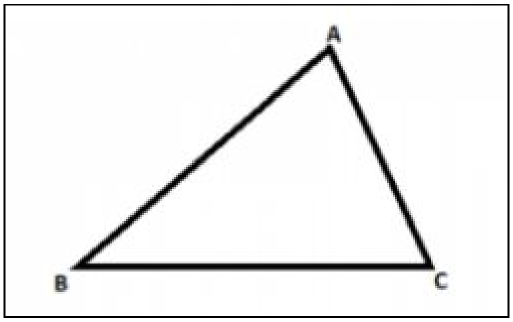
The **triangles class 10 notes chapter 6 is** provided here, is one of the most crucial study resources for the students studying in class 10. These CBSE chapter 6 notes are concise and cover all the concepts from this chapter from which questions might be included in the board exam. You will also come across theorems based on similar concepts. In your previous year classes, you must have learned about the basics of triangles such as the area of a triangle and its perimeters, etc.



The main concepts from this chapter that are covered here are-

- What is a triangle?
- Similarity criteria of two polygons having the same number of sides
- Similarity criteria of triangles
- Proof of Pythagoras Theorem
- Example Questions
- Problems based on Triangles
- Articles Related to Triangles

What is Triangle?

A triangle can be defined as a polygon which has three angles and three sides. The interior angles of a triangle sum up to 180 degrees and the exterior angles sum up to 360 degrees. Depending upon the angle and its length, a triangle can be categorized in the following types-

1. Scalene Triangle – three sides of a triangle are of different measure
2. Isosceles Triangle – two sides are of equal length
3. Equilateral Triangle – three sides of a triangle are equal and each of the measures of the interior angles 60 degrees
4. Acute angled Triangle – all the angles are smaller than 90 degrees
5. Right angle Triangle – has only one 90 degrees angle
6. Obtuse-angled Triangle – has an angle which is greater than 90 degrees

Similarity Criteria of Two Polygons Having the Same Number of Sides

Any two polygons which have the same number of sides are similar if the following two criteria are met-

1. Their corresponding angles are equal, and
2. Their corresponding sides are in the same ratio (or proportion)

Similarity Criteria of Triangles

To find whether the given two triangles are similar or not, it has four criteria. They are:

- **Side-Side- Side (SSS) Similarity Criterion –** When the corresponding sides of any two triangles are in the same ratio, then their corresponding angles will be equal and the triangle will be considered as similar triangles.
- **Angle Angle Angle (AAA) Similarity Criterion** – When the corresponding angles of any two triangles are equal, then their corresponding side will be in the same ratio and the triangles are considered to be similar.
- **Angle-Angle (AA) Similarity Criterion –** When two angles of one triangle are respectively equal to the two angles of the other triangle, then the two triangles are considered as similar.
- **Side-Angle-Side (SAS) Similarity Criterion –** When one angle of a triangle is equal to one angle of another triangle and the sides including these angles are in the same ratio (proportional), then the triangles are said to be similar.

Proof of Pythagoras Theorem

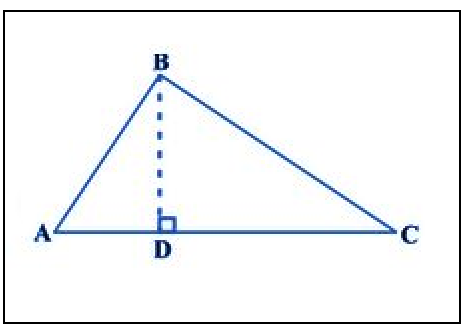
Statement – "In a right-angled triangle, the sum of squares of two sides of a right triangle is equal to the square of the hypotenuse of the triangle." Know more Pythagoras theorem and Pythagorean triplets here along with examples.

Proof –

Consider the right triangle, right-angled at B.

Construction-

Draw BD ⊥ AC



Now, $\triangle ADC \sim \triangle ABC$

So, AD/AB = AB/AC

or, AD. AC = AB^2 ……………(i)

Also, $\triangle BCD \sim \triangle ABC$

So, CD/BC = BC/AC

or, CD. AC = BC^2 ……………(ii)

Adding (i) and (ii),

AD. AC + CD. AC = $AB^2 + BC^2$

AC(AD + DC) = $AB^2 + BC^2$

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

⇒ $AC^2 = AB^2 + BC^2$

Hence, proved.

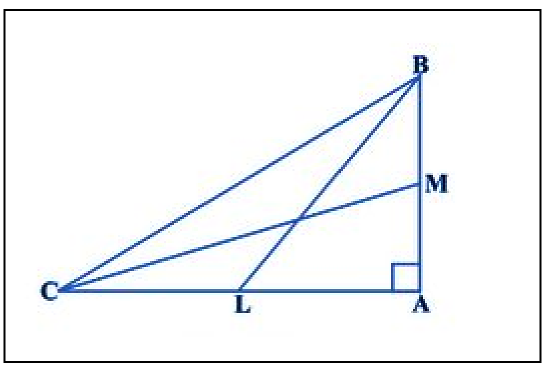
Example Question

Question:

In a right-angled triangle ABC, which is right-angled at A, where CM and BL are the medians of a triangle. Show that, $4(BL^2 + CM^2) = 5\ BC^2$

Solution:

Given that,



Medians BL and CM, ∠A = 90°

From the triangle ABC, we can write it as:

$BC^2 = AB^2 + AC^2$ (Using Pythagoras Theorem) …(1)

From the triangle, ABL,

$BL^2 = AL^2 + AB^2$

or we can write the above equation as:

$BL^2 = (AC/2)^2 + AB^2$ (Where L is the midpoint of AC)

$BL^2 = (AC^2/4) + AB^2$

$4BL^2 = AC^2 + 4\ AB^2$ ....(2)

From triangle CMA,

$CM^2 = AC^2 + AM^2$

$CM^2 = AC^2 + (AB/2)^2$ (Where M is the midpoint of AB)

$CM^2 = AC^2 + AB^2/4$

4CM = 4 AC +AB ....(3)

Now, by adding (2) and (3), we get,

$4(BL^2 + CM^2) = 5(AC^2 + AB^2)$

Using equation (1), we can write it as:

$4(BL^2 + CM^2) = 5\ BC^2$

Hence, it is proved.

Problems Related to Triangles

1. A girl having a height of 90 cm is walking away from a lamp-post's base at a speed of 1.2 m/s. Calculate the length of that girl's shadow after 4 seconds if the lamp is 3.6 m above the ground.
2. S and T are points on sides PR and QR of triangle PQR such that angle P = angle RTS. Now, prove that triangle RPQ and triangle RTS are similar.
3. E is a point on the side AD produced of a parallelogram ABCD and BE intersects CD at F. Show that triangles ABE and CFB are similar.