Comparing line Segment

More about Angle

Triangle and Its types

Quadrilateral and Its types

<u>Polygon</u>

Three Dimensional shapes



Comparing line Segment

Line Segment:

A line segment is a fixed portion of a line. This makes it possible to measure a line segment. This measure of each line segment is a unique number called its "length".

To compare any two line segments, we find a relation between their lengths. This can be done in several ways.

Comparison by observation:

We can compare line segments simply by looking at them.

For example, here the line segment PQ is greater than AB.



But sometimes we cannot be sure about our judgment. As shown in the figure:



Comparison by Tracing

Another method of comparing line segments is by tracing.

Consider two line segments and to compare AB and CD, we use a tracing paper, trace CD and place the traced segment on AB.





Now we can easily tell that CD is greater than AB.

Accuracy of this method depends upon the accuracy of the trace. Also, it is hideous to trace a line segment every time we want to compare it.

Comparison using Ruler and a Divider

Let us know about a ruler and a divider. A ruler is divided into 15 parts, each of which is of length 1cm. Each centimeter is divided into 10 subparts, each of which is of length 1mm.



Now let us measure the line segment AB. Place the zero mark on the ruler at one end of the line segment say A. Read the mark at B. It is 5cm. So, the length of AB is 5cm.



Place your eye vertically above the mark to get a correct measure.





Let us use the divider to measure length.

To measure a line segment by a divider, open it and place the end point of one of its arms at A and the end point of the second arm at B. Now, without disturbing the opening of the divider, lift the divider and place it on a ruler. Ensure that one end point is at the zero mark of the ruler. Now read the mark against the other end point.





More about Angle

Angles - 'Right' and 'Straight'

An angle is the figure formed by two rays, called the sides of the angle, having a common endpoint, called the vertex.



Right Angle

Right angle is an angle that has a measure of 90°.

Example:

The figure below shows a right angle.



The turn from north to east is also a right angle.



Straight angle

The turn from north to south is by two right angles; it is called a **straight angle**. (NS is a straight line)





Stand facing south. Turn by a straight angle. Which direction do you face now? You face north.



Turning by two straight angles (or four right angles) in the same direction makes a full turn. This one complete turn is called **one revolution**. The angle for one revolution is a **complete angle**.



 $\frac{1}{4}$ of the revolution = 1 right angle $\frac{1}{2}$ of the revolution = 2 right angle = 1 straight angle $\frac{3}{4}$ of the revolution = 3 right angles



1 complete revolution = 4 right angles = 1 complete angle

Angles - 'Acute', 'Obtuse' and 'Reflex'

Acute angle:

An angle smaller than a right angle (90°) is called an acute angle





Obtuse Angle:

Any angle greater than 90° and smaller than 180° is called an Obtuse Angle.



Reflex Angle:

Reflex Angle is an angle that lies between 180° and 360°.



Measuring Angles

The measure of angle

We call our measure, 'degree measure'. One complete revolution is divided into 360 equal parts. Each part is a **degree**. We write 360° to say 'three hundred sixty degrees'.

The Protractor

You can find a readymade protractor in your 'instrument box'. The curved edge is divided into 180 equal parts. Each part is equal to a 'degree'. The markings start from 0° on the right side and ends with 180° on the left side, and vice-versa.

Suppose you want to measure an angle ABC.





Given ∠ABC

Step 1: Place the protractor so that the mid point (M in the figure) of its straight edge lies on the vertex B of the angle.

Step 2: Adjust the protractor so that BC is along the straight-edge of the protractor.

Step 3: There are two 'scales' on the protractor: read that scale which has the 0° mark coinciding with the straight-edge (i.e. with ray BC).

Step 4: The mark shown by BA on the curved edge gives the degree measure of the angle.



Measuring ∠ABC

We write m $\angle ABC = 40^{\circ}$, or simply $\angle ABC = 40^{\circ}$.

Perpendicular Lines:

When two lines intersect and the angle between them is a right angle, then the lines are said to be **perpendicular**. If a line AB is perpendicular to CD, we write $AB \perp CD$.

Perpendicular Bisector

Perpendicular Bisector is a perpendicular line or a segment that passes through the midpoint of a line.

Example:

In the figure shown, AB is the perpendicular bisector of the line segment PQ passing through its midpoint 'O'.





Triangle and Its types

Classification of Triangles

Naming triangles based on sides

Scalene Triangle:

A triangle having all three unequal sides is called a Scalene Triangle.



Isosceles Triangle:

A triangle having two equal sides is called an **Isosceles Triangle**.



Equilateral Triangle:

A triangle having three equal sides is called an Equilateral Triangle.



Naming triangles based on angles

Acute angled triangle:



If each angle is less than 90°, then the triangle is called an acute angled triangle.



Right angled triangle:

If any one angle is a right angle then the triangle is called a **right angled triangle**.



Obtuse angled triangle:

If any one angle is greater than $90^\circ,$ then the triangle is called an $obtuse\ angled\ triangle.$

H

Obtuse Angled Triangle



Quadrilateral and Its types

Quadrilaterals

A quadrilateral is a polygon which has four sides. It is a quadrilateral, like the one you see here. The sides of the quadrilateral are AB, BC, CD, and DA. There are 4 angles for this quadrilateral. They are given by \angle BAD, \angle ADC, \angle DCB and \angle CBA. BD and AC are the diagonals.



Rectangle:

A rectangle is a quadrilateral with four right angles. The either sides of a rectangle are parallel and of equal length.



Square:

All the sides are of equal length.





Parallelogram:

A Parallelogram is a quadrilateral whose opposite sides are parallel and equal.



Rhombus:

Rhombus is a parallelogram with four equal sides.



Trapezium:

Trapezium is a quadrilateral with only one pair of parallel sides.





<u>Polygon</u>

A polygon is a closed plane figure made up of 3 or more line segments.

Polygons are named based on their sides.

Number of sides	Name	Illustration
3	Triangle	\bigtriangleup
4	Quadrilateral	\bigcirc
5	Pentagon	
6	Hexagon	\bigcirc
8	Octagon	



Three Dimensional shapes

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



The ball is a sphere.



The box is a cuboid.



The ice-cream is in the form of a cone.



The playing die is a cube.



This can is a cylinder.



This is the shape of a pyramid.

Faces, edges and vertices

In case of many three dimensional shapes we can distinctly identify their faces, edges and vertices. (Note 'Vertices' is the plural form of 'vertex').

Consider a cube each side of the cube is a flat surface called a flat face (or simply a face). Two faces meet at a line segment called an edge. Three edges meet at a point called a vertex.



Prism:

A prism is a polyhedron consisting of two parallel, congruent faces called bases.

One of its faces is a triangle. So it is called a Triangular prism.



The triangular face is also known as its base. A prism has two identical bases; the other faces are rectangles.



If the prism has a rectangular base, it is a rectangular prism.



Pyramid:

A pyramid is a polyhedron with a polygonal base and triangles for sides.



Cylinder:

A Cylinder is a three-dimensional geometric figure that has two congruent and parallel bases.





Sphere:

A three-dimensional surface, all points of which are equidistant from a fixed point



Cone:

Cone is a three-dimensional figure that has one circular base and one vertex.



