Basic Geometrical Terms

Curve

Polygon

Angle

Triangle and Quadrilaterals

Circles

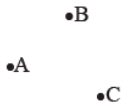
Basic Geometrical Terms

Points:

A point determines a location.

If you mark three points on a paper, you would be required to distinguish them. For this they are denoted by a single capital letter like A, B, C. These points will be read as point A, point B and point C.

In the figure shown, A, B and C are points.



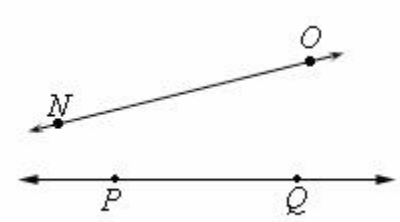
Line Segment:

Line segment is the part of a line consisting of two endpoints and all points between them.

In the figure shown, PQ, PR, and RQ are line segments.

Line:

A Line is a straight path that is endless in both directions. A line does not have any thickness.

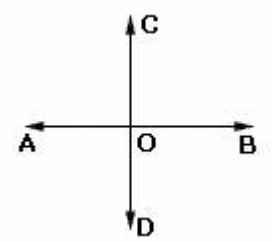


In the above figure, *NO* and *PQ* extend endlessly in both directions. So, NO and PQ represent lines.

Intersecting Lines:

Lines that have one and only one point in common are known as intersecting lines.

The common point where all the intersecting lines meet is called the Point of Intersection.

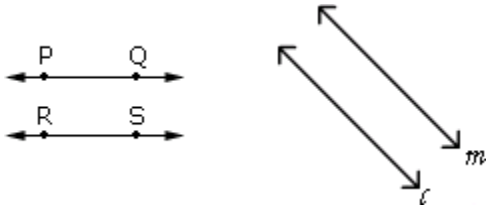


In figure, there are two lines **AB** and **CD** which intersect each other at **O**.

Parallel Lines:

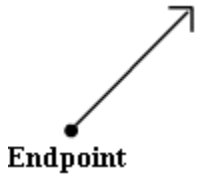
Parallel Lines are distinct lines lying in the same plane and they never intersect each other. Parallel lines have the same slope.

In the figure below, lines PQ and RS are parallel and the lines l and m are parallel.



Ray:

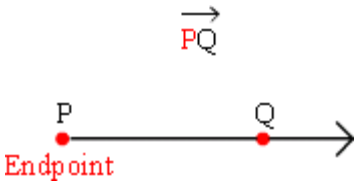
A ray is a part of a line that begins at a particular point (called the endpoint) and extends endlessly in one direction. A ray is also called half-line.



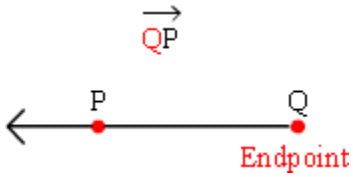
How do we name a Ray?
A ray is named based on the direction in which it extends.

A ray is named with its endpoint in the first place, followed by the direction in which it's moving.

In the example shown below, P is the endpoint and Q is the point towards which the ray extends. So, the ray PQ is represented as:



Look at another example. This ray will be called QP as it starts at Q and extends towards P. So, the ray QP is represented as:



Curve

Curve is a line that is not straight.

A curve can be classified into two categories, an open curve or a closed curve.

Examples of Curve

Figure 1 Figure 2

Figure 1 is a closed curve and Figure 2 is an open curve.

Position in a figure

A court line in a tennis court divides it into three parts: inside the line, on the line and outside the line. You cannot enter inside without crossing the line.

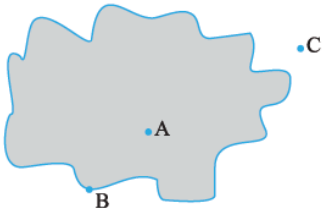
A compound wall separates your house from the road. You talk about 'inside' the compound, 'on' the boundary of the compound and 'outside' the compound.
In a closed curve, thus, there are three parts.

(i) Interior ('inside') of the curve

(ii) Boundary ('on') of the curve and

(iii) Exterior ('outside') of the curve.

In the figure below, A is in the interior, C is in the exterior and B is on the curve.



The interior of a curve together with its boundary is called its "**region**".

Polygon

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

Polygons have special names depending on the number of lines forming their boundary.

For example, a polygon with three sides is called **a triangle**.

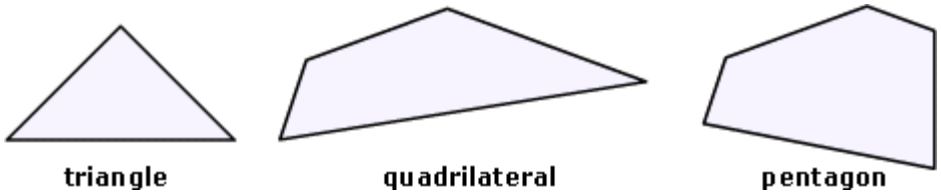
A polygon with four sides is called **a quadrilateral.**

A polygon with five sides is called **a pentagon.**

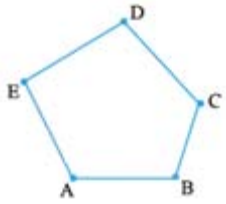
Polygons that have all sides measure the same are called **regular polygons.**

Examples of Polygon:

The figure shows a few polygons.



Sides, vertices and diagonals



Sides:

The line segments forming a polygon are called its **sides.**

The sides of polygon ABCDE are AB, BC, CD, DE and EA.

