyam has a rectangular garden of length 95 meter and breadth 80 meter. He wants to plant trees by digging 5 meter broad area outside the garden. Find out the area in which he will plant trees?

9. A 2 meter wide path is present to the inner side of a square ground of side 60 meter. Find out –
   (i) Area of path.
   (ii) Expenditure on cementing the path at the rate of Rs. 270 per square meter.

10. Two pathways parallel to the length and breadth have been constructed in the centre of a rectangular park. Whose length is 125 m. and breadth is 95 m. If width of each pathway is 10 meter. Find out –
   (i) Expenditure on putting soil on the pathway at the rate of Rs. 80 per square meter.
   (ii) Area of putting grass excluding the paths.

16.4.1 Circumference of Circle

Mamta wants to put a moulding frame of plastic around her tea table which is semicircular at both the ends.

Mamta told her sister Meena to bring a frame for this purpose. Meena wants to measure the length of edges of table. But she is facing problem in measuring the ends. Mamta guides her that to measure curved surface use different methods. Let's learn to measure the length of figure of curve. Mamta measured the distance with the help of thread by wraping it to circular bangle. This is known as "circumference" around the circular field.

We can find out circumference by finding out the distance covered in one complete round on a plane surface by putting a mark on the circumference of a circular disc, wheel, bangle etc.

Meena – In all these situations there is problem in finding accurate circumference of a circular part. Lets determine a formula for it.

Mamta – Yes, I have seen that when blacksmith puts an iron rim around a wooden wheel he used to measure the length of diameter and on the basis of the length of diameter he estimates length of rim correctly and then puts it. Come. let's find the relationship between diameter and circumference. Mamta and Meena took 7 circular objects of different radius. They measured them with the help of thread and detected the ratio of circumference and diameter by filling the measurements in the following table.

Circule	Radius	Diameter	Perimeter	Perimeter ÷ Diameter
1	3.5 cm	7.0 cm	22.0 cm	$\frac{22}{7} = 3.14$
2	7.0 cm	14.0 cm	44.0 cm	$\frac{44}{14} = 3.14$
3	10.5 cm	21.0 cm	66.0 cm	$\frac{66}{21} = 3.14$
4	14.0 cm	28.0 cm	88.0 cm	$\frac{88}{28} = 3.14$
5	17.5 cm	35.0 cm	110.0 cm	$\frac{110}{35} = 3.14$

It is clear from the above table that the value of circumference/diameter is almost same for all shapes of different radii. This value is approximately 3.14. This constant is shown by "π" pie.

$$\text{So } \frac{\text{circumference (c)}}{\text{diameter (d)}} = \pi \text{ or } \frac{\text{circumference (c)}}{2 \times \text{radius}} = \frac{c}{2r}$$

$$\text{or } c = \pi d \qquad \text{or } c = 2\pi r$$

So circumference of circular objects = $\pi d = 2\pi r$.

Example 11 Mohan wants to put golden rim on his mother's bangals. How long rim will he use when the radius of bangles is 3.5 cm. (without overlapped).

Solution Radius of circular bangle = 3.5 cm

Circumference of circle = $2\pi r$

$$= 2 \times \frac{22}{7} \times \frac{35}{10} \text{ cm} \quad \left| \; \pi = \frac{22}{7} \right.$$

$$= 22 \text{ cm}$$

Example 12 Diameter of a circular wheel is 11.2 cm. Find the circumference of wheel.

Solution

Diameter of wheel (d) = 11.2 cm

therefore radius (r) = 11.2 ÷ 2 cm = 5.6 cm

Circumference of circular wheel = $2\pi r$

$$= 2 \times \frac{22}{7} \times 5.6 \text{ cm}$$

$$= 35.2 \text{ cm}$$

Example 13 What will be the distance covered by Banwari in rotating a wheel of radius 42 meter in 2 rotations?

