

CHAPTER FOUR
MEASUREMENT
AREA AND
PERIMETER OF
TRIANGLE
MATHEMATICS
FOR GRADE 7

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Objectives :

After completing this section, you should be able to do the following:

- ❑ Formulate the area and perimeter of triangles
- ❑ Solve the area and perimeter of triangles
- ❑ Differentiate the difference types of triangles based on angles and sides

The area and perimeter of triangles

➤ **The area of a triangle** is defined as the total space that is enclosed by any particular triangle. The basic formula to find the area of a given triangle is

$A = 1/2 \times b \times h$, where **b** is the base and **h** is the height of the given triangle, and base and height are perpendicular each other.

Formula

$$\text{Area } A = \frac{bh}{2}$$

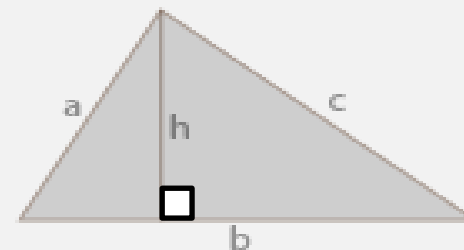
$$\text{Perimeter } P = a + b + c$$

b → base

h → height

a → side

c → side



Triangle

Example: Find the area of the triangle with base b as 3cm and height h as 4cm,

Solution:

$$\begin{aligned} A &= \frac{1}{2} \times b \times h = \\ &= \frac{1}{2} \times 4 \text{ cm} \times 3 \text{ cm} \\ &= 2 \text{ cm} \times 3 \text{ cm} \\ &= 6 \text{ cm}^2 \end{aligned}$$

TYPES OF TRIANGLE

Triangles can be broadly classified into two types, which are:

- Triangles based on the lengths of their sides
- Triangles based on their interior angles

Based on their Sides

Scalene Triangle

Isosceles Triangle

Equilateral Triangle

Based on their Angles

Acute Triangle

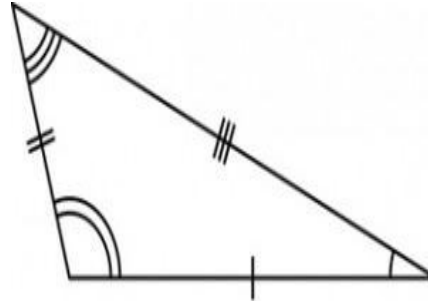
Obtuse Triangle

Right Triangle

Types of Triangles Based on Sides

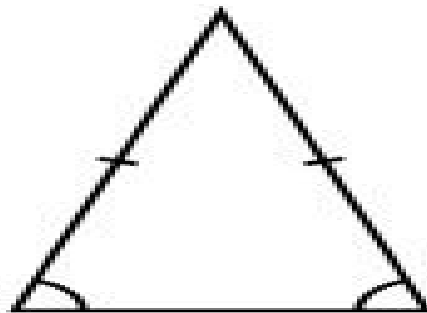
1. Scalene Triangle

- A scalene triangle has all side lengths of different measures.



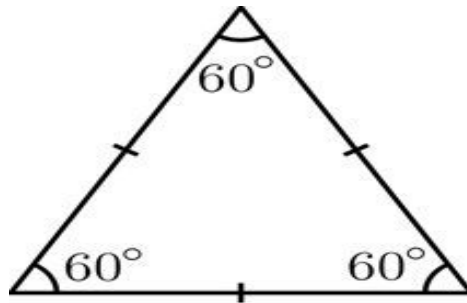
2. Isosceles Triangle

In an isosceles triangle, the lengths of two of the three sides are equal.



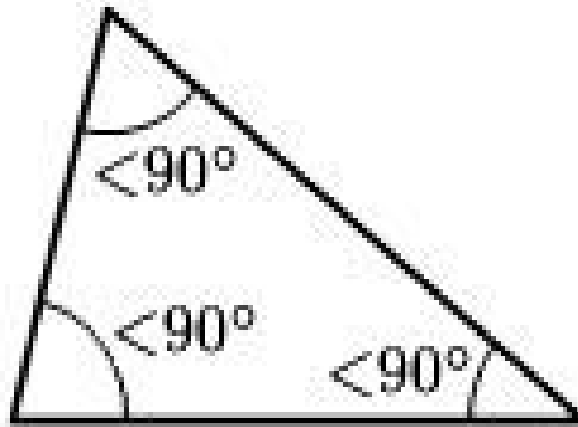
3. Equilateral Triangle

All the lengths of the sides are equal. In such a case, each of the interior angles will have a measure of 60 degrees. Since the angles of an equilateral triangle are same, it is also known as an **equiangular triangle**



