



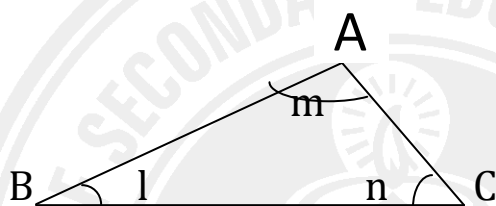
CHAPTER-6

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.

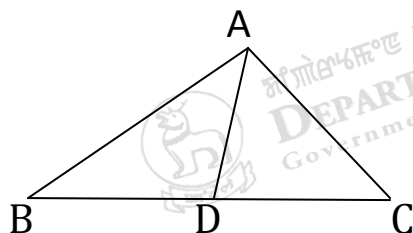


Here, ABC is a triangle in which

- (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.



1. How many medians can a triangle have?

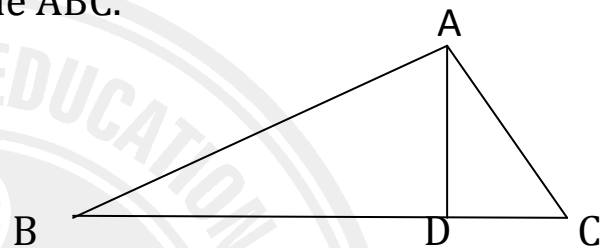
Ans : There are three medians can be drawn in a triangle.

2. Does a median lie in the interior of a triangle?

Ans : Yes, a median lie in the interior of the triangle.

ALTITUDE OF A TRIANGLE:

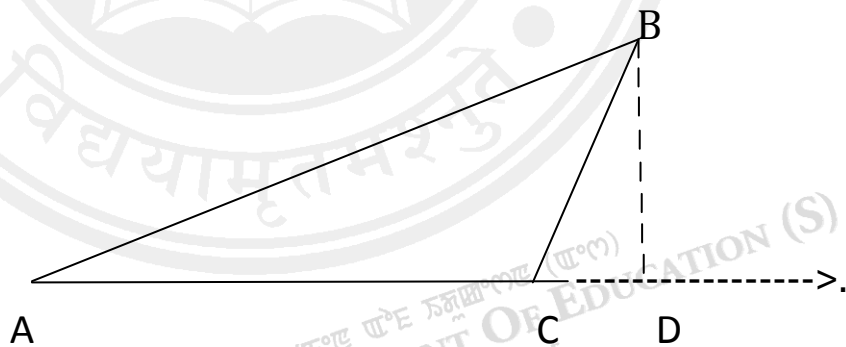
The altitude of triangle is a line that extends from one vertex of a triangle perpendicular to the opposite side. Here, \overline{AD} is the altitude of the triangle ABC.



1. How many altitudes can a triangle have?

Ans: There are three altitudes can a triangle have.

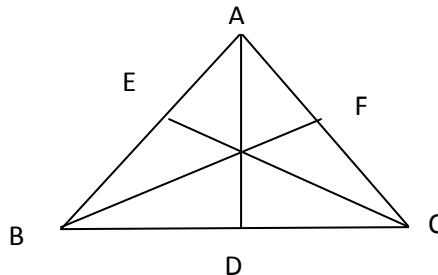
2. Will an altitude always lie in the interior of a triangle? If not draw a rough sketch to show such a case.



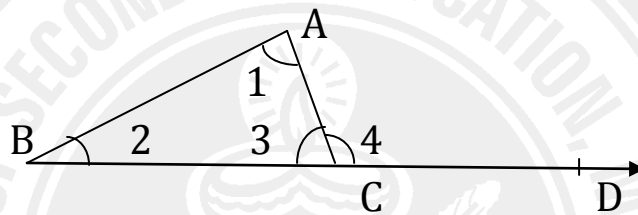
Ans: No, sometimes it may lie at the exterior of a triangle. Here, \overline{BD} is the altitude of the triangle ABC.

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 $\triangle ABC$, $\angle 1$, $\angle 2$ and $\angle 3$ are the three interior angles and $\angle 4$ are exterior angle. $\angle 3$ and $\angle 4$ are adjacent angles, $\angle 1$ and $\angle 2$ are called interior opposite angles of exterior $\angle 4$.

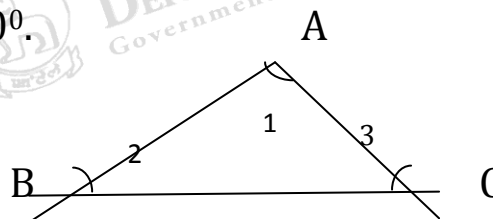
PROPERTY.

1. An exterior angle of a triangle is equal to the sum of its two interior opposite angles. i.e. $\angle 1 + \angle 2 = \angle 4$ and it is also known as Exterior Angle Property of a triangle.

ANGLE SUM PROPERTY OF TRIANGLE.

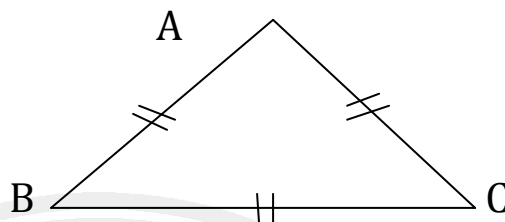
[Note: The sum of three angles of a triangle is 180°]

i.e. $\angle 1 + \angle 2 + \angle 3 = 180^\circ$.



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.



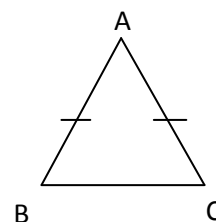
PROPERTY:

- a. All the sides have same length
- b. Each angle has measure of 60° .

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

PROPERTY:

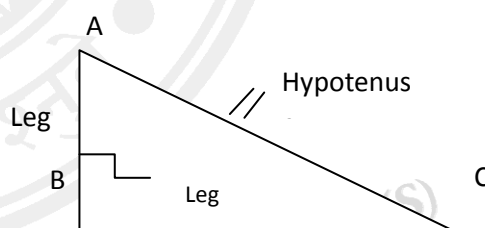
- a. Two sides have same length.
- b. Base angles opposite to equal side are equal.



RIGHT-ANGLED TRIANGLE AND PYTHAGORAS PROPERTY

Note: Right-angled triangle.

In the triangle, out of the three angle one is 90° 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.

$$\text{i.e. } AC^2 = AB^2 + BC^2.$$