



Sri Sathya Sai
VIDYA VAHINI
श्री सत्यसाई विद्या वाहिनी

Master Lesson Plan

for

10 - Mensuration (ଘରିମିତି)

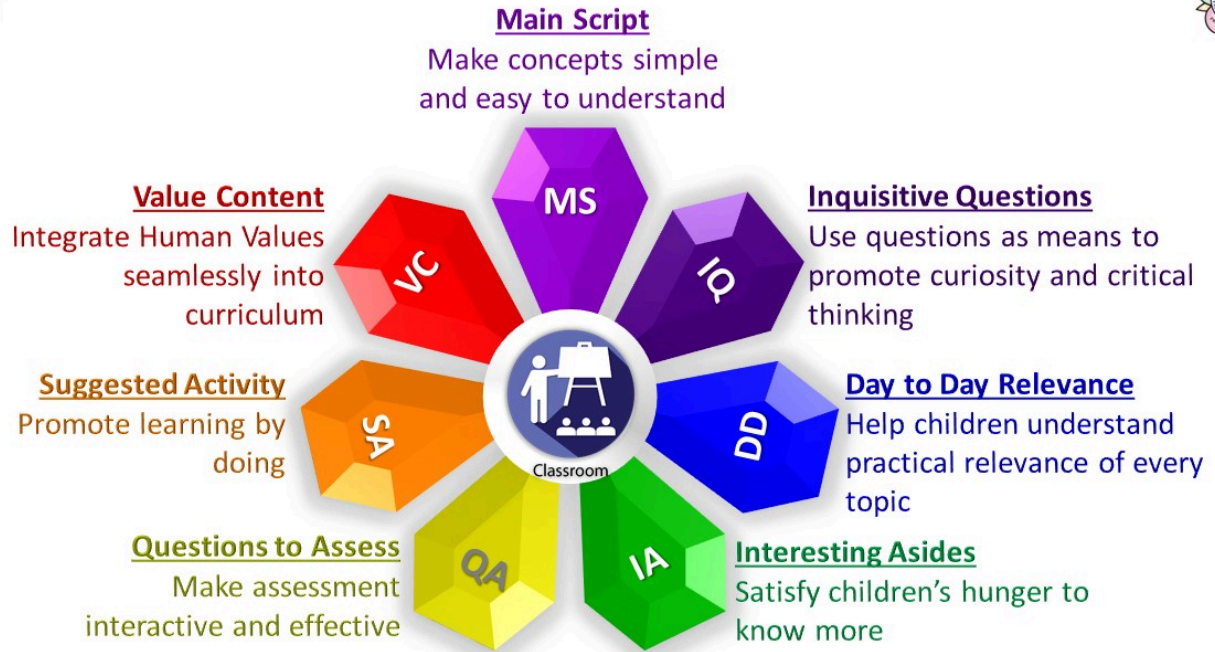
Board	Standard	Subject	Chapter	Language	Creation date
Odisha (English)	STD VII	Mathemat ics	10 - Mensuration (ଘରିମିତି)	English	27-03-2024 13:51:48

DISCLAIMER

1. Strictly not for Commercial use.
2. Provided on **as is** basis with no warranties of any kind.
3. Content that falls in Public Domain or common Knowledge facts can be used freely.
4. Some of the contents are owned by the Third parties and are used in compliance with their licensing conditions. Any one infringing the Copyright of such Third parties will be doing so at their own risks and costs.
5. Content can be downloaded and used for Personal, educational and informational purposes only. Any attempt to remove, alter, circumvent or distort the data that is accessed is Illegal and strictly prohibited.



Master Lesson Plan (MLP) - Covers the entire chapter with the help of these 7 asset types



For more information on how to use the lesson plan effectively, please scroll to the guidelines at the end of this document.

MS_Objectives of Perimeter and Area

Notes to the teacher:

This asset lays down the proposed plan for transacting this chapter.

It states the asset objectives of the MLP. This asset is for teacher's reference and need not be taught to the students.

Students will be able to

1. Observe the variation in area and perimeter of a rectangle.
2. Solve problems on perimeter and area of squares and rectangles.
3. Analyse problems on perimeter and area of squares and rectangles.
4. Appreciate some interesting facts about area and perimeter of Sri Ranganatha Swami temple.
5. Describe a parallelogram and estimate its area and perimeter.
6. Solve problems on area of parallelogram.
7. Explain perimeter and area of a triangle with suitable examples.
8. Solve problems on perimeter and area of a triangle.
9. Analyse problems on area of parallelogram and area of a triangle.
10. Explain the circumference and diameter relationship and obtain the formula for area of a circle.
11. Solve problem on perimeter and area of a circle.
12. Appreciate interesting facts about different informal units used in measurements.
13. List the use of area and perimeter in daily life.
14. Estimate areas of rectangular and circular pathways.
15. Solve problems on area of rectangular and circular pathways.
16. Recognise the need to maintain calm and inner peace in the midst of trials and tribulations.

Time to teach	Asset type	Theme	Sub Theme
3 minutes	Main Script	Perimeter & Area	Area of rectangle and square

SA_Area and Perimeter of a Rectangle - Activity**Area and Perimeter of Rectangle - Activity****Aim:**

To observe the variation in area and perimeter of a rectangle .

Material Required:

Square dotted sheet, a pair of scissors and observation sheet(one each per team)

Observed Shape	Area (unit ²)	Perimeter (units)
Rectangle		
Fig 1		
Fig 2		
Fig 3		
Fig 4		

Note to the teacher: The teacher can print the observation sheet or can draw the table on the board for the students to copy in their notebooks.

Setting of Activity: Indoor

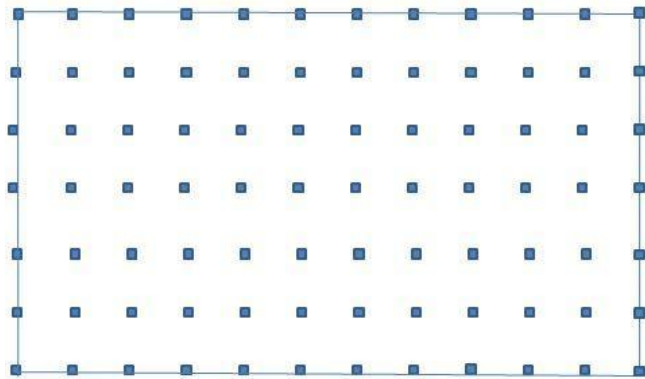
Type of Activity: Group activity, Experiment by students

Instruction to teacher:

- Teacher should ask the students to come prepared with materials required prior to the day of the activity.
- Teacher divides the class into groups of 4 students each.
- Teacher explains the activity as given in the procedure.

Procedure:

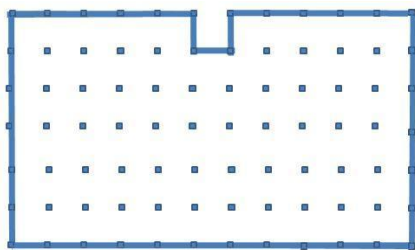
1) On a square dotted sheet(graph sheet could also be used), draw a rectangle (12 x 7) as shown below



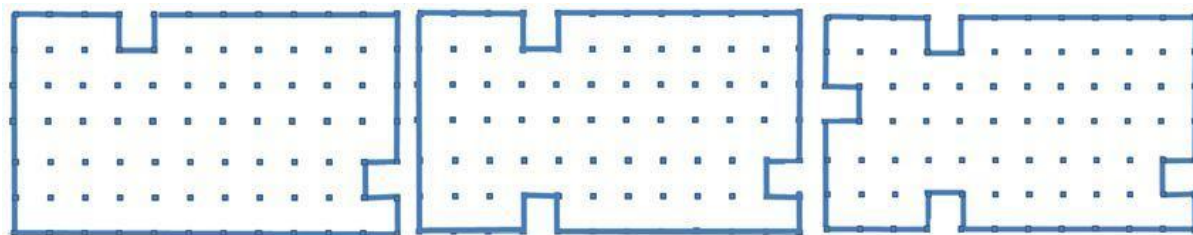
2) Find the perimeter and area of the rectangle and record the values in observation table.

Observed Shape	Area (unit ²)	Perimeter (units)
Rectangle	66	34
Fig 1		
Fig 2		
Fig 3		
Fig 4		

3) Take the rectangle and cut a square of side 1 unit from one side of the rectangle. Find the perimeter and area of the rectangle. Record the values.



4) Cut squares of side 1 unit from the other three sides in succession and each time record the perimeter and area of the shape (Refer diagram below)



5) Students in the group should take turns to perform the activity and record the values.

Observation:

The variation in area and perimeter in the rectangle is observed and noted in the table

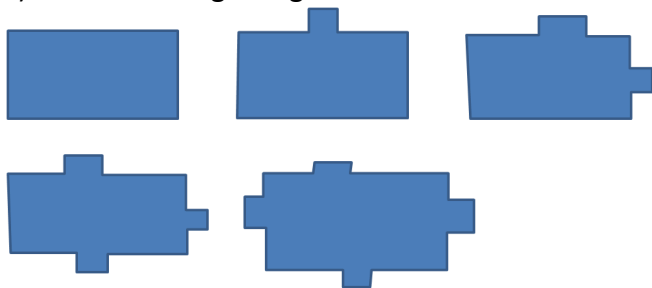
Observed Shape	Area (unit ²)	Perimeter (units)
Rectangle	66	34
Fig 1	65	36
Fig 2	64	38
Fig 3	63	40
Fig 4	62	42

1. The first rectangle has the largest area but least perimeter.
2. The last figure has the least area and largest perimeter.

Conclusion: As the perimeter of the figure increases, the area of the figure decreases.

Questions to ponder:

1) Observe the figures given below and state the relation between the area and perimeter.



Expected Answer: As the perimeter of the figure increases the area also increases

2) Give one example of a situation where as perimeter increases, the area also increases.

Expected Answer: As the radius of a circle increases, its area also increases and perimeter also increases.

Precautions:

The teacher should ask the students to handle a pair of scissors cautiously.

