Verify that the Sum Of the Angles Of a Triangle Is 180°

OBJECTIVE

To verify that the sum of the angles of a triangle is 180°.

Materials Required

1. Cardboard sheet
2. White chart paper
3. Geometry box
4. Scissors
5. Adhesive
6. Drawing sheet
7. Tracing paper

Prerequisite Knowledge

1. Knowledge of straight angle
2. Concept of triangle and its properties

Theory

1. For straight line angle refer to Activity 11.
2. **Triangle**
   A plane figure closed by three intersecting lines is called a triangle, here Tri' means 'three'. A triangle has three sides, three angles and three vertices and it is denoted by the symbol 'Δ'. A ΔABC is shown in Fig. 12.1.

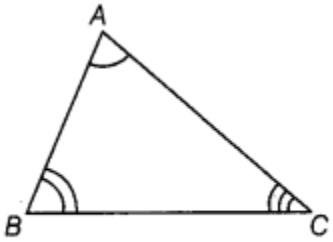

Fig. 12.1

Some basic properties of triangles are given below:

1. The sum of all the angles of a triangle is always 180°.
2. Angles opposite to equal sides of a triangle are equal.
3. The sides opposite to equal angles in a triangle are equal.

4. In a triangle, the angle opposite to longer side is larger and vice-versa.
5. The sum of two sides of a triangle is greater than the third side.
6. The exterior opposite angle in a triangle is equal to sum of opposite interior angles.

Note: The property (1) is called Angle Sum Property of triangle.

Procedure

1. Take a cardboard of suitable size and by using adhesive, paste a white chart paper on it.
2. Draw a ΔABC of suitable lengths on the drawing sheet and also mark all the angles as shown in Fig. 12.2.

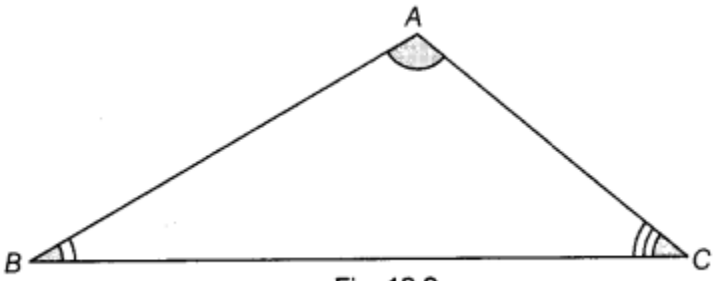

Fig. 12.2

3. By using tracing paper, cut out the angles respectively equal to ∠A , ∠B and ∠C from a drawing sheet, (see Fig. 12.3).

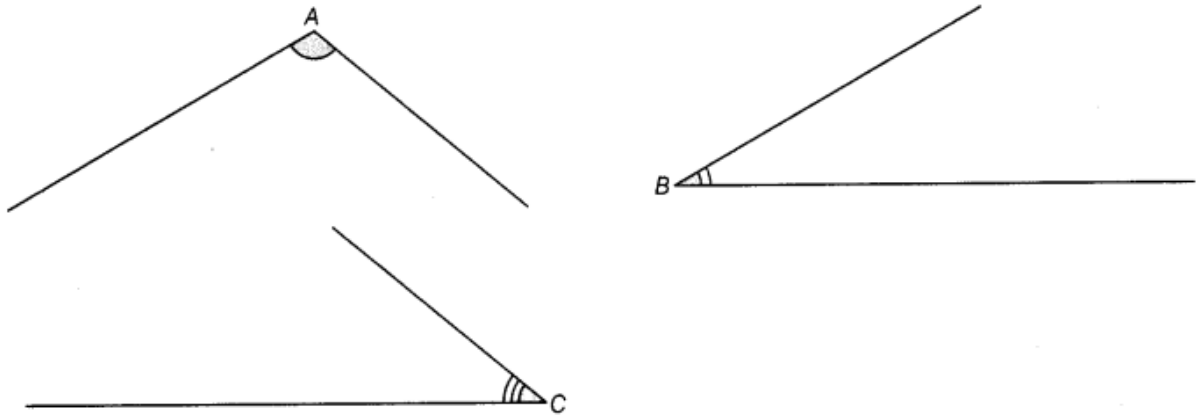

Fig. 12.3

4. Now, draw a line on the cardboard and paste the cut outs of the angles (∠A, ∠B and ∠C) on the line at a point O as shown in Fig. 12.4.

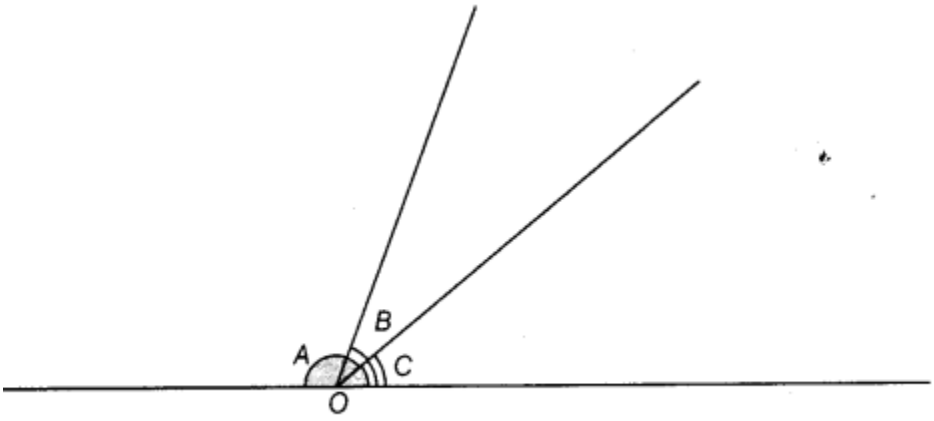

Fig. 12.4

Demonstration

When all the three cut outs of the angles A, B, C placed adjacent to each other at a point, then it forms a line forming a straight angle, i.e. 180°.
Flence, it is proved that the sum of the three angles of a triangle is 180°.
Therefore, ∠A + ∠B + ∠C =180°

Observation

Measure of ∠A = …… ,
Measure of ∠B = …… ,
Measure of ∠C = …… ,
Hence, sum (∠A + ∠B + ∠C) = …… .

Result

The sum of angles of a triangle is 180°, have been verified.

Application

This result can be used in many geometrical problems such as to find the sum of angles of a quadrilateral, pentagon and hexagon etc.

Viva Voce

Question 1:
What is the angle sum property of a triangle?
Answer:
The sum of angles of a triangle is 180°.

Question 2:
In a triangle, if the sum of two angles is 60°, then what will be the measure of third angle?
Answer:
180°-60° =120°.

Question 3:
In a triangle, if one of the angles is 80°, then what will be the sum of other angles?
Answer:
180° – 80° = 100°, Le. the sum of other angles = 100°.

Question 4:
If a triangle has all three angles are equal in measure, then what will the measure of each angle mark?
Answer:
180°/30° = 60°.

Question 5:
What do we mean by scalene triangle?
Answer:
A triangle whose all the three sides are unequal, is called scalene triangle.

Suggested Activity

Find the sum of the angles of pentagon and hexagon.