

The Triangles and its Properties

Definition

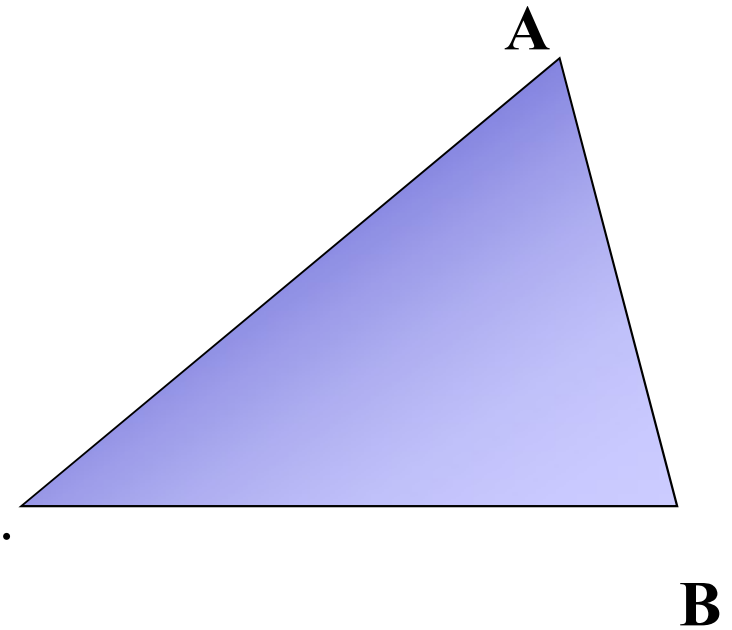
A three sided closed figure is called Triangle.

A triangle has three sides, three angles and three vertices.

SIDES are AB, BC and AC.

ANGLES are angle A , angle B, angle C.

VERTICES are A, B and C .



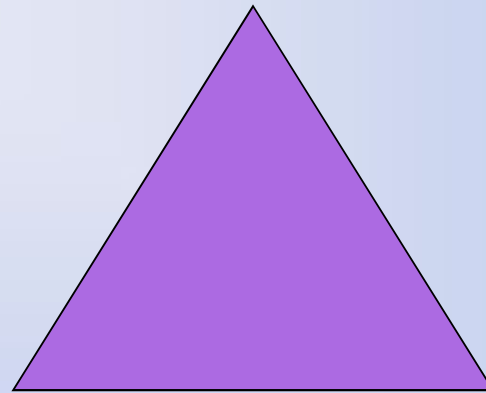
Types Of Triangles

With respect to their sides.

1. Equilateral Triangle.

A triangle having all its three sides equal is called an *Equilateral Triangle*.

All the angles of an equilateral triangle are equal and each of them is equal to 60° .