Image Source: Original Contribution by akshayssvv@gmail.com

Time to teach	Asset type	Theme	Sub Theme
20 minutes	Suggested Activity	Perimeter & Area	Perimeter of rectangle

QA_Problems on Area and Perimeter of Rectangles and Squares

Problems on Area and Perimeter of Squares and Rectangles

Tick the correct answer:

i) Length of a rectangle is 10 cm and breadth is half of it. Then the area of rectangle is

- a. 50 cm²
- b. 5 cm²
- c. 10 cm²
- d. 100 cm²

ii) The area of a square with perimeter 100 cm is

- a. 50 cm²
- b. 625 cm²
- c. 100 cm²
- d. 25 cm²

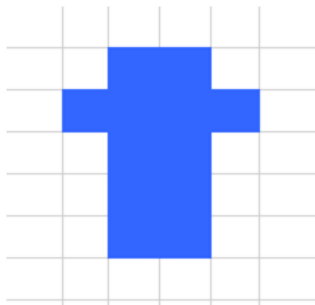
iii) The side of a regular pentagon of perimeter 50 cm is

- 15 cm
- 25 cm
- 10 cm
- 5 cm

iv) Perimeter of rectangle is 36 cm and breadth is 6 cm then length of rectangle is

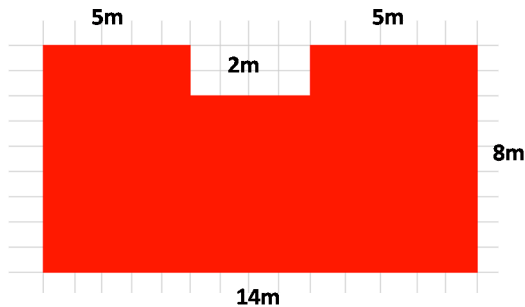
- 1. 20 cm
- 2. 6 cm
- 3. 18 cm
- 4. 12 cm

v) The perimeter of this shape (each square has a side length of 1 cm).



1. 12 cm
2. 18 cm
3. 20 cm

vi) The diagram shows the plan view of a small pool. What is the perimeter of the pool?



1. 34 m
2. 40 m
3. 48 m

Fill in the blanks:

- The distance covered along the boundary of a closed figure is called the _____ (perimeter).
- The amount of surface enclosed by a closed figure is _____ (area).
- All the sides of a regular polygon are _____ (equal).
- We find the _____ (perimeter) if we want to know the wood stick required to make a picture frame.

Classify as true or false statement:

- 1.If both length and breadth of a rectangle are doubled then, its perimeter is doubled. True
- 2.The perimeter of a regular hexagon with side 3 cm is 9 cm. False
- 3.For carpeting a room we find its area. True
- 4.An increase in the perimeter need not lead to increase in area of figure. True
- 5.Rectangles with same perimeter have equal areas. False

Solve the following

1) Find the area of a rectangle whose perimeter is 30 units and whose width is 5 units.

$$P = 2l + 2w$$

$$30 = 2l + 10$$

$$l = 10 \text{ units}$$

$$\text{Area} = l \times w = 10 \times 5$$

Answer: (50 unit²)

2) Suppose you had a rectangle whose length was 40 meters and whose width was 15 meters. Could you construct a second rectangle with the same area, but with a length of 25 meters? What would be the width of the second rectangle? How would you compare the perimeters?

$$l = 40 \text{ m } w = 15 \text{ m}$$

$$\text{Area} = l \times w = 40 \times 15 = 600 \text{ sq.m}$$

$$\text{If } l = 25 \text{ m, then new } w = \text{Area} / l = 600 / 25 = 24 \text{ m}$$

$$\text{Perimeter of 1st rectangle} = 2l + 2w = 80 + 30 = 110 \text{ m}$$

$$\text{Perimeter of new rectangle} = 2l + 2w = 50 + 48 = 98 \text{ m}$$

Answer: Width of the second rectangle is 24 meters. Perimeters are 110 meters and 98 meters respectively

3) A farmer plans to add barbed wire to the fence around his rectangular shaped field. The length of the field is 132 meters and its width is 126 meters. Find the following:

a) How much barbed wire will he need?

b) How much will the barbed wire cost if it sells Rupees 30 a meter?

c) How many square meter of area will the barbed wire enclose?

$$a) l = 132 \text{ m}$$

$$w = 126 \text{ m}$$

$$P = 2l + 2w = 264 + 252 = 516 \text{ m}$$

$$b) \text{ Cost of wire} = 516 \times 30 = \text{Rs.}15480$$

$$c) \text{ Area enclosed} = l \times w = 132 \times 126 = 16632 \text{ sq.m}$$

Answers: a) 516 meters b) Rs 15,480 c) 16,632 meter²

4) The area of a square plot is 108900 square meters. How many meters of fencing would be required to construct a fence around it?

$$\text{Area} = \text{side} \times \text{side}$$

$$108900 = \text{side} \times \text{side}$$

$$\text{side}(a) = 330 \text{ m}$$

Answer: The side of the square $a = 330$ meters. Fencing required is its perimeter $= 4a = 1320$ meters

Note: Worksheet with additional questions attached.

Time to teach	Asset type	Theme	Sub Theme
20 minutes	Questions to Assess	Perimeter & Area	Area of rectangle and square

IA_Amazing facts about Sri Ranganatha Swami Temple

Amazing facts about Sri Ranganatha Swami temple



There are 108 holy temples of Lord Vishnu in India but the foremost of these is the Sri. Ranganatha Swami temple in Tamil Nadu.

This temple complex is one of the largest of its kind. It is the biggest functioning Vaishnava temple in the world.

The temple is situated on the island of Srirangam. It is surrounded by two rivers - Cauvery and Kollidam (a tributary of Cauvery).

The area of the huge temple complex is 156 acres and its perimeter is around 4 kms (10,710 feet) .



The temple is unique. It is in fact a temple town. The temple has 7 prakarams (concentric rectangular enclosures).

These enclosures are formed by thick and huge walls. The inner 5 enclosures constitute the temple and the outer two enclosures function as the settlements.

The 7 enclosures together make up the temple town of Srirangam. The topology of the temple is one of its kind.

Image Source:

Front View of the temple: This image was originally posted to Flickr by Prof. Mortel at <https://flickr.com/photos/43714545@N06/37254366620>. It was reviewed on 15 November 2017 by FlickreviewR 2 and was confirmed to be licensed under the terms of the cc-by-2.0.

Side View of the temple:

[https://commons.wikimedia.org/wiki/File:Trichy,_Sri_Ranganathaswamy_Temple_\(6993763451\).jpg](https://commons.wikimedia.org/wiki/File:Trichy,_Sri_Ranganathaswamy_Temple_(6993763451).jpg) (Author- Arian Zwegers)

Time to teach	Asset type	Theme	Sub Theme
4 minutes	Interesting Asides	Perimeter & Area	Perimeter of rectangle

MS_Area and Perimeter of a Circle

Area and Perimeter of a circle

Introduction

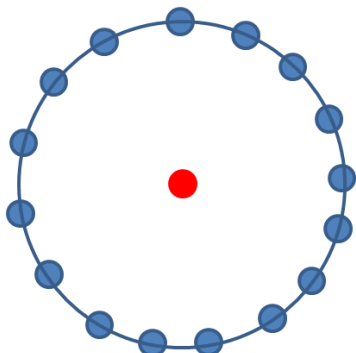
Many articles that we see around us like coins, bangles, compact discs etc are round in shape.



Any round shaped figure is called a Circle.

Definition

A Circle is the path of all the points that are equidistant from a fixed point on a given surface.



The fixed point is called the centre of the circle.

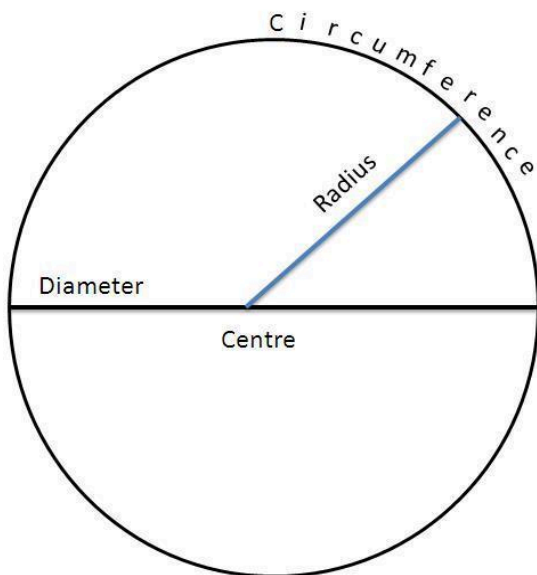
PARTS OF CIRCLE

Origin/Centre - The centre of the circle is also called its origin.

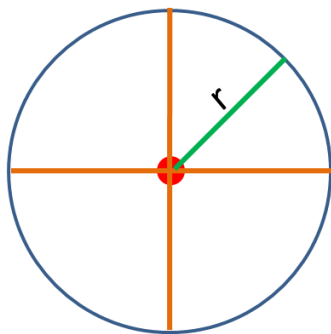
Diameter - The longest distance from one end of a circle to the other end is called the diameter. It always passes through the centre of the circle.

Radius - The distance from the origin of the circle to any point on the circle is called the radius.

Circumference - The distance around a circle is called the circumference.



Relation between diameter and radius

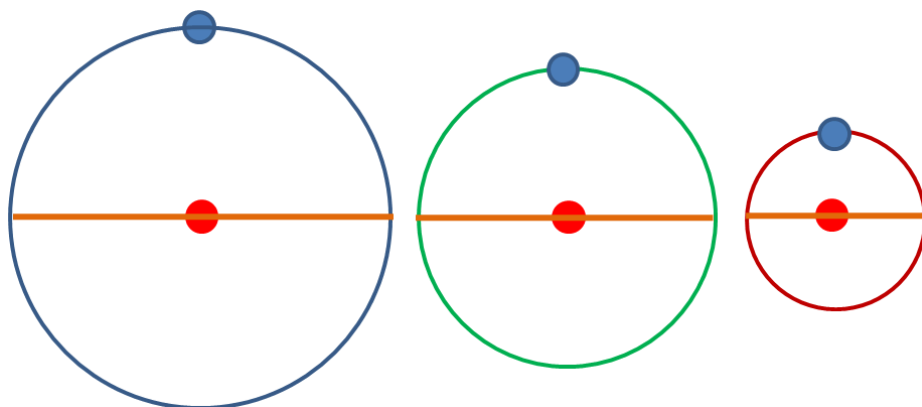


The diameter(d) of a circle is double the radius(r) of the circle. Hence, the radius is half of the diameter of a circle.

