

6th Standard Maths

Understanding Elementary Shapes

All the shapes we see around us are formed using curves or lines. We can see comers, edges, planes, open curves and closed curves in our surroundings. We organise them into line segments, angles, triangles, polygons, and circles. We can see that they do not have the same measure. So it is necessary to develop tools to compare their sizes.

Measuring Line

A line segment is a fixed portion of a line. So, we can measure a line segment. The distance between the endpoints of a line segment is called its length. The measure of a line segment is a unique number. Actually, the measure of a line segment is called its length. it helps us in comparing two line segments.

This can be done in several ways:

- Comparison by observation
- Comparison by tracing
- Comparison using a ruler and a divider.

There are four main directions. They are North (N), South (S), East (E) and West (W).

The turn from north to east is by a right angle. The turn from north to south is by two right angles. It is called a straight angle.

If we turn by two straight angles or four right angles in the same direction, then it makes a full turn and we reach our original position. This one complete turn is called one revolution. The angle for one revolution is a complete angle.

We can see such revolutions on clock faces. When the hand of a clock moves from one position to another, it turns through an angle. Suppose the hand of a clock starts at 12 and goes around until it reaches 12 again. Clearly, it has made one revolution. It has turned through one complete angle or two straight angles or four right angles.

Angles – Acute, Obtuse, and Reflex

An angle is called an acute angle if it is smaller than a right angle. An angle is called an obtuse angle, if it is larger than a right angle, but less than a straight angle.

An angle is called a reflex angle if it is larger than a straight angle.

Acute angle: An angle smaller than a right angle is called an acute angle. An acute angle is less than one-fourth of a revolution.

Obtuse angle: An angle larger than a right angle but less than a straight angle is called an obtuse angle. An obtuse angle is greater than one-fourth of a revolution but less than half a revolution.

Reflex angle: A reflex angle is larger than a straight angle.

Measuring Angles

To compare two angles exactly, we need the measures of the angles. This is

done with the help of a protractor. One complete revolution is divided into 360 parts. Each part is called a degree. The measure of the angle is called 'degree measure'. We write 360 degrees as 360° .

Perpendicular Lines

If two lines intersect each other and the angle between them is a right angle, then they are called perpendicular lines. If a line AB is perpendicular to line CD, then we write $AB \perp CD$.

Classification of Triangles

We know that a triangle is a polygon with the least number of sides. There are different types of triangle.

Triangles can be classified on the basis of their angles as follows:

- If each angle of a triangle is acute, it is called an acute-angled triangle.
- If anyone angle of a triangle is a right angle, it is called a right-angled triangle.
- If anyone angle of a triangle is obtuse, it is called an obtuse-angled triangle.

The triangles can also be classified on the basis of the lengths of their sides as follows:

- If all the three sides of a triangle are of unequal length, it is called a scalene triangle.
- If any two of the sides of a triangle are equal, it is called an isosceles triangle.

- If all the three sides of a triangle are of equal length, it is called an equilateral triangle.

Quadrilaterals

We know that a quadrilateral is a four-sided polygon. A quadrilateral has four sides, four angles, and two diagonals. Quadrilaterals can be classified with reference to their properties as follows:

- If the quadrilateral has only one pair of parallel sides, then the quadrilateral is called a trapezium.
- If two pairs of sides are parallel, then the quadrilateral is called a parallelogram.

Polygons

We know that a polygon of 3 sides is called a triangle and a polygon of 4 sides is called a quadrilateral. We may have polygons of still more number of sides. We may classify the polygons according to the number of their sides. A polygon of 5 sides is called a pentagon, a polygon of 6 sides is called a hexagon and a polygon of 8 sides is called an octagon.

Three Dimensional Shapes

We see around us many three dimensional shapes. Cubes, cuboids, spheres, cylinders, cones and pyramids are some of them.

Cube

Each side is called a face, Two faces intersect in a line segment called an edge. Three edges meet at a point called a vertex.

Prism

One of its faces is a triangle. So it is called a triangular prism. The triangular face is known as its base. A prism has two identical bases. Its other faces are parallelograms. If the prism has a rectangular base, it is called a rectangular prism, (or cuboid).

Pyramid

It is a shape with a single base. The other faces are triangles. If the base face is a triangle, it is called a triangular pyramid. If the base face is a square, it is called a square pyramid.

