Triangle Theorem

Triangles are governed by two important inequalities. The first is often referred to as the triangle inequality. It states that the length of a side of a triangle is always less than the sum of the lengths of the other two sides. The triangle inequality theorem states that any side of a triangle is always shorter than the sum of the other two sides.

Theorem 1

The sum of interior angles of a triangle is 180°

Draw three different triangles in your notebook. Measure ∠X, ∠Y and ∠Z using a protector and fill in the table.

Verification:

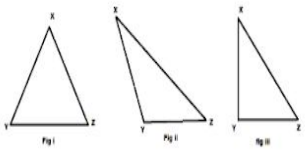
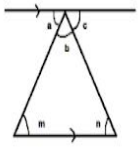


Figure	∠X	∠Y	∠Z	∠X +∠Y+∠Z
(i)				
(ii)				
(iii)				

Look at the figure and complete the table given below.



Statements	Reasons
a+b+c = 180°	Sum of adjacent angles on a straight line
a = m, c = n	Corresponding angles
m+b+n = 180°	?

Conclusion: The sum of interior angles of a triangle is 180°

Theorem 2

Base angles of an isosceles triangle are equal.

Draw three different triangles making AB = AC, ∠B and ∠C opposite to AC and AB respectively are the base angles. Measure ∠ABC and ∠ACB using a protector and fill in the table.

Verification:

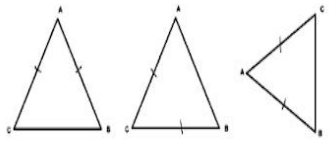


Figure	∠ABC	∠ACB	Result
(i)			∠ABC =∠ACB
(ii)			
(iii)			

Conclusion: Base angles of an isosceles triangle are equal.

Theorem 3

Each of the base angles of an isosceles right triangle is 45°.

Draw three triangles making ∠B = 90° and AC = BC. Measure ∠BAC and ∠ACB and fill in the table.

Verification:

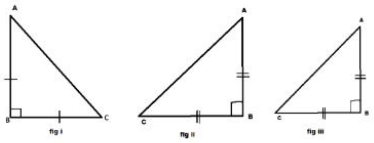


Figure	∠BAC	∠ACB	Result
(i)			∠BAC =∠ACB = 45°
(ii)			
(iii)			

Conclusion: Each of the base angles of an isosceles right triangle is 45°

Theorem 4

The line joining the vertex and midpoint of the base of an isosceles triangle is perpendicular to the base.

Draw three triangles making AB = AC. Join the midpoint P of BC and A, in each figure. Measure the angles APB and APC and fill in the blanks.

Verification:

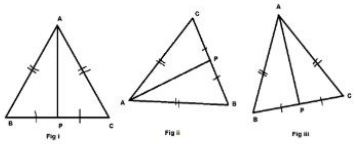


Figure	∠APB	∠APC	Result
(i)			∠APB =∠APC =90°
(ii)			
(iii)			

Conclusion: The line joining the vertex and mid-point of the base of an isosceles triangle is perpendicular to the base.

Theorem 5

All the angles of an equilateral triangle are equal.

Draw three triangles making AB = BC =CA in each figure. Measure∠ABC, ∠BCA and ∠CAB and fill in the table given below.

Verification:

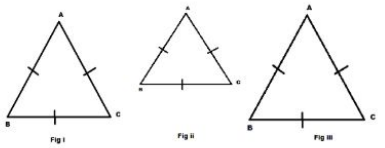


Figure	∠ABC	∠BCA	∠CAB	Result
(i)				∠ABC =∠BCA =∠CAB
(ii)				
(iii)				

Conclusion: All angles of an equilateral triangle are equal.