Diameter $d=2r$

Relation between diameter and circumference

Take three or four circular discs A, B, C, D of different sizes or draw 3 or 4 circles of different radii. Measure the lengths of the circumference of each of the discs with the help of a piece of thread. Find their diameters and complete the following table.



Name of the disk	Diameter d	Circumference c	Ratio c/d
A			
B			
C			
D			

You will see that the value of the ratio is slightly greater than 3, i.e. between 3.1 and 3.2.

Thus, the ratio of the circumference of a circle to its diameter is the same for all circles, regardless of their sizes. This ratio is denoted by the Greek letter π .

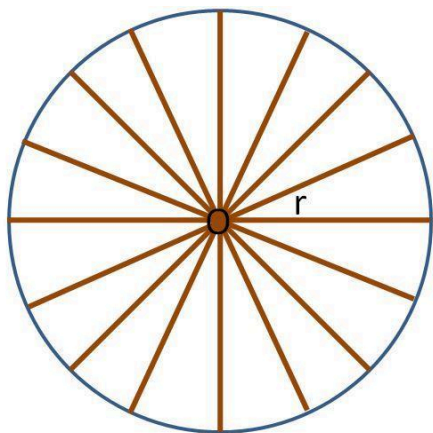
Note that we cannot write π in the form p/q , p, q integers, $q \neq 0$. In other words, the ratio π is irrational.

We have $c/d = \pi$ or $c = \pi d = 2\pi r$ ($d = 2r$) where c = circumference, d = diameter and r = radius of the circle.

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

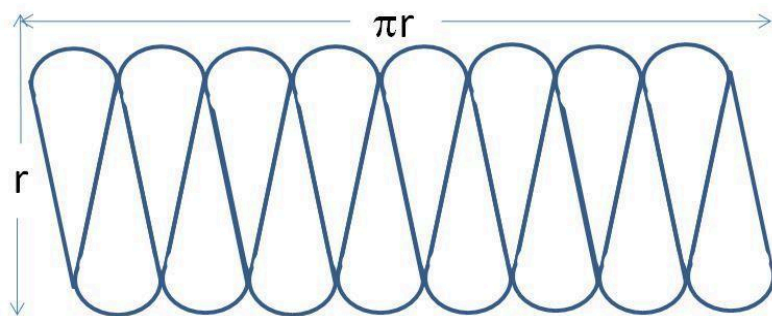
The rational approximation of π is $22/7$ or 3.14 or 3.1416

Area of a circle



Draw a circle with any given radius say r cm.

Now cut the circle into 16 sectors with the help of scissors and arrange them in the form of a rectangle as shown in figure.



The area of the circle is equal to the area of the figure formed.

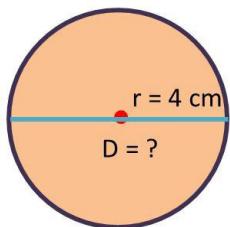
The figure is nearly in the form of a rectangle. Its length l is approximately equal to the sum of the arcs of 8 sectors out of a total of 16 sectors $\frac{1}{2}$ circumference of circle = πr cm and its breadth b is approximately r cm.

If the circle can be divided into as large as a number of equal sectors as possible, and these sectors are arranged as shown above, the arcs of these sectors are very small and may be considered as straight lines.

In this way the area of the circle will be very close to the area of a rectangle of length πr and breadth r . Hence the area of a circle of radius $r = \pi r \times r = \pi r^2 \text{ cm}^2$

Examples:

1) If radius of a circle is 4 cm, find its diameter.



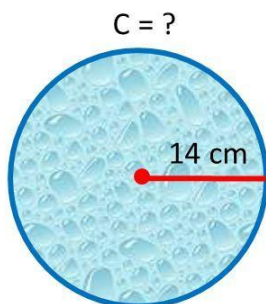
Solution :

Diameter = 2 x radius

$\Rightarrow$ Diameter = 2 x 4

$\Rightarrow$ Diameter = 8 cm.

2) A circular swimming pool has a radius of 14 m. Find the circumference of the pool.



Solution:

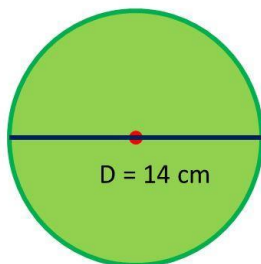
$$C = 2\pi r$$

$$= 2 \times \frac{22}{7} \times 14$$

$$= 88$$

So, the circumference of the pool is 88 m.

3) Find the area of a circle with a diameter 14 cm long. Use $\pi = 22/7$



Diameter $d = 14$, radius $r = 14/2 = 7 \text{ cm}$

Area $A = \pi r^2 = (22/7) \times 7 \times 7 = 154 \text{ cm}^2$

Image Source:

Coin

<https://pixabay.com/photos/coin-currency-money-finance-indian-4138688/>

Compact Disc

<https://pixabay.com/vectors/disc-pink-cd-compact-disc-dvd-153701/>

Bangle

SSSVV Gallery - Keyword - Bangle

All other images original contribution by sailakshmi1973@gmail.com

Time to teach	Asset type	Theme	Sub Theme
15 minutes	Main Script	Perimeter & Area	Definition of Perimeter

QA_Questions on Perimeter and Area of Circle

Fill in the blanks

- The collection of all those points in a plane which are at a constant distance from a fixed point is called a **Circle**.
- The distance around a circular region is known as its **circumference**.
- The ratio of the circumference of a circle to its diameter is denoted by **pi**.
- The circumference of a circle is equal to two pi times the **radius** of the circle.
- The **area** of a circle is equal to pi times the squares of its radius.
- Two or more circles with the same center are called **concentric** circles.

Answer the following

1) A diameter of a circle is 14 cms. What is its area? $\pi = 22/7$

Solution

$$d = 14 \text{ cm}$$

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

$$\text{Area} = \pi \times r^2 = (22/7) \times 7 \times 7 = 154 \text{ cm}^2$$

2) The circumference of a circle is 31.4 inches. What is its area? Use $\pi = 3.14$

Solution

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

$$2\pi r = 31.4$$

$$r = 5 \text{ inch}$$

$$\text{Area} = \pi \times r^2 = 3.14 \times 5 \times 5 = 78.5 \text{ sq.inch}$$

3) There is a circular play ground of area 154 sq m. What is the radius of this circular play ground? What is the perimeter of the ground?

Solution-

$$154 = 22/7 \times r \times r$$

$$r = 7 \text{ m}$$

$$\text{Perimeter} = 2 \times 22/7 \times 7$$

$$\text{Perimeter} = 44 \text{ m}$$

4) A diameter of one circle is 45 inches and a diameter of a second circle is 15 inches. Find the ratio of their areas.

Solution

$$D_1/D_2 = 45/15 = 3/1$$

$$2r_1/2r_2 = 3/1$$

$$r_1/r_2 = 3/1$$

$$\text{Area of circle} = \pi \times r^2$$

$$\text{Ratio of area of circles} = \pi \times r_1^2 / \pi \times r_2^2 = r_1^2 / r_2^2 = 3^2 / 1^2 = 9/1$$

5) A road roller makes 200 revolutions while covering 2200 m. Find the radius of the roller.

Solution

Distance covered = 2200 m

Distance covered = No. of revolutions X Circumference of roller

$2200 = 200 \times \text{circumference}$

Circumference = 11 m

$2\pi R = 11$

$R = 11/2\pi$

Radius $R = 1.75$ m

6) The minute hand of a circular clock is 15 cm. How far does the tip of the minute hand move in 1 hour?

Solution

In one hour, minute hand covers one revolution. Distance covered in one revolution is equal to circumference of circular clock.

Distance covered = Circumference

$= 2\pi R$

$= 2\pi \times 15$ (here R is the length of minute hand)

$= 30\pi = 30 \times 3.14 = 94.2$ cm

Note: Extra questions attached as document.

Time to teach	Asset type	Theme	Sub Theme
20 minutes	Questions to Assess	Perimeter and Area	

MS_Area and Perimeter of a Parallelogram

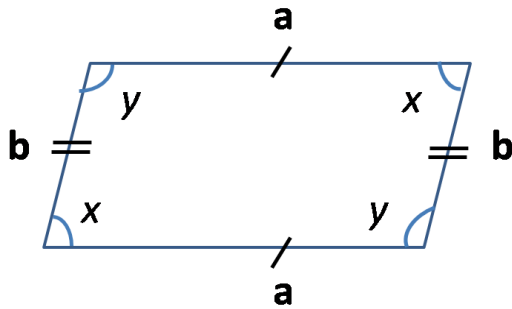
Area and Perimeter of a parallelogram

Introduction

Any four sided polygon is called a Quadrilateral.

Some of the types of quadrilaterals are square, rectangle, parallelogram etc.

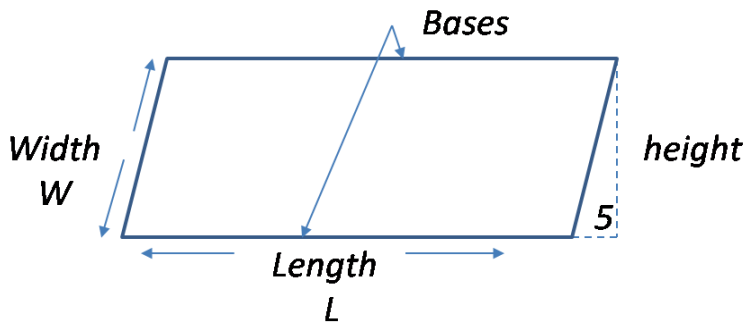
A Parallelogram is a quadrilateral whose opposite sides are parallel and equal in length.



In a parallelogram,

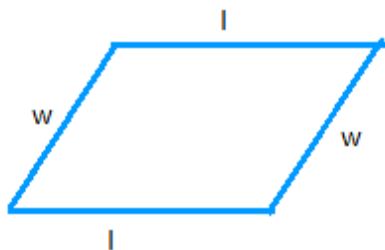
- Opposite sides are equal
- Opposite angles are equal
- Sum of adjacent angles is 180° ie $x+y=180^\circ$

The distance between these parallel sides is called the height or altitude and the parallel sides are called the bases.



