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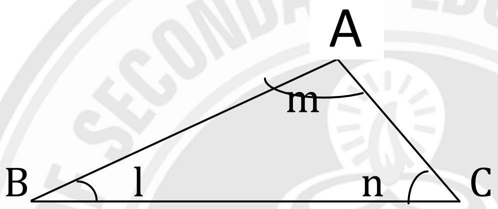
CHAPTER-6

THE TRIANGLE AND ITS PROPERTIES

NOTES:

What is a triangle?

Ans : A simple closed curved consisting of three lines segment which has 3 vertices, 3 sides and 3 angles.



Here, ABC is a triangle in which

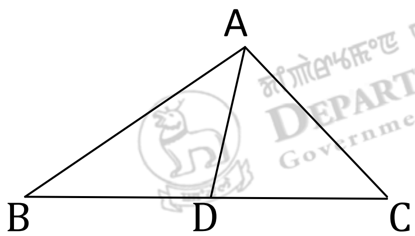
(i). $\overline{AB}$, $\overline{BC}$, $\overline{CA}$ are sides of triangle.

(ii). l, m, n are the angles of triangle and

(iii) A, B, C are the vertices of the triangle.

MEDIANS OF A TRIANGLE:

The line segment AD, joining the mid-point of $\overline{BC}$ to its opposite vertex A is called median of the triangle.



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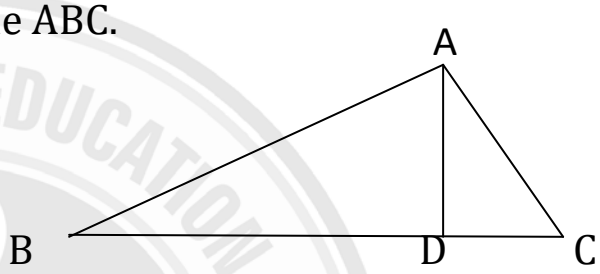
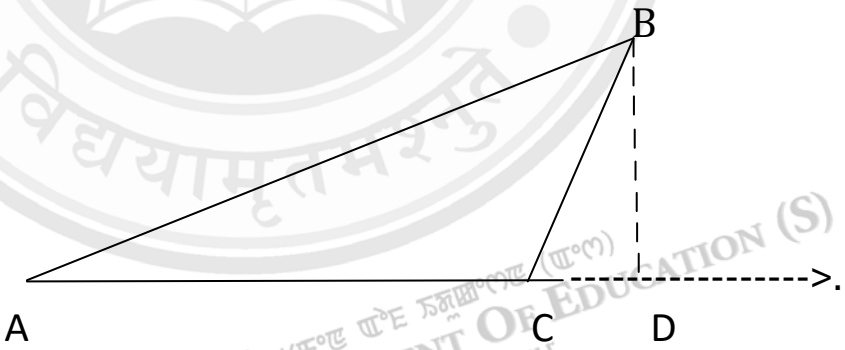
1. **How many medians can a triangle have?**
   Ans : There are three medians can be drawn in a triangle.
2. **Does a median lie in the interior of a triangle**?
   Ans : Yes, a median lie in the interior of the triangle.

<u>ALTITUDE OF A TRIANGLE:</u>

The altitude of triangle is a line that extends from one vertex of a triangle perpendicular to the opposite side. Here, $\overline{AD}$ is the altitude of the triangle ABC.



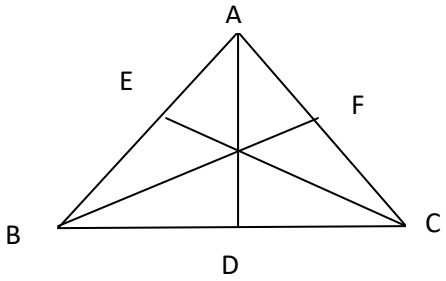
1. How many altitudes can a triangle have?
   Ans: There are three altitudes can a triangle have.
2. Will an altitude always lie in the interior of a triangle? If not draw a rough sketch to show such a case.



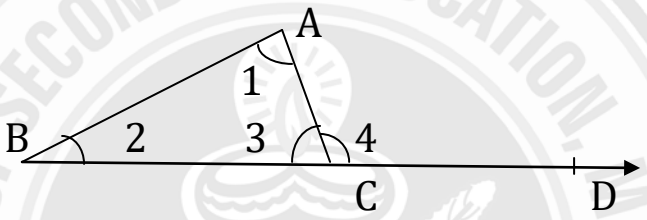
Ans: No, sometimes it may lie at the exterior of a triangle. Here, $\overline{BD}$ is the altitude of the triangle ABC.

1. Can the altitude and a median be same for a triangle?

   Ans: Yes, it can be happened only in the case of equilateral triangle.



EXTERIOR ANGLE OF A TRIANGLE AND ITS PROPERTY:



In $\triangle$ABC, $L1$, $L2$ and $L3$ are the three interior angles and $L4$ are exterior angle. $L3$ and $L4$ are adjacent angles, $L1$ and $L2$ are called interior opposite angles of exterior $L4$.

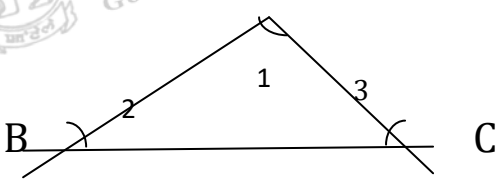
PROPERTY.

1. An exterior angle of a triangle is equal to the sum of its two interior opposite angles. i.e. $L1 + L2 = L4$ and it is also known as Exterior Angle Property of a triangle.

ANGLE SUM PROPERTY OF TRIANGLE.

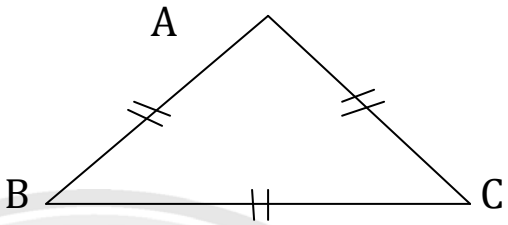
[**Note: The sum of three angles of a triangle is 180^0**]

i.e. $L1 + L2 + L3 = 180^0$.



TWO SPECIAL TRIANGLES : EQUILATERAL AND ISOSCELES

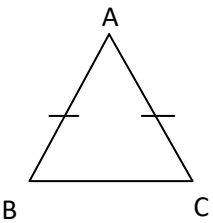
EQUILATERAL TRIANGLE: A triangle in which all the three sides are equal in their length is called equilateral triangle.



PROPERTY:

a. All the sides have same length
b. Each angle has measure of 60^0.

ISOSCELES TRIANGLE: A triangle in which two sides are of equal length is called isosceles triangle.



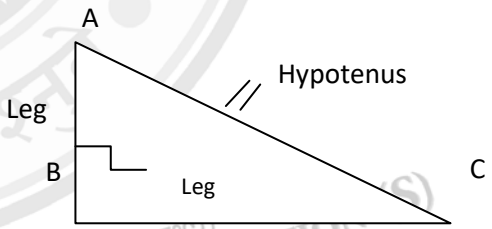
PROPERTY:

a. Two sides have same length.
b. Base angles opposite to equal side are equal.

RIGHT-ANGLED TRIANGLE AND PYTHAGORAS PROPERTY

Note: Right-angled triangle.

In the triangle , out of the three angle one is 90^0 is called a right angled triangle



PYTHAGORAS THEOREM: In a right angled triangle, the square on the hypoteneuse is equal to the sum of the squares on two legs.

i.e. $AC^2 = AB^2 + BC^2$.