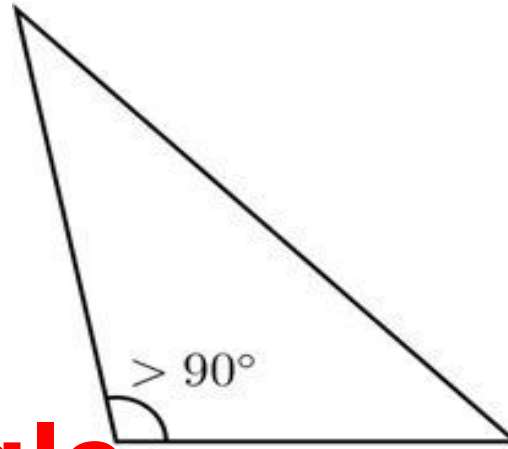
1. Acute Triangle

- An acute triangle is a triangle whose all the three interior angles are acute (less than 90°)



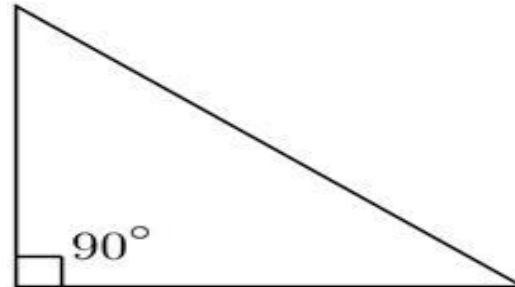
2. Obtuse Triangle

Obtuse triangles are those in which one of the three interior angles has measure greater than 90°



3. Right Triangle

A right triangle is a triangle in which one of the angles is 90 degrees



Worked examples

1. Find the area of a right triangle with a base of 6 cm and a height of 9 cm.

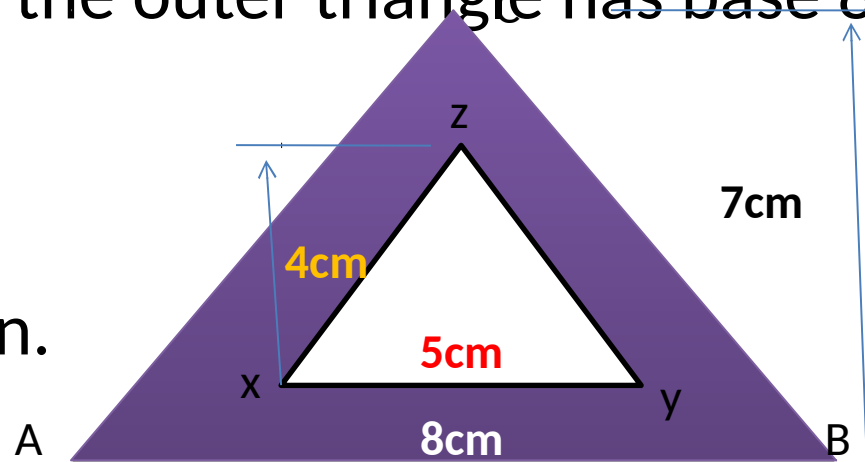
Solution: $A = \frac{1}{2} \cdot (b) \cdot (h) = \frac{1}{2} \cdot (6 \text{ cm}) \cdot (9 \text{ cm})$

$$A = \frac{1}{2} \cdot (54 \text{ cm}^2)$$

$$A = 27 \text{ cm}^2$$

2. In the figure to the right the outer triangle has base 8cm and height 7cm

find the area shaded region.

