- ***Polygons***: A simple closed figure is a polygon if it is made up entirely of line segments. OR

  A polygon is a closed curve (figure) formed by the line segments such that:

  (i) No two line segments intersect except at their end points.

  (ii) No two line segments with a common end point are coincident.

  The smallest possible polygon is made up of three sides called as ***Triangle***.

  A polygon made up of four line segments is called as a ***quadrilateral***.

  A polygon made up of five line segments is called as ***pentagon*** and so on….

  Sides of a polygon: The line segments forming the polygon are called its *sides*.

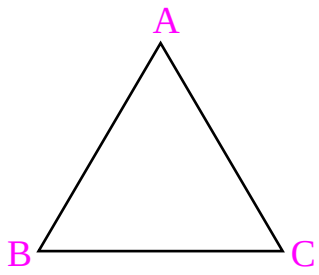
  Vertex or vertices: The end points of the line segments are called its *vertices*. We can also say that the meeting point of a pair of sides is called as *vertex*.

  Adjacent sides: Any two sides of a polygon with a common end point are called as *adjacent sides*.

  Adjacent vertices: The end points of the same side of a polygon are known as the *adjacent vertices*.

  Diagonals: The line segment obtained by joining the vertices which are not adjacent are called the *diagonals* of the polygon.

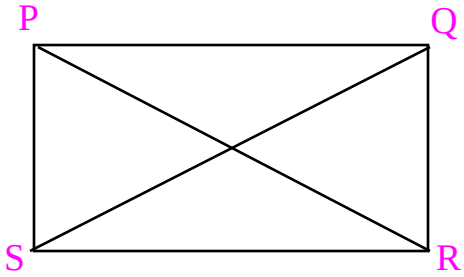
  The adjacent figure is a triangle ABC made up of three line segments.

  Its vertices are: A, B and C

  Its sides are: AB, BC and CA.

  The adjacent figure is a quadrilateral PQRS made up of four line segments.

  Its vertices are: P, Q, R and S

  Its sides are: PQ, QR, RS and SP.

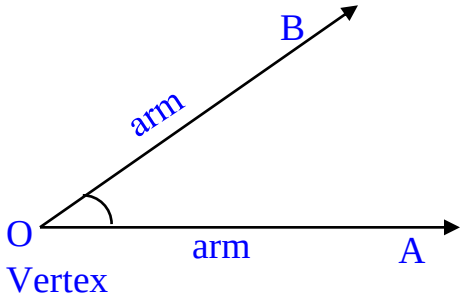
Its adjacent sides are: (PQ, QR), (QR, RS), (RS, SP) and (SP, PQ)

Its adjacent vertices are: (P, Q), (Q, R), (R, S) and (S, P).

The diagonals are: PR and QS.

- ***Angles*:** An *angle* is a figure formed by two rays with the same initial point. The common initial point is called the *vertex of the angle* and the rays forming the angle are called its *arms or sides*.

The figure given here is angle AOB written as ∠AOB. Here, 'O' is the vertex and OA and OB are the arms of the angle. The arms are joined by a small circular arc near the vertex.



This angle can be named as ∠AOB or ∠BOA and read as 'angle AOB' or 'angle BOA'. The symbol ∠ stands for angle. Always remember that ***the vertex of the angle should be written in the middle*** and the two extreme letters are any points on the arms of the angle. Sometimes an angle is also written by using the letter of the vertex. Like, the angle above can also be written as ***angle O or ∠O.***

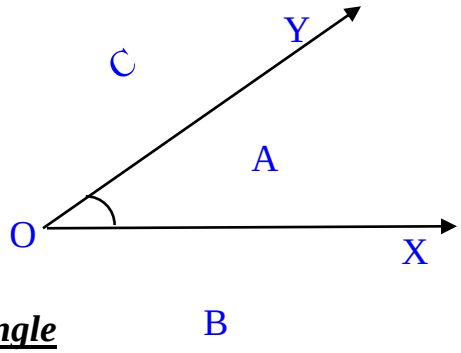
- ***Interior and exterior of an angle.***

Consider ∠XOY. All the points in the plane of ∠XOY can be divided into three groups:

i) Points which lie within the arms of the angle produced indefinitely – ***Interior of the angle***

ii) Points which lie on the arms of the angle produced indefinitely

iii) Points which lie outside the arms of the angle produced indefinitely – ***exterior of the angle***

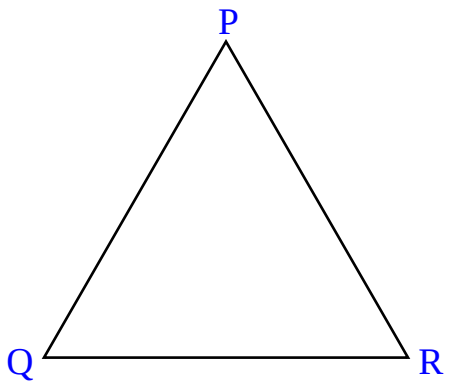


The interior of ∠XOY together with the angle itself is called the *angular region* XOY.

In the figure above, point A lies in the interior of ∠XOY, while points B and C lie in the exterior of ∠XOY.

- ***Triangles:*** A plane figure formed by three non-parallel line segments is called a *triangle*.

  If P, Q and R are no-collinear points in a plane, then the figure made up by the three line segments PQ, QR and RP is called a triangle with vertices P, Q and R.



  The triangle with vertices P, Q and R is generally denoted by the symbol ΔPQR.

  Sides: The three line segments PQ, QR and RP that form the triangle PQR are called the *sides of the triangle* PQR.

  Angles: The three angles ∠PQR, ∠QRP and ∠RPQ are *the angles* of triangle PQR.