Perimeter of a parallelogram

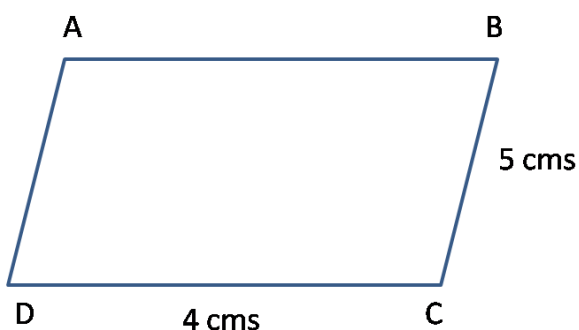
The opposite sides of a parallelogram are congruent. Therefore, if you know the length of one side you know the length of its opposite side.



If the two adjacent sides of a parallelogram are l and w then its perimeter is $2(l + w)$

Example :

Find the perimeter of the parallelogram ABCD.



Solution:

Perimeter of the parallelogram ABCD = $2(l+w) = 2(4+5)$ cm and

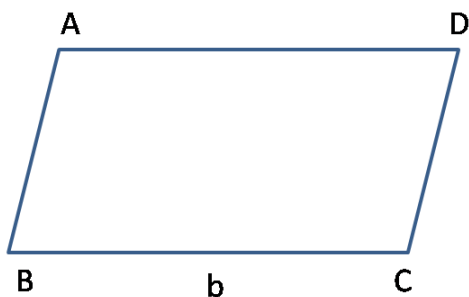
Perimeter = 18 cm

Area of a parallelogram

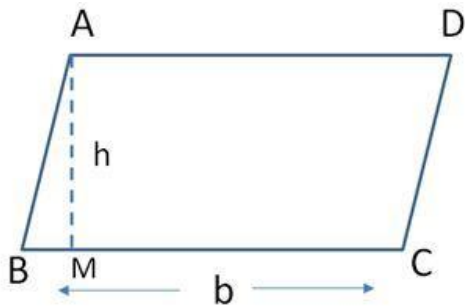
We derive the formula for the area of a parallelogram by moving a piece of the parallelogram so as to make a rectangle with the same area, which is easier to calculate.

Derivation of area formula

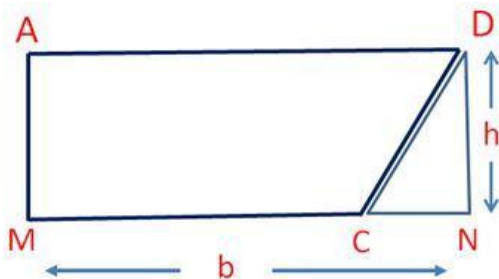
1. Consider a parallelogram ABCD with base length b .



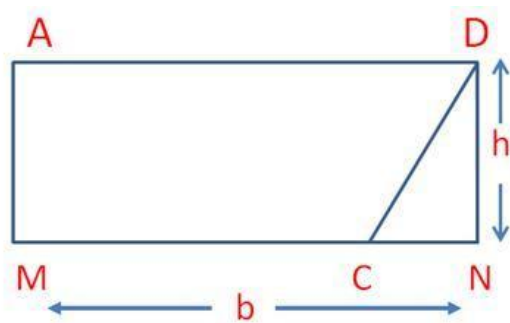
1. Draw perpendicular AM on BC.



1. Note that AM is the height h of the parallelogram.
2. Also base $b = BM + MC$
3. Cut off the triangular section ABM



- Move the cut section to touch the original so as to create a rectangle AMND whose area is clearly the same as the area of original parallelogram.



Note that after moving the triangular section $BM = CN$

Length of the rectangle = $MN = MC + CN = MC + BM = BC = b$ and breadth of the rectangle = h

Area of the parallelogram = Area of rectangle AMND = $b \times h$

Area of the parallelogram = $b \times h$

Illustrations

Example-1. Find the area of a parallelogram if a side measures 5.7 cms and the corresponding

height is 3 cms.

Solution

The area of the parallelogram= $b \times h$

Base $b = 5.7$ and height $h = 3$

Area $A = b \times h = 5.7 \times 3 = 17.1 \text{ cm}^2$.

Example 2: Find the base of the parallelogram given its area is 800 cm^2 and its height is 20 cm.

Solution:

The area of the parallelogram= $b \times h$

$$800 = b \times 20$$

$$800/20 = b$$

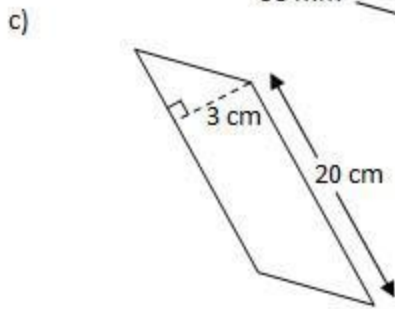
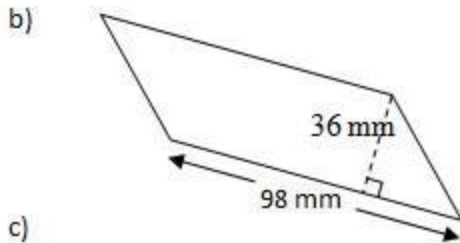
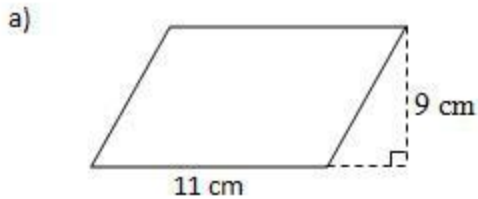
$$40 \text{ cm} = b.$$

Image Source: Original Contribution by sailakshmi1973@gmail.com

Time to teach	Asset type	Theme	Sub Theme
15 minutes	Main Script	Perimeter & Area	Finding areas of Quadrilaterals

QA_Questions on Area of Parallelogram

Find the area of the following parallelograms:



Answers:

Area of parallelogram = $b \times h$

Applying the above formula to all parallelograms, we get

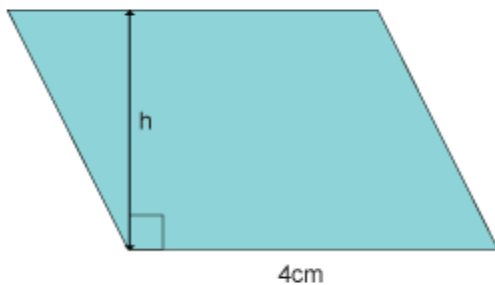
a. 99 cm^2

b. 3528 mm^2

c. 60 cm^2

Solve the following

1) The area of this parallelogram is 12 sq.cm. What is its perpendicular height?



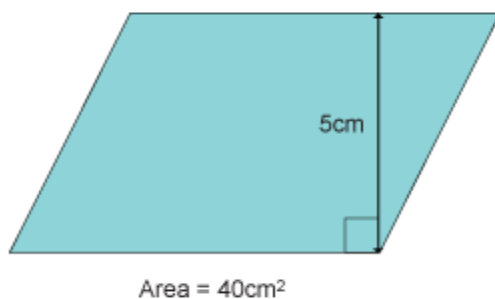
Solution

Area of parallelogram = $b \times h$

$$12 = 4 \times h$$

$$h = 3 \text{ cm}$$

2) Find the length of the base of this parallelogram:

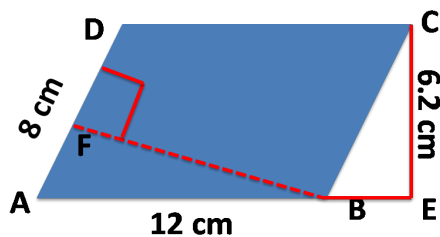


Area of parallelogram = $b \times h$

$$40 = b \times 5$$

$$b = 8\text{cm}$$

3) In a parallelogram ABCD, $AB = 12 \text{ cm}$, $AD = 8 \text{ cm}$ and $CE = 6.2 \text{ cm}$.



Find the

a) Area of parallelogram

b) The length BF

Solution

Area of parallelogram ABCD = $b \times h$

$$= AB \times CE$$

$$=12 \times 6.2$$

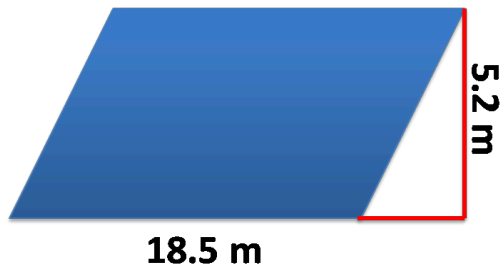
$$=74.4 \text{ sq.cm}$$

Area of parallelogram ABCD =AD x BF

$$74.4=8 \times BF$$

$$BF=9.3 \text{ cm}$$

4) A garden is in the shape of a parallelogram with base 18.5 m and altitude 5.2 m. Find the cost of gardening the whole garden if the gardener charges Rs.5 per sq.m.



Solution

Area of garden = b x h

$$=18.5 \text{ m} \times 5.2 \text{ m}$$

$$= 96.2 \text{ sq.m}$$

Cost of gardening= 96.2 x 5

$$= \text{Rs.}481$$

Time to teach	Asset type	Theme	Sub Theme
15 minutes	Questions to Assess	Perimeter & Area	Parallelograms on same base and between same parallels

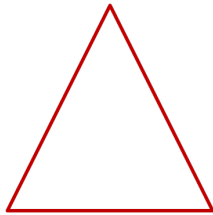
MS_Perimeter and Area of Triangle

Perimeter and Area of a triangle

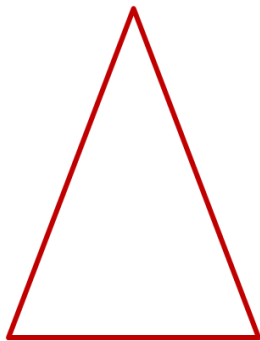
Introduction

A triangle is a three sided polygon. Triangles are classified based on their sides as Equilateral, Isosceles and Scalene.