Solution Radius of circular wheel = 42 meter

Circumference of wheel = $2\pi r$

$$= 2 \times \frac{22}{7} \times 42 \text{ meter}$$

$$= 264 \text{ meter}$$

$\therefore$ Distance covered by wheel in one round = 264 meter

$\therefore$ Distance covered by wheel in two round = 264×2 meter

= 528 meter

Example 14 Khusboo divides a circular paper plate of radius 14 cm. into two equal parts. Find out perimeter of each semi circular plate (use $\pi = \frac{22}{7}$)

Solution

Radius (r) of plate = 14 cm

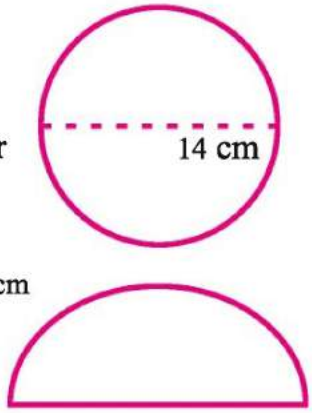
Circumference of circle = $2\pi r$

Therefore, circumference of semicircle = $\frac{1}{2} \times 2\pi r$

$= \pi r$

$= \frac{22}{7} \times 14$ cm

$= 44$ cm



Diameter (d) of circle = 2 × radius

= 2 × 14 cm

= 28 cm

So perimeter of each semicircular plate = Circumference of semicircle + diameter

= 44 cm + 28 cm

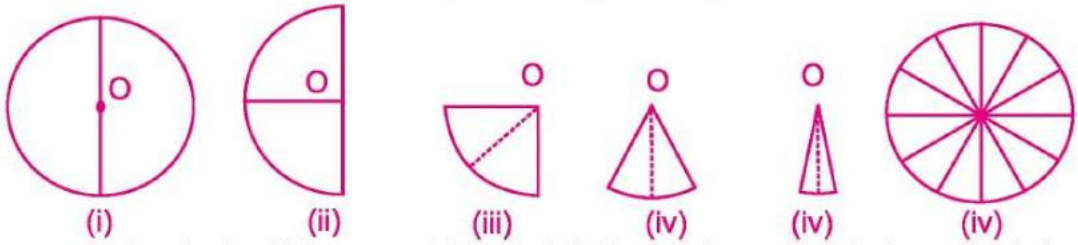
= 72 cm

16.4.2 Area of Circle

Meena wants to put red soil on a circular ground of radius 28 meter, so she is calculating the expenditure for it, if for putting soil on 1 square meter, it costs Rs. 10. Meena's sister told her that here we have to find the area of that circular ground rather than its perimeter.

Both of them cut a circular sheet of transparent paper of radius 2.8 cm by taking scale of 10 meter = 1 cm to show circular part. They tried to determine the area by calculating the squares after putting the sheet on a graph paper. Due to the ends which were not straight they could find only a rough estimation of area. They thought of another method of calculating area:-

Meena folded the circle continuously according to the figure and cut it from crease.



Mamta - We obtained 2 from one, 4 from 2, eight from 4, sixteen from 8 pieces of a circle.

Meena - If we fold like as onwards then we would get double pieces continuously

Mamta - One situation is like that obtained one piece will be triangular with height is equal to radius and base will be so small..

Meena - If we get n pieces then total area of n pieces would be equal to area of circle.

Mamta - Yes, In this case.

Area of circle = Area of {triangle 1 + triangle 2+ triangle 3 + triangle 4+ ----- +---------_+triangle n}

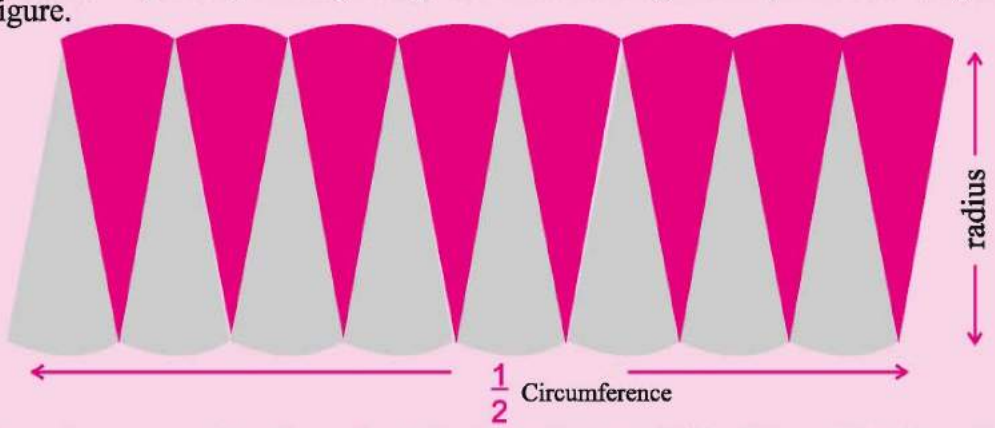
$= \left[\frac{1}{2} b_1 r + \frac{1}{2} b_2 r + \frac{1}{2} b_3 r + \frac{1}{2} b_4 r + \ldots\ldots + \ldots\ldots\ldots + \frac{1}{2} b_n r\right]$