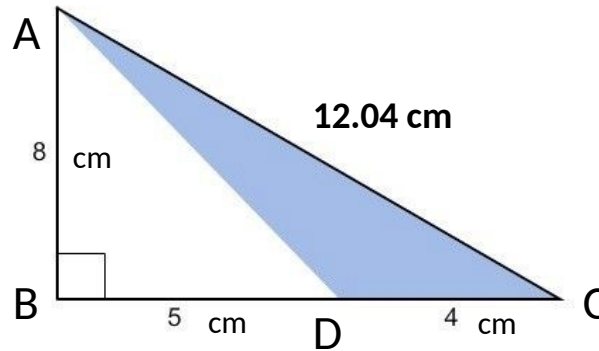


Solution: The area of shaded region =

$$\begin{aligned} & \text{area(triangle ABC)} - \text{area(triangle XYZ)} \\ &= \text{Outer} \left(\frac{1}{2} \times b \times h \right) - \text{Inner} \left(\frac{1}{2} \times b \times h \right) \\ &= \left(\frac{1}{2} \times 8 \text{ cm} \times 7 \text{ cm} \right) - \left(\frac{1}{2} \times 5 \text{ cm} \times 4 \text{ cm} \right) \\ &= \left(\frac{1}{2} \times 56 \text{ cm}^2 \right) - \left(\frac{1}{2} \times 20 \text{ cm}^2 \right) \\ &= 28 \text{ cm}^2 - 10 \text{ cm}^2 \\ &= 18 \text{ cm}^2 \end{aligned}$$

Therefore , the area of shaded region **18 cm²**

2. Find the shaded region of triangle (ADC) and the Perimeter



$$\begin{aligned}
 \text{Solution: area(} \triangle ADC \text{)} &= \text{area(} \triangle ABC \text{)} - \text{area(} \triangle ABD \text{)} \\
 &= \text{area(} \triangle ABC \text{)} - \text{area(} \triangle ABD \text{)} \\
 &= \text{larger } \left(\frac{1}{2} \times b \times h \right) - \text{smaller } \left(\frac{1}{2} \times b \times h \right) \\
 &= \left(\frac{1}{2} \times 9\text{cm} \times 8\text{cm} \right) - \left(\frac{1}{2} \times 5\text{cm} \times 8\text{cm} \right) \\
 &= 36\text{ cm}^2 - 20\text{ cm}^2 \\
 &= 16\text{ cm}^2
 \end{aligned}$$

Therefore, the area of shaded region ($\triangle ADC$) is 16 cm^2

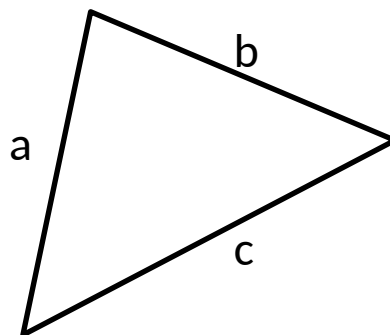
and **ALSO Perimeter(P) = AB + BC + CA = 8 + 9 + 12.04 = 29.04 cm**

SUMMARY

- **The area of a triangle** is defined as the total space that is enclosed by any particular triangle. The basic formula to find the area of a given triangle is $A = \frac{1}{2} \times b \times h$,

where **b** is the base and **h** is the height of the given triangle, whether it is scalene, isosceles or equilateral.

- The perimeter(P) of any triangle is the sum of all its sides, $P = a + b + c$



Types of Triangles Based on Sides

1. Scalene Triangle

- A scalene triangle has all side lengths of different measures.

2. Isosceles Triangle

In an isosceles triangle, the lengths of two of the three sides are equal.

3. Equilateral Triangle

All the lengths of the sides are equal. In such a case, each of the interior angles will have a measure of 60 degrees.

Types of Triangles Based on Angles

1. Acute Triangle

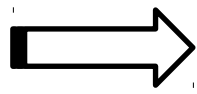
- An acute triangle is a triangle whose all the three interior angles are less than 90° .

2. Obtuse Triangle

- Obtuse triangles are those in which one of the three interior angles has a measure greater than 90° .

3. Right Triangle

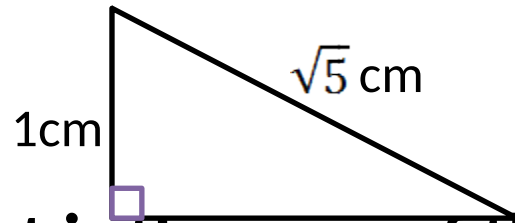
- A right triangle is a triangle in which one of the angles is 90° .



ACTIVITY

□ Write and solve the following problems

1. Find the area of an isosceles right angled triangle With length of legs 7cm?
2. What is the area and perimeter of the triangle?



3. Given the figure below and what is the area of the shaded region if $AD=6\text{cm}$, $CD=4\text{cm}$ and $BC=8\text{cm}$?