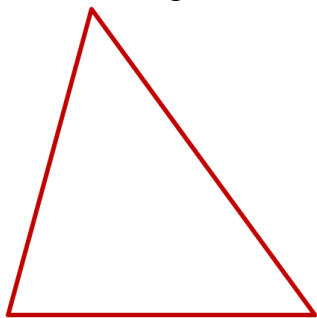
Equilateral triangles - All 3 sides equal



Isosceles triangle - Any two sides equal

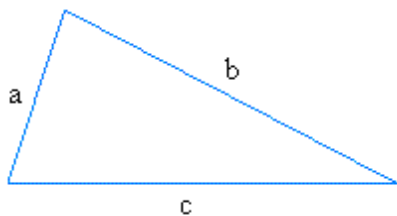


Scalene triangle - All three sides are unequal



Perimeter of a triangle

Consider a triangle consisting of sides a , b and c .



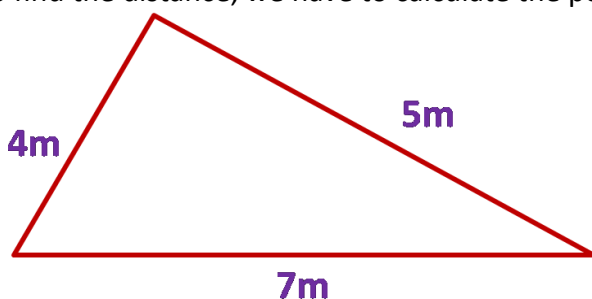
Perimeter of the triangle = $a + b + c$

Example

A man walks around the triangular shaped pathway each side of length 4 m, 5 m and 7 m find the distance he covered by walking it around once.

Solution :

To find the distance, we have to calculate the perimeter of the triangle.



Perimeter of the triangle = $a + b + c$

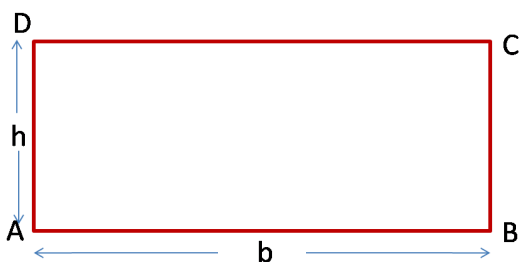
$$= 4 + 5 + 7$$

$$= 16 \text{ m}$$

The man covers a distance of 16 m.

Area of a right angled triangle

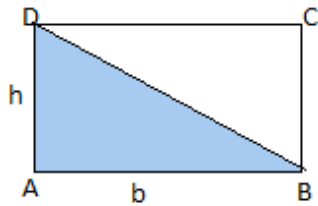
Consider a rectangle ABCD as shown below



Let the length of the rectangle ABCD be b and breadth be h .

The area of the rectangle = $b \times h$

Join the diagonal BD of rectangle ABCD.



The rectangle ABCD is divided into two right angled triangles of equal size. Observe that triangle ABD and triangle CBD are congruent to each other (SSS / RHS congruency rule).

Thus, $2 \times \text{area of triangle ABD} = \text{area of rectangle ABCD} = b \times h$

Area of ABD = $\frac{1}{2} \times b \times h$

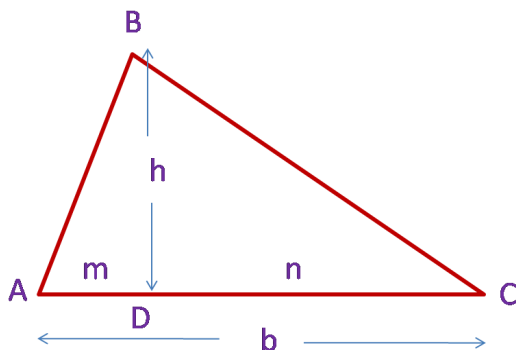
In the formula, $b = AB$ is known as base of the triangle and $h = AD$ is its height.

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

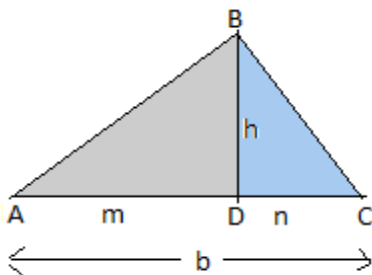
Verification of formula

Note that the above formula was derived for a right angled triangle. Hence it is necessary to verify if it holds good for other types of triangles also.

Consider a triangle ABC



Draw a line BD through B perpendicular to AC.



Let $AD = m$ and $CD = n$. Height of the triangle is h and base is b .

Area of ABC = Area of ABD + Area of CBD

$$= \frac{1}{2} \times m \times h + \frac{1}{2} \times n \times h$$

$$= \frac{1}{2} \times h (m + n) = \frac{1}{2} \times h \times b$$

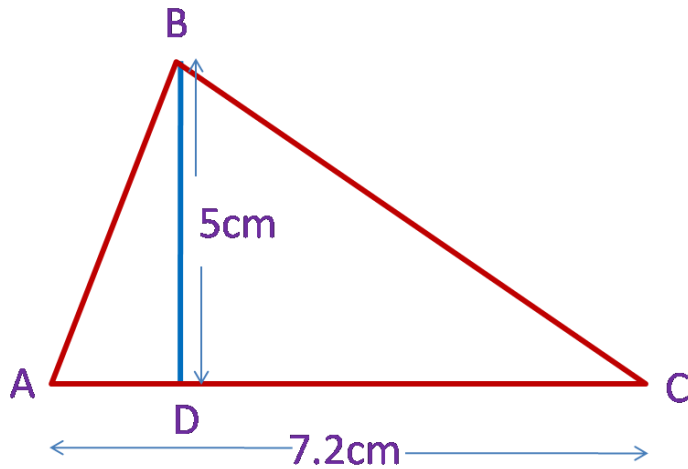
Area of triangle = $\frac{1}{2} \times h \times b$

Examples

1) Find the area of a triangle, whose base measures 7.2 cm and height is 5 cm.

Solution

Base $b = 7.2$ cms and height $h = 5$ cms.

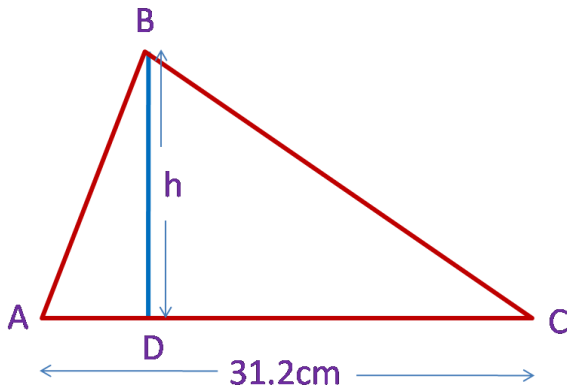


Area of the right triangle = $\frac{1}{2} \times b \times h = \frac{1}{2} \times 7.2 \times 5 = 18 \text{ cm}^2$.

2) Find the height of a triangle, if its area is 624 cm^2 and the base is 31.2 cm .

Solution

Area A = 624 cm^2 and base b = 31.2 cm



$$A = \frac{1}{2} \times b \times h$$

$$624 = \frac{1}{2} \times 31.2 \times h$$

$$h = (624 \times 2) / 31.2 = 40 \text{ cm}$$

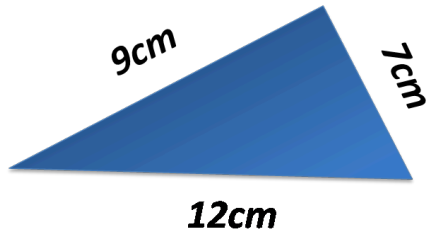
Image Source: Original contribution by sailakshmi1973@gmail.com

Time to teach	Asset type	Theme	Sub Theme
15 minutes	Main Script	Perimeter & Area	Relation between

			area of triangle and parallelogram
--	--	--	---------------------------------------

QA_Questions on Perimeter and Area of a Triangle

- 1) Find the perimeter, P , of the triangle shown below.

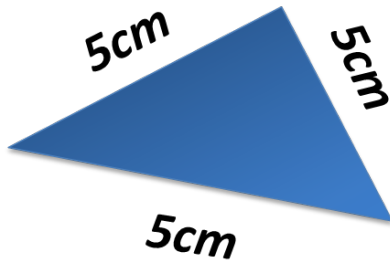


Solution:

$$\begin{aligned} P &= 12 + 9 + 7 \\ &= 28 \end{aligned}$$

So, the perimeter is 28 cm.

- 2) Find the perimeter of an equilateral triangle with each side measuring 5 centimeters.

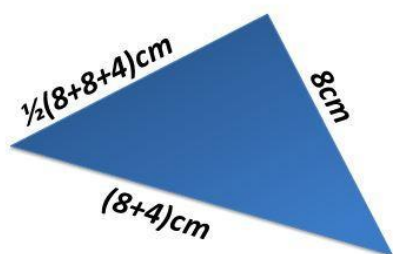


Solution:

$$\begin{aligned} P &= 5 \text{ cm} + 5 \text{ cm} + 5 \text{ cm} \\ &= 15 \text{ cm} \end{aligned}$$

So, the perimeter is 15 cm.

- 3) Find the perimeter of the triangle, if the first side is of 8 cm long; the second side is 4 cm longer than the first side; and the third side measure is half of the sum of that of the first and the second sides.



Solution

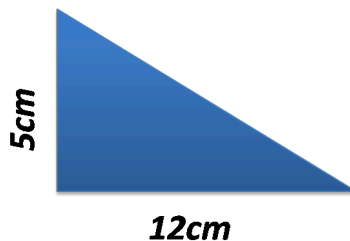
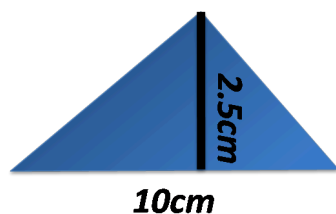
The second side is $8\text{ cm} + 4\text{ cm} = 12\text{ cm}$ long in accordance with the problem condition.

The third side is $(8\text{ cm} + 12\text{ cm})/2 = 10\text{ cm}$ long in accordance with the problem condition.

The perimeter of the triangle is the sum of the measures of its sides. Therefore, it is equal to $8\text{ cm} + 12\text{ cm} + 10\text{ cm} = 30\text{ cm}$.

Answer. The perimeter of the triangle is 30 cm.

4) Find the area of the following triangles



Solution:

Area of triangle XYZ = $\frac{1}{2} \times 10 \times 2.5 = 12.5\text{ sq.cm}$

Area of triangle OEF = $\frac{1}{2} \times 12 \times 5 = 30\text{ sq.cm}$

5) Find the area of an acute triangle with a base of 45 inches and a height of 10 inches.