$= \frac{1}{2} r[b_1 + b_2 + b_3 + b_4 + \ldots\ldots\ldots\ldots + b_n]$ $(b_1, b_2, \ldots b_n$ = base of all triangles)

$= \frac{1}{2} r[b_1 + b_2 + b_3 + b_4 + \ldots\ldots + \ldots\ldots\ldots + b_n] = \frac{1}{2} r[2\pi r]$ square unit $\because$ (Circumference $= 2\pi r$)

$= \frac{1}{2} (2\pi r^2)$ square unit $= \pi r^2$ square unit

Activity- Shade the half portion of a circle and folded it 6 times successively and obtained 64 parts by cutting along the crease. Arrange these parts according to the figure.



Do you express the formula of area of circle with the help of it? You will find that this figure is same as rectangle. Its length and breadth are equal to circumference and radius 'r' respectively. If radius of circle is r then.

Area of rectangle = length × breadth

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

Hence area of required circle $= \pi r^2$

Example 15 Find the area of circular disc having 25 cm. as radius. (take $\pi = 3.14$)

Solution: Radius of disc , (r) = 25 cm.

Area of circular disc $= \pi r^2$

$= 3.14 \times (25)^2$

$= 3.14 \times 25 \times 25$

$= 1962.50$ sq.cm.

Example 16 The diameter of a circular garden is 11.2 meter. Find out its area

Solution Diameter d = 11.2 meter

Therefore, radius r = 11.2 ÷ 2 meter

= 5.6 meter

Area of circle = πr^2

$= \frac{22}{7} \times (5.6)^2$ square meter

$= \frac{22}{7} \times 5.6 \times 5.6$ square meter

= 98.56 square meter

Example 17 Area of a circular plate is 2826 square cm. Find the radius of the plate. ($\pi = 3.14$)

Solution Area = 2826 sq. cm

$\pi r^2 = 2826$ sq. cm

$3.14 \times r^2 = 2826$ sq. cm

$r^2 = \frac{2826}{3.14}$ sq.cm

$r^2 = 900$ sq.cm

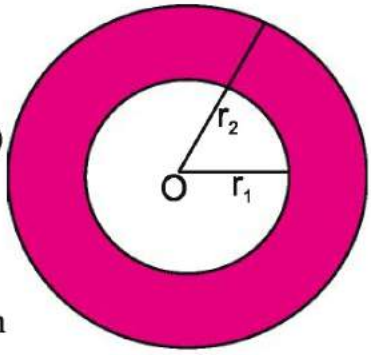
$r = 30$ cm

Example 18 The adjoining figure shows two circles with the same centre. The radius of the larger circle is 12 cm and the radius of the smaller circle is 4cm. Find out –

(i) The area of the larger circle.

(ii) The area of the smaller circle.

(iii) The shaded area between the two circles (π=3.14)



Solution

(i) Diameter of larger circle r_2 = 12 cm

Area of larger circle = πr_2^2

$= 3.14 \times (12)^2$ sq. cm

$= 3.14 \times 12 \times 12$ sq. cm

= 452.16 sq. cm

(ii) Diameter of smaller circle r_1 = 8 cm

Area of smaller circle = πr_1^2

$= 3.14 \times (8)^2$ sq. cm

$= 3.14 \times 8 \times 8$ sq. cm

= 200.96 sq. cm

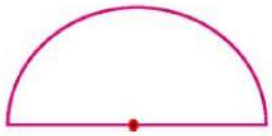
(iii) Area of shaded portion = Area of larger circle – Area of smaller circle