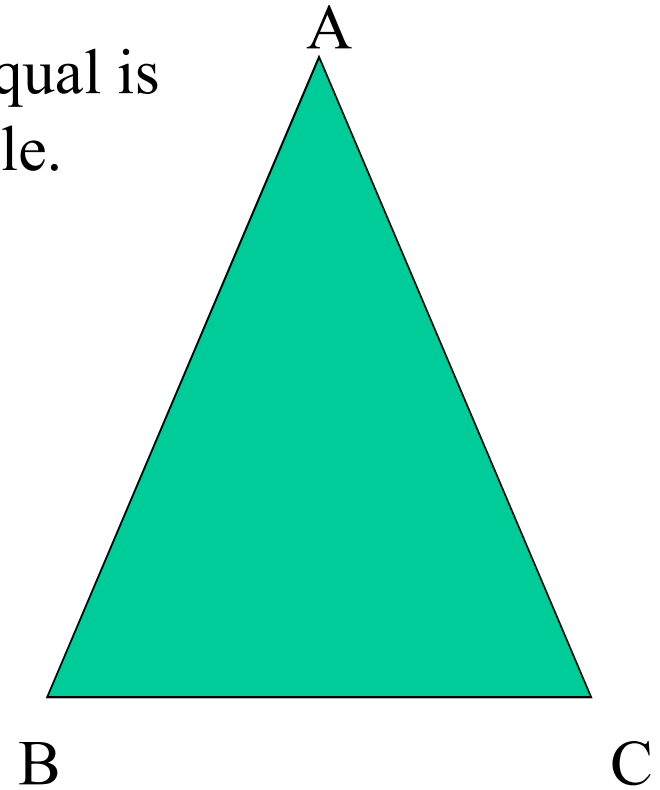


2. Isosceles Triangle:-

A triangle having its two sides equal is called an isosceles triangle.

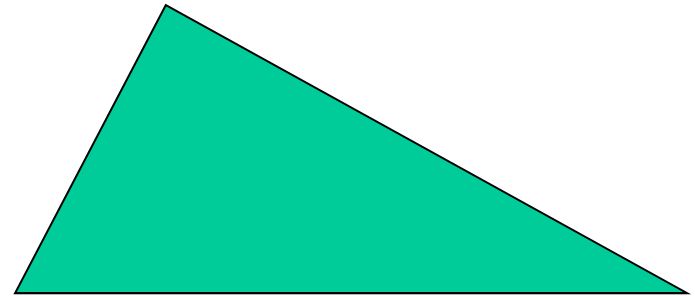
In an isosceles triangle the angles opposite to the equal sides are also equal.

In the triangle $AB = AC$, and
therefore
 $\text{angle } ABC = \text{angle } ACB$

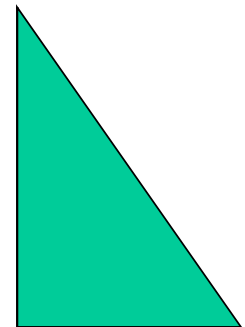
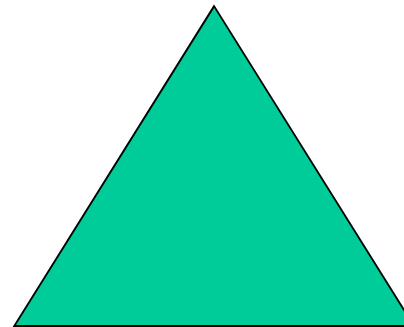
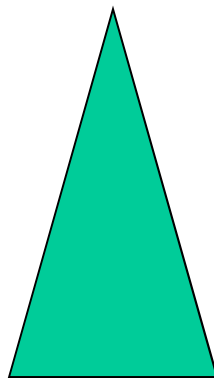
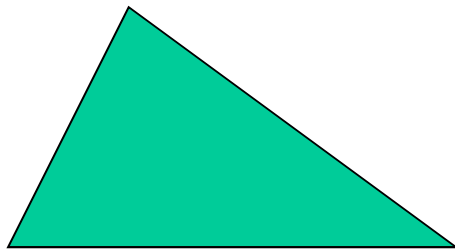


3. Scalene Triangle:-

A triangle in which no sides are equal is called a Scalene Triangle.



Q. Identify the following triangles with respect to their sides.



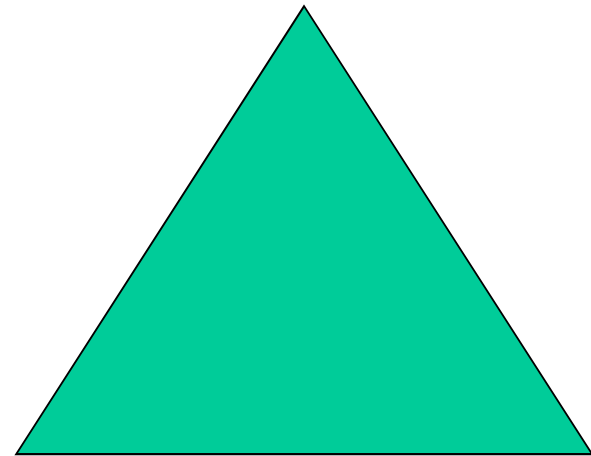
Types Of Triangles

With respect to Their Angles

1. Acute Angled Triangle:-

The Triangle which has all its angles acute (that is less than 90°) is called Acute Angled Triangle.

