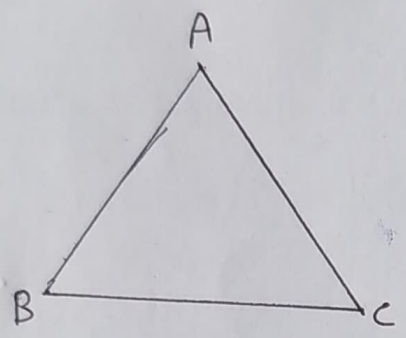The Triangle and its Properties

① Triangle = ?

A triangle is a simple closed curve made of three line segment. It has three vertices, three sides and three angles.
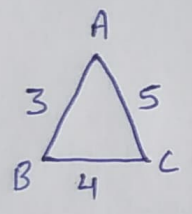

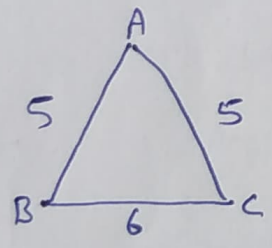Side - $\overline{AB}$, $\overline{BC}$, $\overline{AC}$

Angles - or $\angle A$, $\angle B$, $\angle C$
or $\angle BAC$, $\angle ABC$, $\angle BCA$

Vertices -
A, B, C
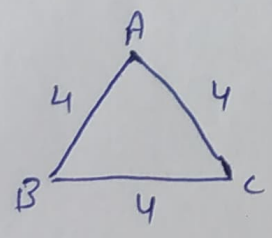
② Types of Triangle =
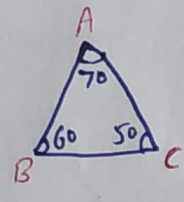Based on Sides ⇒

Scalene
{ three sides are different }
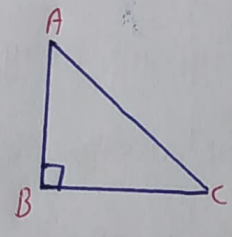

Isosceles
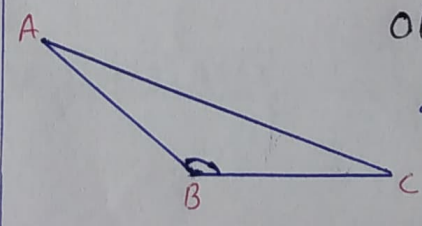{ Any two sides are equals }

Equilateral
{ All three sides are equal }

Based on Angles ⇒
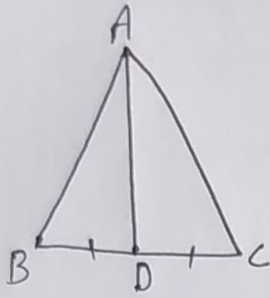

Acute angle
{ All angle is less than 90° }

Right angle
{ One angle is 90° }

Obtuse angle
{ One angle is more than 90° }

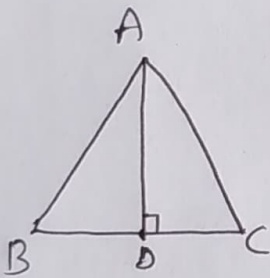③ Median = A median connects a vertex of a triangle to the mid-point of the opposite side. A triangle has 3 medians.
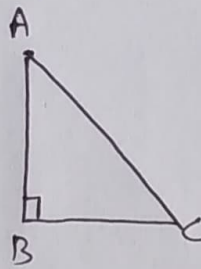

here AD is a median

and $BD = DC$

④ Altitudes = The perpendicular line segment from a vertex of a triangle to its opposite side is called an altitude of the triangle. A triangle has 3 altitudes.
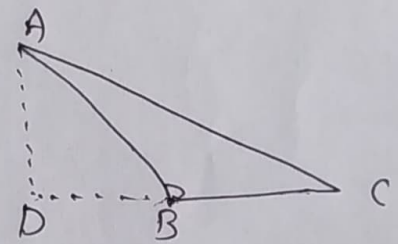
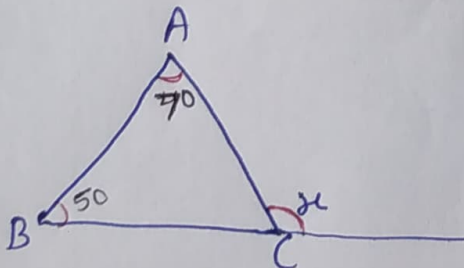(Height)

Here
AD is a altitude
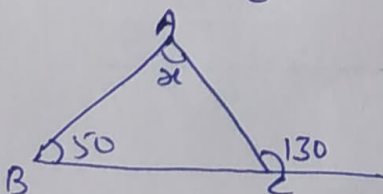

Here
AB is a altitude

Here
AD is a altitude.

⑤ Exterior angle of a triangle and its property =

An exterior angle of a triangle is equal to the sum of its interior opposite angles.

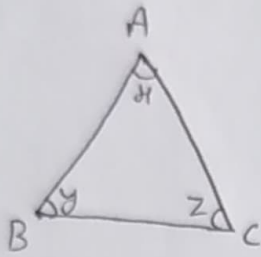Ext angle = Sum of opposite int· angles

$x = 50 + 70$

$x = 120$

$x + 50 = 130$

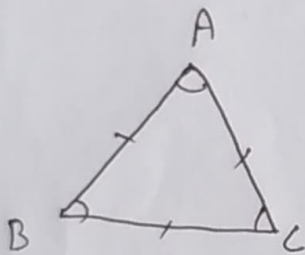$x = 130 - 50$

$x = 80$

⑥ Angle Sum Property of a triangle =

The total measure of the three angles of a triangle is 180°.

$$\angle x + \angle y + \angle z = 180°$$
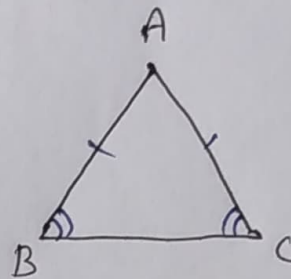
⑦ Two special triangles:

(i) Equilateral

(ii) Isosceles

(*) All sides are equals
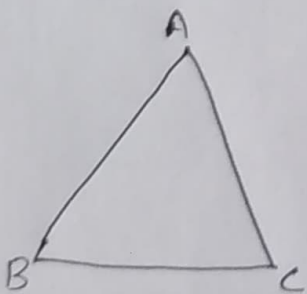
AB = BC = AC

(*) All angles is 60° each

(*) Any two sides are equals

Here   AB = AC

(*) Corresponding angles are equals.

Here

$$\angle B = \angle C$$

⑧ Sum of the lengths of two sides of a triangle is always greater than the third side.

AB + BC > AC

or

BC + CA > AB

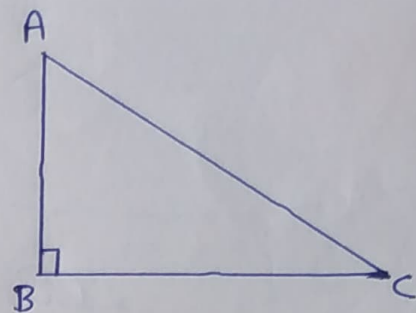or

CA + AB > BC

⑨ Right - angled Triangle and Pythagorus Property =

$$(hypotenuse)^2 = (Perpendicular)^2 + (Base)^2$$

$$\boxed{AC^2 = AB^2 + BC^2}$$

(*) If the Pythagoras property holds, the triangle must be right - angled triangle.