Vertex:

The meeting point of a pair of sides is called its **vertex.**

Sides AE and ED meet at E, so E is a vertex of the polygon ABCDE. Points B and C are its other vertices.

Adjacent sides:

Any two sides with a common end point are called the **adjacent sides** of the polygon.

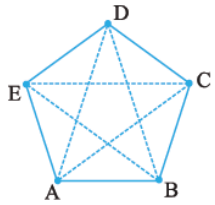
Adjacent vertices:

The end points of the same side of a polygon are called the **adjacent vertices**. Vertices E and D are adjacent, whereas vertices A and D are not adjacent vertices.

Diagonals:

Consider the pairs of vertices which are not adjacent. The joins of these vertices are called the diagonals of the polygon.

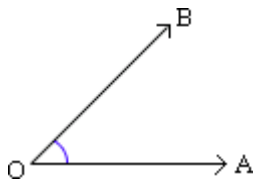
In the figure below, AC, AD, BD, BE and CE are diagonals.



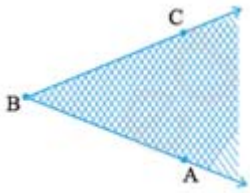
Angle

An angle is formed by two rays with a common endpoint (called the vertex).

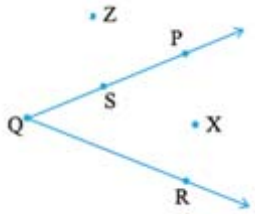
In the figure shown, angle AOB is formed by the rays OA and OB with a common endpoint O.



The portion common to both shadings is called the interior of ABC. (Note that **the interior** is not a restricted area; it extends indefinitely since the two sides extend indefinitely).



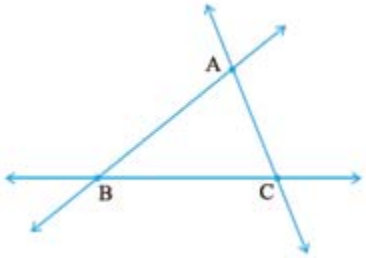
In the below diagram, X is in the interior of the angle, Z is not in the interior but in the exterior of the angle; and S is on the PQR. Thus, the angle also has three parts associated with it.



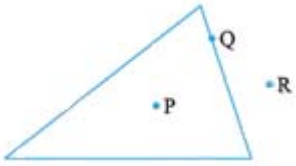
Triangle and Quadrilaterals

A triangle is a three-sided polygon.

In fact, it is the polygon with the least number of sides. We write DABC instead of writing "Triangle ABC". The three sides of the triangle are AB, BC and CA. The three angles are ∠BAC, ∠BCA and ∠ABC. The points A, B and C are called the vertices of the triangle.



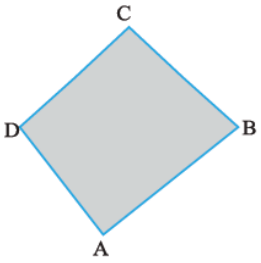
Being a polygon, a triangle has an exterior and an interior. In the figure, P is in the interior of the triangle, R is in the exterior and Q on the triangle.



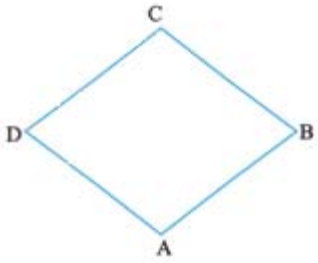
Quadrilateral:

A four sided polygon is a **quadrilateral.**

This quadrilateral ABCD has four sides AB, BC, CD and DA. It has four angles ∠A, ∠B, ∠C and ∠D.

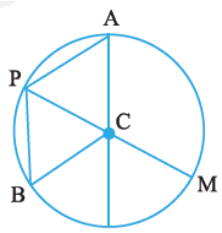


In any quadrilateral ABCD, AB and BC are adjacent sides. AB and DC are opposite sides. ∠A and ∠C are said to be opposite angles. Similarly, ∠D and ∠B are opposite angles. Naturally ∠A and ∠B are adjacent angles.



Circles

A Circle is the locus of all points that are at an equal distance from a given point (on the plane) called the center.



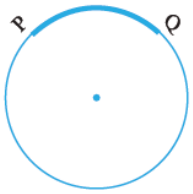
Parts of a circle

Here is a circle with **centre** C. Where A, P, B, M are points on the circle.

You will see that CA = CP = CB = CM. Each of the segments CA, CP, CB, and CM is **radius** of the circle. The radius is a line segment that connects the centre to a point on the circle.

CP and CM are radii (plural of 'radius') such that C, P, M are in a line. PM is known as **diameter** of the circle. Is a diameter double the size of a radius? Yes.

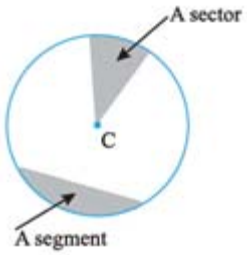
PB is a **chord** connecting two points on a circle.
Is PM also a chord? Yes.



An **arc** is a portion of circle.

If P and Q are two points on a circle then you get the arc PQ.

As in the case of any simple closed curve you can think of the **interior** and **exterior** of a circle. A region in the interior of a circle enclosed by an arc on one side and a pair of radii on the other two sides is called **a sector.**



A region in the interior of a circle enclosed by a chord and an arc is called **a segment** of the circle.

The distance around a circle is its **circumference.**

The diameter of a circle divides it into **two semi-circles**. A semi-circle is half of a circle, with the end points of diameter as part of the boundary.