An Equilateral triangle is always an acute angled triangle.

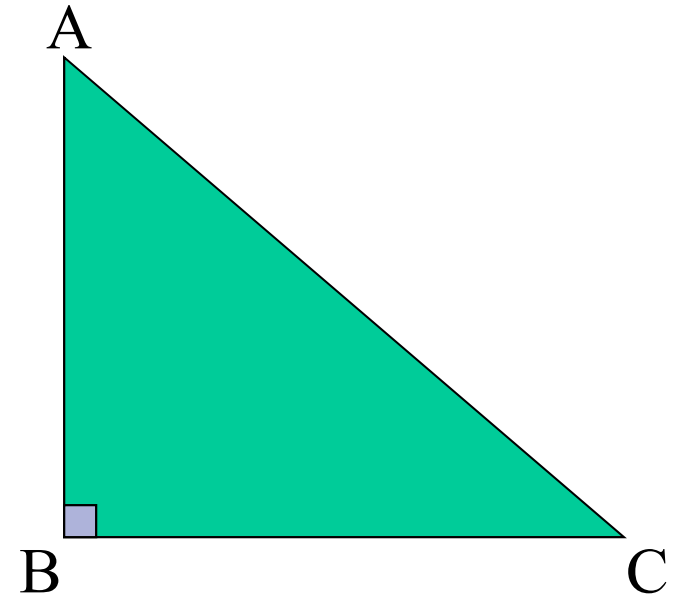


2. Right Angled Triangle:-

A triangle in which one of the angles is equal to 90° is called a Right Angled Triangle.

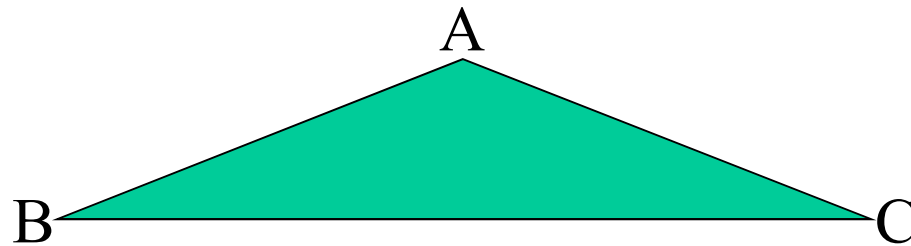
No triangle can contain more than one right angles.

A right angled triangle having two sides equal is called a right angled isosceles triangle, and in it the remaining two angles are equal to 45°