Solution: Area = $\frac{1}{2} b.h$

= $\frac{1}{2} 45\text{ inches} \times 10\text{ inches}$

= $\frac{1}{2} \times 450\text{ sq.inches}$

Area = 225 sq.inches

6) The area of a triangular-shaped mat is 18 square feet and the base is 3 feet. Find the height.

Solution:

Given: Area = 18 sqft

base = 3 feet

height = ?

Area = $\frac{1}{2} b.h$

$18 = \frac{1}{2} \times 3 \times h$

Multiplying both sides of the equation by 2, we get:

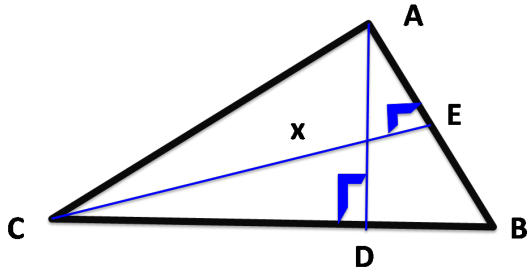
$36\text{ ft}^2 = (3\text{ ft}) \cdot h$

Dividing both sides of the equation by 3 ft, we get: $12 \text{ ft} = h$

Commuting this equation, we get:

$$h = 12 \text{ ft}$$

7) In triangle ABC, $BC=12 \text{ cm}$, $AD=15 \text{ cm}$ and $AB=10 \text{ cm}$. Find the area of triangle ABC and length of CE.



Solution:

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

$$= \frac{1}{2} \times 12 \times 15$$

$$= 90 \text{ sq.cm}$$

Again, from the figure,

$$\text{Area of triangle ABC} = \frac{1}{2} \times AB \times CE$$

$$90 = \frac{1}{2} \times 10 \times CE \quad (\text{From above calculations})$$

$$CE = 18 \text{ cm}$$

Image Source: Original contribution by sailakshmi1973@gmail.com

Time to teach	Asset type	Theme	Sub Theme
15 minutes	Questions to Assess	Perimeter & Area	

IA_Different Units used in Measurement

Different units used for measurement

1. Units used in Zari Work

A variety of decorative designs are stitched on to pieces of cloth using threads. This work is called Zari work. Raw materials required for Zari work are light in weight, thin, yet expensive. They are sold in the market in different units. One such informal unit is called “mutthi” or “fist full”. The Zari workers estimate the measure of required raw materials in measure of fist fulls.

2. Units used in Leather Works

Making of wallets, bags, purses, shoes, etc., in leather, requires estimation of leather in different units of lengths and area. The standard units of measurements are inches, foot, square meter, etc.. However, some indigenous units are also used for procuring raw leather like 'Waar', 'Desi', etc.

'Desi' is unit of area measure of leather of dimension 4 inches x 4 inches. For example, for making a bag, a leather piece of an area 1 foot x 1 foot would be required. This is covered by exactly 9 Desi of leather.

'Waar' is a unit of length measure of zippers (used in purses, bags, etc.). The size of zippers is indicated in counts from No. 1 to 8 that show varying width.

3. Traditional Measurement units for pieces of land

We know that in cities, square feet is the common unit of area measure in apartments. The pieces are quoted per square feet. Other units of area measurement are acres, square meters, etc.

However, in some places in India, informal units of area measurement like “khattha”, “bigha” are also still used for measuring area of land.

1 Bigha = 20 Khattha

1 Khattha is around 1300 square feet (though it may vary from place to place).

4. Flower strings

Flower strings are used in India for worship and religious purposes. They are also adorned on hair by ladies. The floral strings are sold in the market in bits, measured from the elbow to the tip of the finger.

Time to teach	Asset type	Theme	Sub Theme
5 minutes	Interesting Asides	Measurement	Area and Perimeter

DD_Use of Area and Perimeter in our Daily life

Calculation of area and perimeter has a lot of relevance in our daily life. For example,

1) A painter calculates the area of walls to be covered in order to determine how many cans of paint would be needed to cover the walls.



2) In a farm, the area of the plot is used to estimate the number of bags of fertilizers we needed for growing crops .



3) Professions such as carpentry and engineering make regular use of the area and the perimeter calculations.

Engineers use perimeters to find out how much material is needed to build a truss (support something with load bearing members).

Example - constructing bridge with iron bars.

Carpenters purchase wooden sheets according to area requirements of the doors. They purchase glass panes according to area of windows. Window frames are purchased by calculating perimeter of the window.



4) In order to fence a garden, the perimeter of the garden should be determined.



5) In order frame a photo, the perimeter and area of the photo should be calculated in advance.



6) Laying tiles on the floor also requires calculation of the area to be covered.



7) For purchasing a carpet, the area to be covered needs to be calculated.



Image Source:

<Painting> - <<https://pixabay.com/illustrations/painter-wall-color-paint-1027853/>>
 <Farm> - <http://www.publicdomainfiles.com/show_file.php?id=13526491218331>
 <Engineer> - <http://www.publicdomainfiles.com/show_file.php?id=13548576619666>
 <Carpenter> - <<https://pixabay.com/illustrations/craftsmen-schreiner-saw-wood-9470/>>
 <Garden with fence> -
 <http://www.publicdomainfiles.com/show_file.php?id=13548576619666>
 <Photo Frame> -
 <<https://www.goodfreephotos.com/vector-images/gold-and-black-frame-vector-clipart.png.php>>
 <Tiles> - <<https://pixabay.com/photos/construction-repair-cement-2748665/>>
 <Carpet Area> - <<https://pxhere.com/en/photo/135571>>

Time to teach	Asset type	Theme	Sub Theme
5 minutes	Day-to-day Relevance	Perimeter & Area	Area of rectangle and square

MS_Area of Pathways

Brief Description (Objective): Students will be able to estimate areas of rectangular and circular pathways.

Teaching Aids Provided: PPT

Teaching Learning Material (TLM): Draw figures on blackboard or can take students to the school playground or garden area

What do you need?: Chalk & blackboard

Get Ready:

Area of Pathways

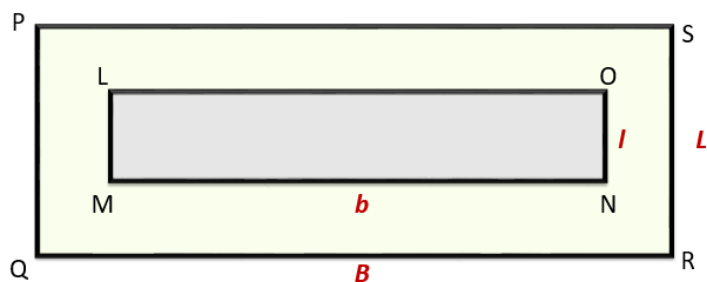
Introduction

Often we observe rectangular pathways constructed for walking purposes in parks. Similarly circular pathways are seen around circular fountains and pools. In order to construct these pathways, it is necessary to know the area of the pathways.



Rectangular Pathways

Look at the two rectangles in the figure.



The smaller rectangle is enclosed by a rectangular pathway. The smaller rectangle LMNO has length l unit and breadth b units. The larger rectangle PQRS has length L units and breadth B . The region that exists between the two rectangles is called the rectangular pathway.

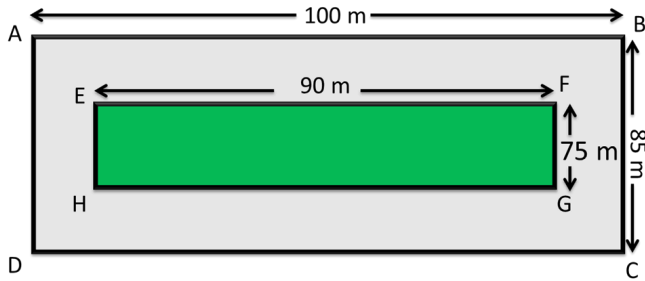
Area of rectangular pathway = Area of larger rectangle PQRS - Area of smaller rectangle LMNO

Area of rectangular pathway = $LB - lb$

Examples:

1) A rectangular garden is 90 m long and 75 m broad. A path 5 m wide is to be built out around

it. Find the area of the uncoloured path.



Solution:

Note: $AB = L = (5\text{m} + 90\text{m} + 5\text{m}) = 100\text{m}$

$BC = B = (5\text{m} + 75\text{m} + 5\text{m}) = 85\text{m}$

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

Area of rectangle ABCD = $L \times B$

Area of rectangle ABCD = $AB \times BC = 100 \times 85 = 8500 \text{ m}^2$

And area of rectangle EFGH = $l \times b = EF \times FG = 90 \times 75 = 6750 \text{ m}^2$

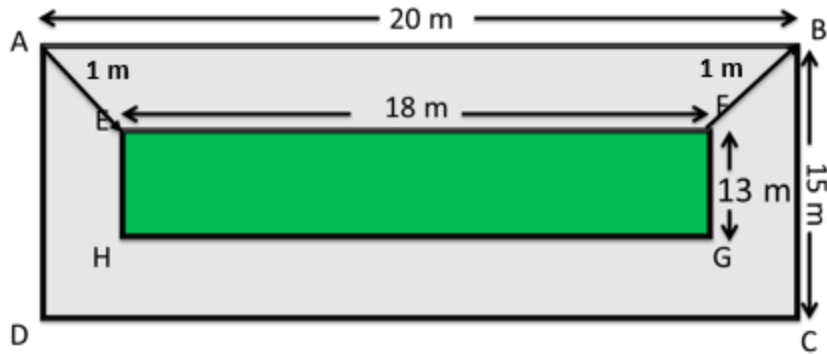
Therefore,

Area of the uncoloured path = Area of rectangle EFGH – Area of rectangle ABCD
 $= 8500 \text{ m}^2 - 6750 \text{ m}^2$

Area of the uncoloured path = 1750 m^2

2) The length and width of a park are 20 m and 15 m respectively. There is a path of 1 m width inside the park; along the periphery. Find the area of the pathway.

Solution:



Given, Length of the park = 20 m

Width of the park = 15 m

Width of the path inside the park = 1 m

Area of the pathway = ?

To solve this problem, we need to find the area of the larger rectangle and the area of the smaller rectangle. Smaller area deducted from larger area would give the area of the pathway.