= 452.16 sq. cm – 200.96 sq. cm

= 251.20 sq. cm

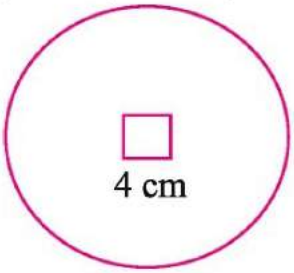
Exercise 16.3

1. Find the circumference of circles having following radius $\left(\pi = \frac{22}{7}\right)$
   (i) 21 cm. (ii) 28 cm (iii) 10.5 cm
2. Find area of the following circles. Given
   (I) radius = 5cm (ii) diameter = 42 meter (iii) radius = 5.6 cm
3. Find the radius of a circular sheet whose perimeter is 132 meter .Also find its area. $\left(\pi = \frac{22}{7}\right)$
4. Circumference of a circle is 44 cm. Find the radius and area of triangle.$\left(\pi = \frac{22}{7}\right)$
5. The given figure is a semi circle with 12 cm. diameter. Find out its circumference.



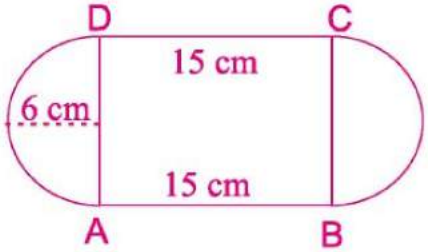
12 cm

6. The radius of a circular pond is 28 meter. A path of 1.4 meter width is present around it. Find the area of path.
7. Area of a circle is 616 square cm. The circle is surrounded by a path 2 meter wide. What is the area of this path?
8. From a circular card sheet of radius 5 cm., a circular sheet of radius of 4 cm. is removed. Find the area of the remaining sheet.($\pi = 3.14$)
9. From a circular card sheet of radius 14 cm., a square of 4 cm. is removed as shown in the adjoining figure. Find the area of the remaining sheet $\left(\pi = \frac{22}{7}\right)$



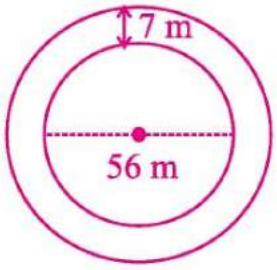
10. The ratio of diameter of two circle is 4 : 5. Find out ratio of their areas.
11. Durga wants to polish a circular table top of diameter 2.8 meter. Find the cost of polishing if the rate of polishing is Rs. 25 per square meter.
12. Gopi ties his horse with a rope of length 12 m. What area of grass can the horse graze upon?

13. In the given figure, two semicircular parts of diameter 12 cm. are added on both the ends of a rectangular part. Length of the part is 15 cm. Find out the area?



14. How many rounds does a wheel of radius 35 meter take in order to cover a distance of 880 meter? $\left(\text{Take } \pi = \frac{22}{7}\right)$

15. How much money does Parvat spend on putting soil on a 7 meter wide path around his circular park at the rate of Rs. 11 per square meter, when the diameter of park is 56 meter? $\left(\text{Take } \pi = \frac{22}{7}\right)$



16. The length of minute hand of a circular watch is 20 cm. How much distance does tip of minute hand cover in 1 hour? ($\pi = 3.14$)

Do and Learn

To show traffic symbols of 5 circular discs are prepared by cutting and iron sheet. Radius of all discs is 21 cm.

Find out the meaning of all these symbols with the help of your teacher and find out circumference and area of discs.

We Learnt

1. Perimeter is the distance around a closed figure wheras area is the part of plane occupied by the closed figure.
2. We have learnt how to find perimeter and area of a square and rectangle in the earlier class. They are :
   (1) Perimeter of a square = 4 × side
   (2) Perimeter of a rectangle = 2 × (length + breadth)
   (3) Area of a square = side × side
   (4) Area of a rectangle = length × breadth
3. Area of a parallelogram = base × height
4. Area of a triangle $= \frac{1}{2}$ (area of the parallelogram generated from it)
   $= \frac{1}{2} \times$ base × height
5. The distance around a circular region is known as its circumference. Circumference of a circle = $2\pi r$ or Circumference = πd, where d is the diameter of a circle and $\pi = \frac{22}{7}$ or 3.14 (approximately).
6. Area of a circle = πr^2, where r is the radius of the circle.