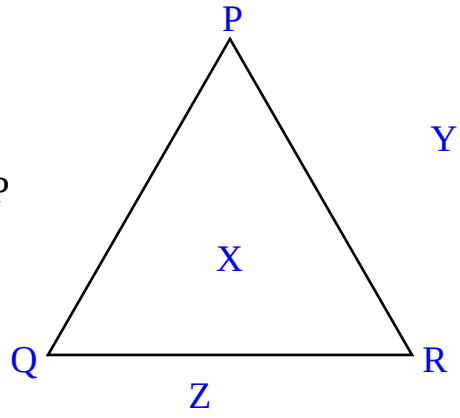
  Elements of triangle: The three sides PQ, QR and RP and the three angles ∠PQR, ∠QRP and ∠RPQ of ΔPQR are together called the *six parts or elements* of ΔPQR.

  Interior and exterior of triangle: Consider the ΔPQR. All points in the plane of ΔPQR are divided into following three parts:

  i) Points which lie inside the region enclosed by ΔPQR – ***Interior of the angle***

  ii) Points which lie on the sides PQ, QR and RP of ΔPQR

  iii) Points which lie outside the region enclosed By ΔPQR – ***exterior of the angle***

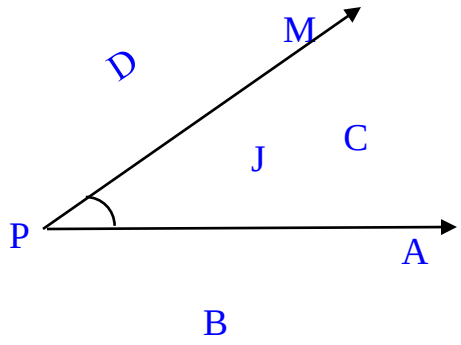


  So, point X is in the interior of ΔPQR, point Y is in the exterior of ΔPQR and point Z is on the side QR of ΔPQR.

  Triangular region: The interior of ΔPQR together with the ΔPQR itself is called the *triangular region* of ΔPQR.

Example 1: In the adjacent figure, name the points which are

(a) in the interior of ∠P
(b) in the exterior of ∠P
(c) on ∠P



Answer 1: The points which are

(a) in the interior of ∠P are J and C (b) in the exterior of ∠P are: B, D

(c) on ∠P are A, P and M

Example 2: Name five polygons.

Answer 2: Square, Triangle, Trapezium, Rectangle, Pentagon etc.

Example 3: Draw a triangle ABC. Write all its six elements. Name the three angles in two ways.

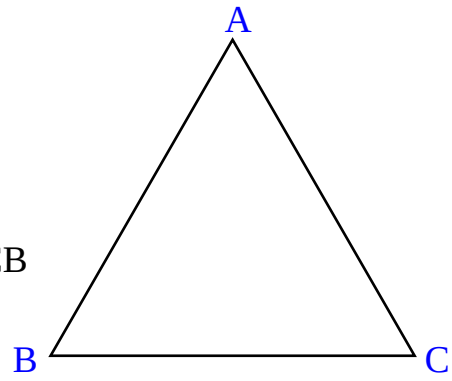
Answer 3: The six elements of triangle ABC are:

Its three sides: AB, BC and CA

Its three angles: ∠A, ∠B and ∠C.

They can also be written as: ∠BAC, ∠ABC and ∠ACB

Its three vertices: A, B and C



<u>Assignment:</u>

1) Complete exercises 4. 2, 4.3 and 4.4 of the textbook.
2) Complete the worksheet given along with this module.

Y. VASANTI PURUSHOTHAM
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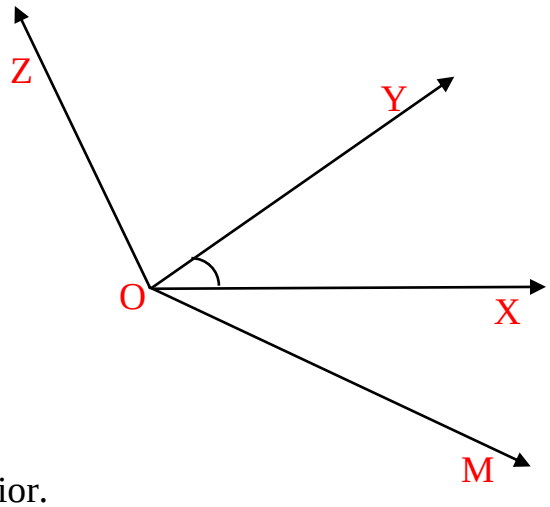
WORKSHEET 2

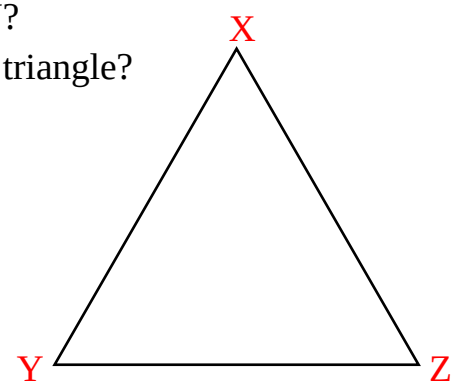
1) Name all the angles formed in the figure given below.



2) Draw any polygon and shade its interior.

3) Draw an angle POQ.
Mark (i) a point A in its interior and (ii) a point B in its exterior.

4) Can the given figure be called triangle XZY?
What other names can you use to name this triangle?



5) **Fill in the blanks**.

a) The vertex of an angle lies _____

b) The other names for ∠PQR is _____

c) The vertex of an angle is always written in the _____

d) A triangle has _____ parts.

e) The interior of a triangle does not include its vertices.

f) The vertices of a triangle are three _____ points.