Length of the smaller rectangle (EF) = $20 - (1 + 1) \text{ m} = 20 - 2 \text{ m} = 18 \text{ m}$

Width of the smaller rectangle (FG) = $15 - (1 + 1) \text{ m} = 15 - 2 \text{ m} = 13 \text{ m}$

We know that Area of Rectangle = Length X Width

Area of rectangle ABCD = $AB \times BC = 20 \times 15 = 300 \text{ m}^2$

Area of rectangle EFGH = $EF \times FG = 18 \times 13 = 234 \text{ m}^2$

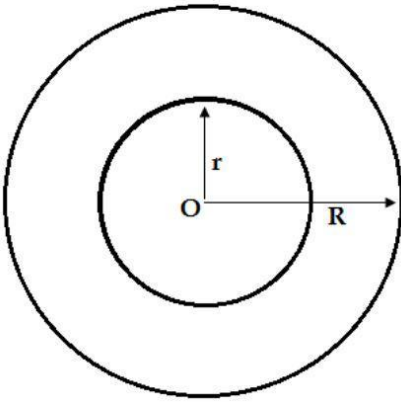
Area of the pathway = Area of rectangle ABCD – Area of rectangle EFGH

$$= 300 \text{ m}^2 - 234 \text{ m}^2 = 66 \text{ m}^2$$

Area of pathway = 66 m^2

Circular Pathways

When two or more circles have the same centre but have different radii, they are circles, that is, circles with common centre.



The region lying between two concentric circles is called annulus or the circular ring or circular pathway. The area of the ring can be calculated easily when the radii of both the circles is given. For that we subtract the area of the inner circle from the area of the outer circle. Let 'R' be the radius of the outer circle and 'r' be the radius of the inner circle.

$$\begin{aligned}\text{Area of ring} &= \text{Area of outer circle} - \text{Area of inner circle} \\ &= \pi R^2 - \pi r^2\end{aligned}$$

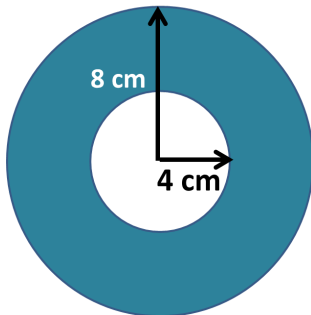
$$\text{Area of circular pathway} = \pi (R^2 - r^2)$$

π (pi) is a constant with value 3.14 approximately.

Example

Find the area of the circular ring formed by two concentric circles, given that the radii of the outer and the inner circles are 8 cm and 4 cm respectively.

Solution:



The area of the region enclosed by two concentric circles is given by:
Area = $\pi (R^2 - r^2)$

Here, $R = 8$ cms and $r = 4$ cms

$$\begin{aligned}\text{Area} &= 3.14(8^2 - 4^2) \text{ sq cms} \\ &= 3.14(64 - 16) \\ &= 3.14 \times 48 \\ &= \mathbf{150.72 \text{ sq cms}}\end{aligned}$$

Image Source:

<Picture of a Pathway> - <https://pixabay.com/photos/footpath-pathway-rural-green-road-691021/>

<Pathway's picture> - <https://pixabay.com/photos/pathway-path-pink-tulips-tulips-2289978/>

Time to teach	Asset type	Theme	Sub Theme
15 minutes	Main Script	Perimeter & Area	Area of rectangle and square

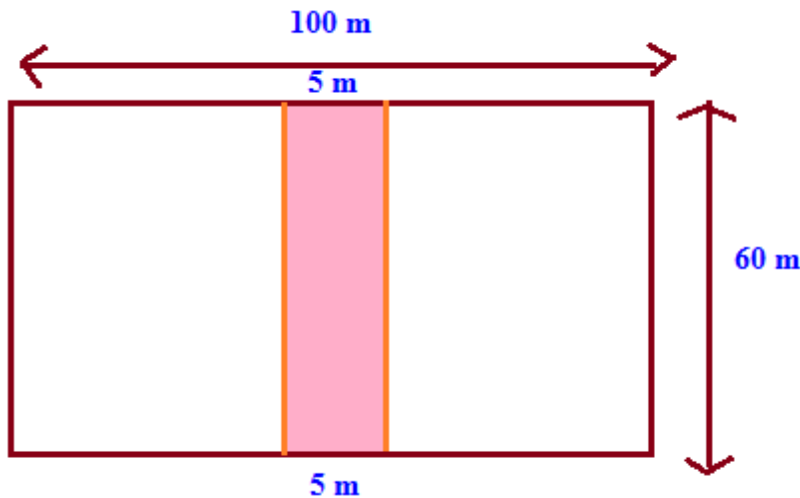
QA_Questions on Area of Pathways

Questions on Area of Pathways

1) A plot is 100 m long and 60 m broad. A path 5 m wide runs breadth wise across the ground in the middle. Find the area of the path.

Solution:

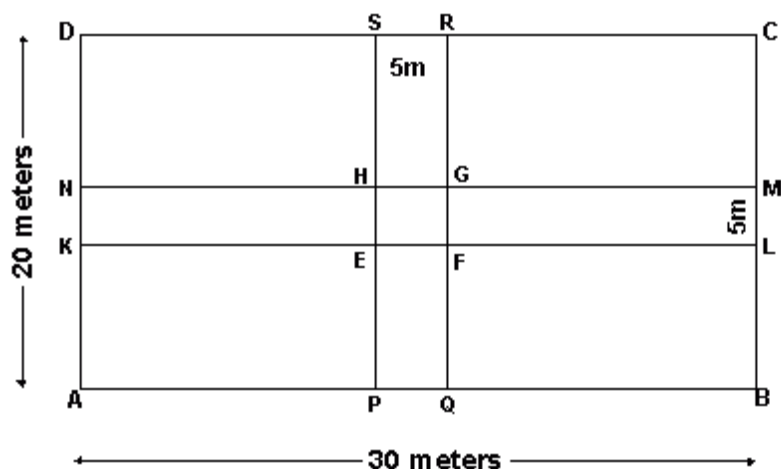
In the bellow figure the shaded portion is the path way. To find the area of pathway we can take the length as 60 m and breadth as 5 m.



$$\begin{aligned}\text{Area of pathway} &= L \times B \\ &= 60 \times 5 \\ &= 300 \text{ m}^2\end{aligned}$$

2)The length and width of a rectangular plot are 30 metres and 20 metres respectively. Two rectangular paths each 5 metres wide run inside the plot, one parallel to the length of the plot and the other parallel to its width. Find the total area occupied by the paths.

Solution:To solve this type of problems first we draw a rough diagram and mention the given measurements.



In the above diagram,

ABCD is the given plot (length 30 metres and breadth 20 metres) and KLMN and PQRS are the two rectangular paths running parallel to its length and width respectively, the width of each of these paths is 5 metres.

Area of the path KLMN = $30 \times 5 = 150$ square metres.

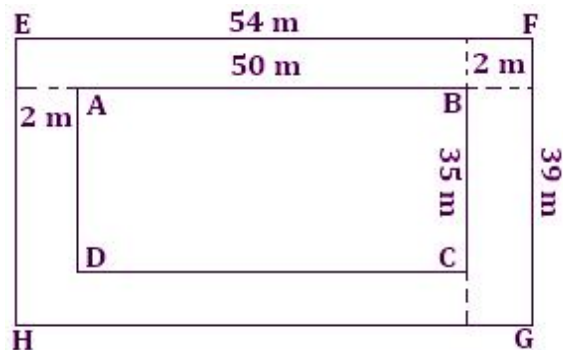
Area of the path PQRS = $20 \times 5 = 100$ square metres.

Area of the path EFGH (common to both the two paths) = $5 \times 5 = 25$ square metres.

Total area occupied by the paths = (The area of the rectangle KLMN) + (The area of the rectangle PQRS) - (The area of the square EFGH)

The required area = $150 + 100 - 25 = 225$ square metres.

3) A rectangular lawn of length 50 m and breadth 35 m is to be surrounded externally by a path which is 2 m wide. Find the cost of turfing the path at the rate of Rs 3 per m^2 .



Solution:

Length of the lawn = 50 m

Breadth of the lawn = 35 m

Area of the lawn = $(50 \times 35) \text{ m}^2$
 $= 1750 \text{ m}^2$

Length of lawn including the path = $[50 + (2 + 2)] \text{ m} = 54 \text{ m}$

Breadth of the lawn including the path = $[35 + (2 + 2)] \text{ m} = 39 \text{ m}$

Area of the lawn including the path = $54 \times 39 \text{ m}^2 = 2106 \text{ m}^2$

Therefore, area of the path = $(2106 - 1750) \text{ m}^2 = 356 \text{ m}^2$

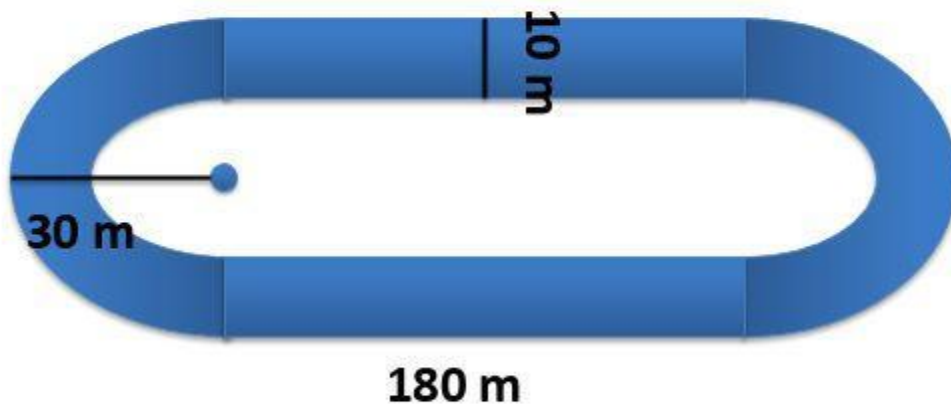
For 1 m^2 , the cost of turfing the path = Rs.3

For 356 m^2 , the cost of turfing the path = $\text{Rs.} 3 \times 356 = \text{Rs.} 1,068$

4) A track is laid out as shown in the figure. If a runner runs in the inside lane,

a) What is the approximate distance he runs in each lap?

b) If he had chosen to run in the outside lane, for the entire race, how far would he have run?