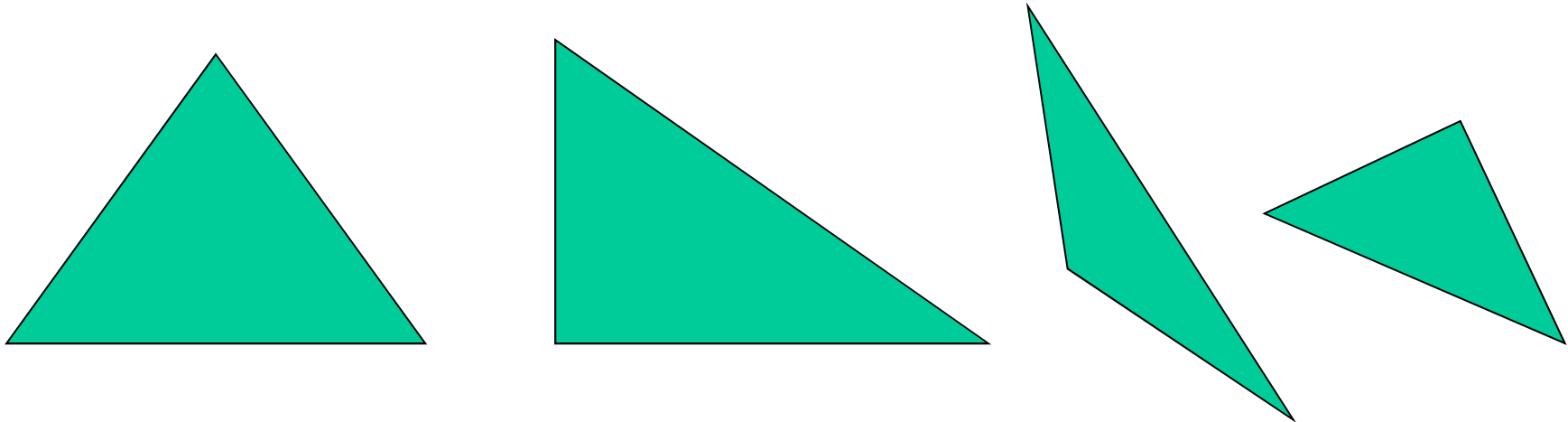
3. Obtuse Angled Triangle:-

A triangle in which one of the angles is obtuse (that is more than 90°) is called an obtuse angled triangle.



The remaining two angles of an Obtuse Angled Triangle are acute.

Q. Identify the following triangles with respect to their angles.

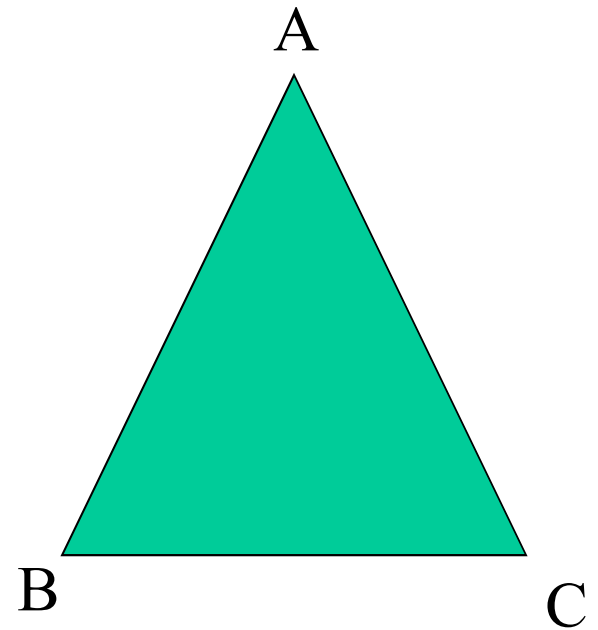


The angles opposite to equal sides of a triangle are equal.

In Triangle ABC

$$AB=BC$$

$$\text{Angle } C = \text{Angle } B$$

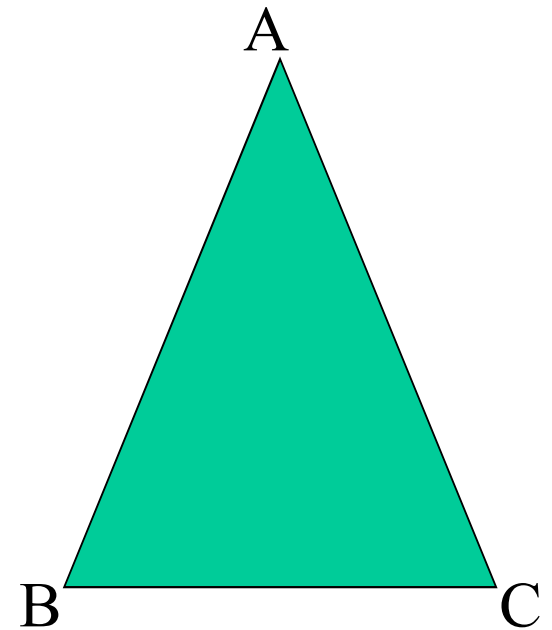


If two angles of a triangle are equal then the sides opposite to them are equal.

