Triangle Inequality

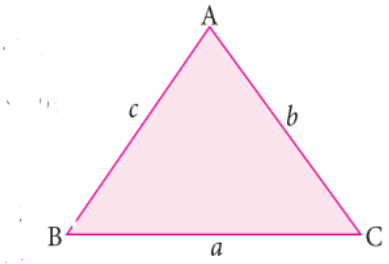
⇨ The sum of any two sides of a triangle is greater than the third side.

According to this property, in a triangle ABC, we have

$b + c > a$; $c + a > b$ and $a + b > c$

Let us understand with examples:

Example: If 5cm, 7cm and 2cm are the measures of Three lines segment. Can it be used to draw a triangle?



Solution: The triangle is formed by three line segments 5cm, 7and 2cm, then it should satisfy the inequality theorem.
Hence, let us check if the sum of two sides is greater than the third side.

$5 + 7 > 2 \Rightarrow 12 > 2 \Rightarrow$ True

$7 + 2 > 5 \Rightarrow 9 > 4 \Rightarrow$ True

$5 + 2 > 7 \Rightarrow 7 > 7 \Rightarrow$ False

Therefore, the sides of the triangle do not satisfy the inequality theorem. So, we cannot construct a triangle with these three line-segments.

Example: If the two sides of a triangle are 2 and 7. Find all the possible lengths of the third side.

Solution: To find the possible values of the third side of the triangle we can use the formula:

A difference of two sides< Unknown side < Sum of the two sides

$7 - 2 < x < 7 + 2$

$5 < x < 9$

There could be any value for the third side between 5 and 9