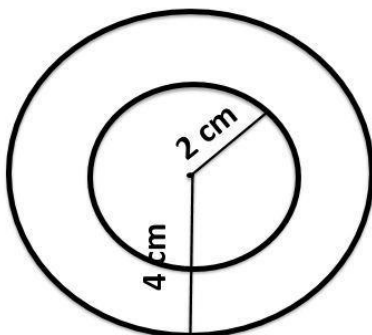
a) In the inside lane, radius of the semicircle $r = 30 - 10 = 20 \text{ m}$

Total distance = $\pi r + 180 + \pi r + 180 = 360 + 2\pi r = 360 + (2 \times (22/7) \times 20) = 485.7 \text{ meters}$

b) In the outside lane, radius of the semicircle $R = 30 \text{ m}$

Total distance = $\pi R + 180 + \pi R + 180 = 360 + 2\pi R = 360 + (2 \times (22/7) \times 30) = 548.57 \text{ meters}$

5) Find the area of the circular ring formed by two concentric circles, given that the radii of the outer and the inner circles are 4 cm and 2 cm respectively.



Solution: The area of the region enclosed by two concentric circles is given by:

$$A = \pi(R^2 - r^2)$$

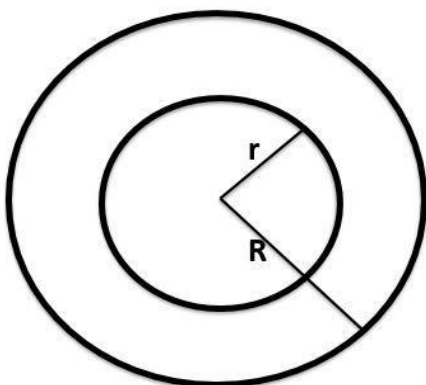
Here, $R = 4$ and $r = 2$

$$A = 3.14(4^2 - 2^2)$$

$$= 3.14(16 - 4)$$

$$\text{Area} = 37.68 \text{ sq cm}$$

6) The area between two concentric circles is 423.5 sq.cm. If the circumference of the outer circle is 132 cm, calculate the radius of the inner circle.



Solution: Let R be the radius of outer circle and r be the radius of inner circle.

Given, Circumference of the circle = 132

$$2\pi R = 132$$

$$2 \times \frac{22}{7} \times R = 132$$

$$R = 21 \text{ cms}$$

$$\text{Area} = \pi(R^2 - r^2)$$

$$423.5 = \frac{22}{7} (21^2 - r^2)$$

$$r = 17.5 \text{ cms}$$

Image Source: Created by shruti2384@gmail.com

Time to teach	Asset type	Theme	Sub Theme
18 minutes	Questions to Assess	Perimeter & Area	Finding areas of Quadrilaterals

VC_The Real Meaning Of Peace

The Real Meaning Of Peace

We have just learnt that Perimeter is the distance covered along the boundary forming a closed figure when you go round the figure once.

Perimeter plays a great role when we need to put up a fencing/wall for the protection of our property. When you build a fence or wall around a place that forms the perimeter, the place becomes a safe place. No one can intrude inside.

In life, this fencing is nothing but peace and calm. When we protect ourselves with the fence of peace and inner calm, nothing can upset us. We are not affected by whatever happens around us.

Let us listen to this story that explains what peace is.

Once a king announced a prize to the artist who would paint the best picture of peace. Many artists sent their pictures to the king. The king looked at all the pictures and liked only two. So he decided to choose between them.

One picture was of a calm lake. The lake was surrounded by peaceful towering mountains all around it. The sky was calm and blue with fluffy white clouds. Everyone found it to be a perfect picture of peace.

The other picture had rugged and bare mountains. The sky was fuming with anger with lightening, thunder and rain falling from the sky. Alongside was a noisy & foaming waterfall. This picture in no way looked peaceful at all.

The teacher stops the story here and asks the class:

Children! Which picture would you choose if you were the King?

(let children come out with answers)

The teacher continues:

The king chose the second picture. Do you know why?

When the king looked closely, he saw behind the waterfall a tiny bush growing in a crack in the rock. A bird had built her nest in the bush. In the midst of the rush of angry water, sat the mother bird on her nest - in perfect peace.

Explained the king, "peace does not mean to be in a place where there is no noise, trouble, or hard work. Peace means to be in the midst of all those things and still be calm in your heart. That is the real meaning of peace."

Children!

- As you grow old, you will understand that life is never 100% perfect or void of trials and tribulations.
- But when we surround ourselves with peace and calm, these trials and tribulations can come close to our perimeters and even touch them and travel along with us for a time.
- Even as we travel along with these, we still retain our inner strength and completeness, so we are not bothered by the ups and downs of life around us.

Time to teach	Asset type	Value	Sub Value
5 minutes	Value Content	Peace	Calm

MS_Summary_Perimeter and Area

Summary of Perimeter and Area

1. The distance covered along the boundary of a closed figure is called the perimeter.
2. The amount of surface enclosed by a closed figure is called its area.
3. Perimeter of a square = $4 \times \text{side}$
Area of a square = $\text{side} \times \text{side}$
4. Perimeter of a rectangle = $2 (\text{length} + \text{breadth})$
Area of a rectangle = $\text{length} \times \text{breadth}$
5. Perimeter of a parallelogram = $2(\text{base} + \text{side})$
Area of a parallelogram = $\text{base} \times \text{height}$
6. Perimeter of a triangle = sum of 3 sides
Area of a triangle = $\frac{1}{2} (\text{base} \times \text{height})$
7. The distance around a circle is called the circumference.
8. Circumference of a circle = πd where d is the diameter of the circle and $\pi = 22/7$ or 3.14 approximately.
9. Area of circle of radius r is πr^2 .
10. Apart from conventional units of measurement like millimeter, centimeter, meter etc., there are some informal units of measurement also.
11. Area and Perimeter calculations have a lot of relevance in our daily life.
12. We should surround ourselves with peace to face any situation easily.

Time to teach	Asset type	Theme	Sub Theme
5 minutes	Main Script	Perimeter & Area	Area of rectangle and square

Master Lesson Plan

Seven Asset Methodology for MLP

What is the purpose of this Master lesson Plan?	This Master Lesson Plan (MLP) prepared by Sri Sathya Sai Vidya Vahini (SSSVV), covers the entire chapter for the given board. The MLP for the chapter given in the textbook is broken down into smaller modules known as assets. Any chapter can be taught using the 7 asset types in SSSVV methodology. Several different assets together complete the entire chapter. Depending on the requirement, each asset is supported by teaching aids such as animated presentation, audio, video, and learning aids such as worksheets. The MLP is for the teacher's preparation and the teaching aids are for use in the classroom.
How to use it?	You can prepare for your class with this MLP by following 3 simple steps: 1. Read your textbook; 2. Go through the information given in the assets (document & multimedia); 3. Prepare your teaching notes. Great! Now you are ready to transact the chapter.
Duration	Kindly note the duration given for each asset. Due care has been taken in planning the assets, to ensure the chapter is completed within the time specified by the Board. Note: Preparation time is not included in the asset duration. The teaching time depends on the duration of the teaching aids and is not impacted by the length of the MLP.
What is a 'Main Script' (MS) Asset?	The Main Script asset is there for explaining the main concepts of the chapter clearly. The information given in the textbook is simplified, organised and structured to give more clarity. Additionally, you may find a video or mnemonics or a graphic organiser to deepen the understanding of the concept.
How to teach using the MS asset?	Please use the blackboard, slides and interaction to develop the concept.
What is an 'Inquisitive Questions' (IQ) asset?	The Inquisitive Questions asset uses questions to promote higher order thinking like the n^{th} why, what-if, new perspectives, cause-effect, and others, creating curiosity.
How to teach using the IQ asset?	You may use the questions to connect with the students, encourage exploration to engage them in the learning process. You may allow multiple responses and instead of rejecting any of the responses, ask why, before revealing the suggested answer or hints.
What is a 'Day to day Relevance' (DD) Asset?	The Day to Day Relevance asset helps students understand the practical relevance of every topic, making them eager participants in the classroom. If students connect the concepts to their environment, they would learn meaningfully without dislike or simply memorizing for exams.

How to teach using the DD asset?	You may use the asset by asking questions about their experience and use it to establish why they are learning the topic. If necessary you may substitute with a recent or local example.
What is an 'Interesting Aside' (IA) asset?	The Interesting Aside asset uses attention grabbing titbits or anecdotes to bring joy and satisfy the child's hunger to know more. This is a quick/short asset intended to bring attention back to the main concept being taught.
How to teach using the IA asset?	You may use this asset to give a piece of interesting information relevant to the topic, without prolonged explanation/discussion. You may suggest appropriate books for further reading.
What is a 'Suggested Activity' (SA) Asset?	The Suggested Activity asset provides a detailed step by step procedure for the teacher to conduct a hands-on activity. This promotes Activity Based Learning.
How to teach using the SA asset?	You may use this asset to energise your students to learn by doing simple, fun-filled activities based on the topic. The asset includes - preparation, activity, and follow-up. You may engage the students in the preparation and follow-up stages to develop collaboration and responsibility. You could try it once, yourself, before the actual delivery to be more comfortable with it. Note: The duration mentioned in the asset is usually for the activity part only.
What is a 'Value Content' (VC) Asset?	The Value Content asset integrates Universal Human Values (such as empathy, inclusivity, respect for nature that translates into responsible behaviour) seamlessly into the curriculum, as the "End of education is character".
How to teach using the VC asset?	You may use this asset to engage with the students to bring out their innate values and connect with the intrinsic values in the topic/concept. The asset includes pointers on the specific pedagogical technique followed.
What is a 'Questions to Assess' (QA) asset?	The Questions to Assess asset uses an interactive approach to check learning of different types of learners, and provides feedback to the teacher for appropriate action. The questions cater to all the levels of Bloom's Taxonomy. Questions from 'Apply' level and above enable students to reflect on their learning.
How to teach using the QA asset?	You may go through the slides to understand its flow and know when to click for the answer (slides include suggested answers). While presenting in the class, you may display the question and encourage multiple responses, before revealing the answer. In some cases, this asset may include extra questions/worksheet that can be given as homework.