In Triangle ABC

$$\text{Angle } B = \text{Angle } C$$

$$AC=AB$$



Question) A triangle ABC is an isosceles triangle with $AB=AC$. If Angle $A=70$, find Angle B, < C.

Solution:-) In triangle ABC

$$AB=AC$$

so Angle C = Angle B (The angles opposite to equal sides are equal)

$$\text{Angle A} + \text{Angle B} + \text{Angle C} = 180$$

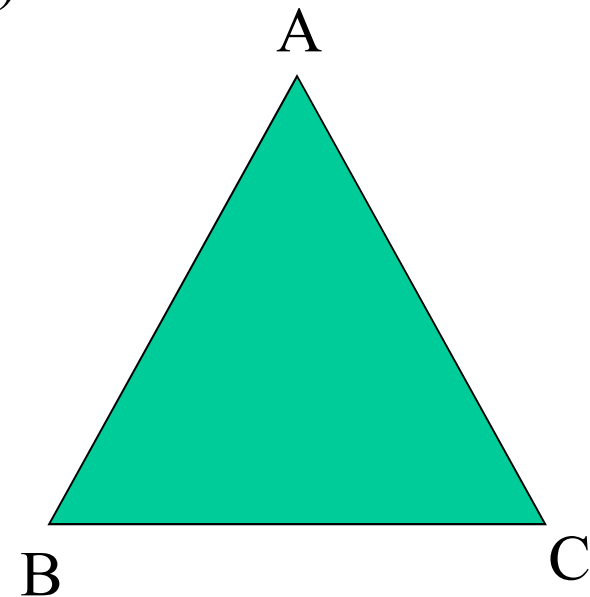
$$70 + \text{Angle B} + \text{Angle C} = 180$$

$$2\text{Angle B} = 180 - 70$$

$$2\text{Angle B} = 110$$

$$\text{Angle B} = 110/2$$

$$\text{Angle B} = 55^\circ$$

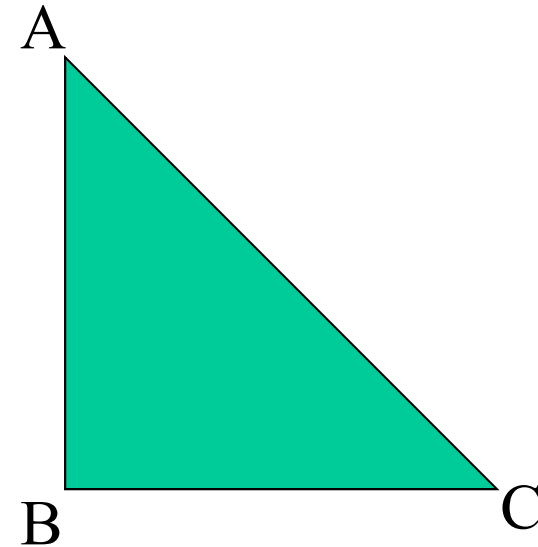


Pythagoras Theorem

In a Right Triangle the square of Hypotenuse is equal to the sum of the square of two sides.

$$\text{Hypotenuse}^2 = (\text{one side})^2 + (\text{other side})^2$$

$$AC^2 = AB^2 + BC^2$$



Pythagoras Triplet:-)

A Triplet (a,b,c) is called Pythagoras if it satisfy.

$$C^2 = A^2 + B^2$$

Example) Check whether (2,3,5) is pythagorean triplet or not?

Solution: Let $a=2, b=3$ and $c=5$

$$c^2=5^2$$

$$=25$$

$$a^2+b^2=2^2+3^2$$

$$=4+9$$

$$=13$$

c^2 is not equal to a^2+b^2 so the given triplet is not pythagorean

Question: Check whether (3,4,5) is pythagorean or not??