

Day 24 Aug 2020

## Chapter - 4

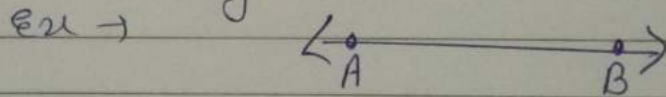
# Basic Geometrical Ideas

### \* Basic Definitions in Geometry

1. Point  $\rightarrow$  It determines a location and is usually determined by a capital letter.  $(\cdot) A$

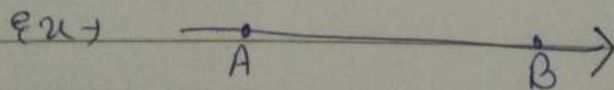
2. Line segment  $\rightarrow$  The shortest distance between two points is called a line segment. It is represented by a bar. Ex  $\overline{AB}$

3. Line  $\rightarrow$  By extending a line segment indefinitely on both sides, a line is obtained. It is represented by bidirectional arrow.



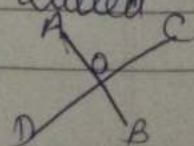
Line =  $\overleftrightarrow{AB}$

4. Ray  $\rightarrow$  A ray is a line which starts from a particular point and goes infinitely towards a particular direction.

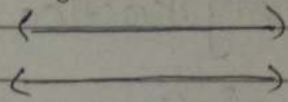


It is represented by unidirectional arrow.

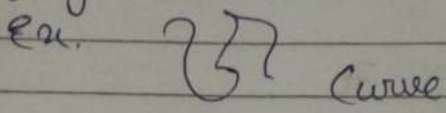
5. Intersecting lines  $\rightarrow$  If two distinct lines meet or cross at a point, they are called intersecting lines, ex



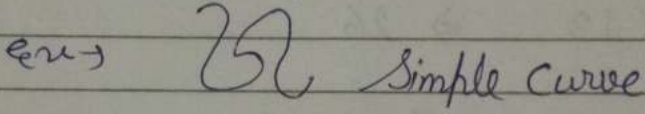
6. Parallel lines Parallel lines are lines which are always the same distance apart and never intersect anywhere in a plane.



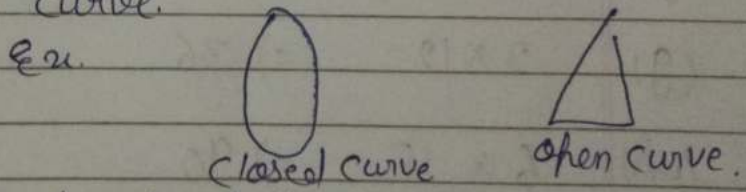
7. Curve  $\rightarrow$  It is a drawing which is done without lifting the pencil.



8. Simple curve  $\rightarrow$  A curve that never crosses itself is a simple curve.



9. Closed and open curves  $\rightarrow$  A curve is closed if its ends are joined. otherwise, it is an open curve.



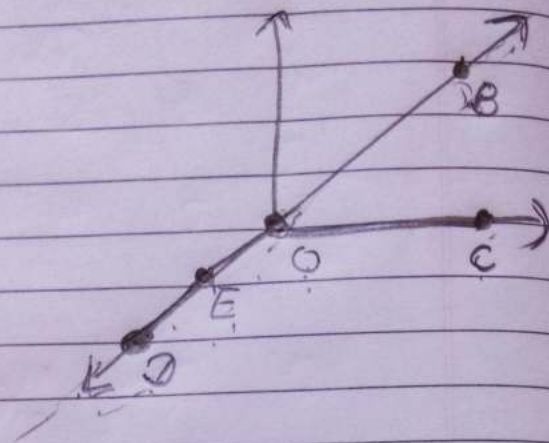
10. Angle  $\rightarrow$  It is made up of two rays which are starting from a common point.

(i) Interior angle  $\rightarrow$  It is an angle inside a shape. Ex. Triangle

(ii) Exterior angle  $\rightarrow$  The exterior angle is the angle between any side of a shape, and a line extended from the next side.

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Ex - 4.1

Q1. Use the figure to name:-



(a) Five Points

Ans B, O, E, D and C

(b) A line

Ans  $\overleftrightarrow{BD}$

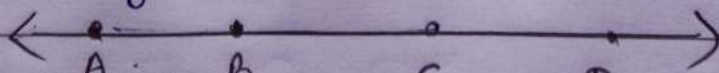
(c) Four rays

Ans  $\overrightarrow{OD}$ ,  $\overrightarrow{OB}$ ,  $\overrightarrow{OC}$ ,  $\overrightarrow{OE}$

(d) Five line segments.

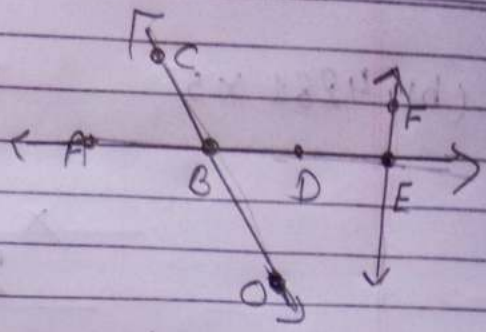
As  $\overline{DE}$ ,  $\overline{EO}$ ,  $\overline{OB}$ ,  $\overline{OC}$  and  $\overline{BE}$

Q2. Name the line given in all possible (12) ways, choosing only two letters at a time from the figure given.



Ans  $\overleftrightarrow{AB}$ ,  $\overleftrightarrow{BC}$ ,  $\overleftrightarrow{CD}$ ,  $\overleftrightarrow{AC}$ ,  $\overleftrightarrow{AD}$ ,  $\overleftrightarrow{BC}$ ,  
 $\overleftrightarrow{BD}$ ,  $\overleftrightarrow{CA}$ ,  $\overleftrightarrow{CB}$ ,  $\overleftrightarrow{CD}$ ,  $\overleftrightarrow{DA}$ ,  
 $\overleftrightarrow{DB}$ ,  $\overleftrightarrow{DC}$ .

Q3. Use the fig. to name:-



(a) Line containing point E.

Ans  $\overleftrightarrow{AE}$

(b) Line passing through A.

Ans  $\overleftrightarrow{AE}$

(c) Line on which O lies.

Ans  $\overleftrightarrow{OC}$

(d) Two pairs of intersecting lines.

Ans (i)  $\overleftrightarrow{OC}$  and  $\overleftrightarrow{AE}$  (ii)  $\overleftrightarrow{EF}$  and  $\overleftrightarrow{AE}$

Q4. How many lines can pass through:-

(a) one given point?

Ans Countless lines can pass through from 1 point.

(b) two given points?

Ans Only one.

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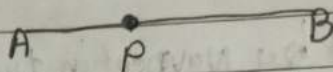
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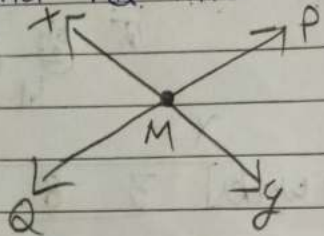
Ex - 4.1

Q5. Draw a rough figure and label suitably in each of the following cases:-

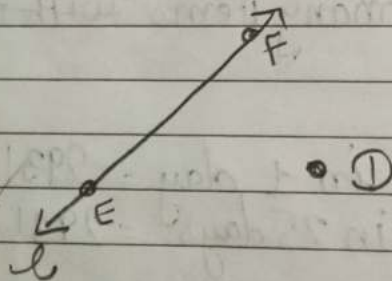
(a) Point P lies on  $\overline{AB}$ .



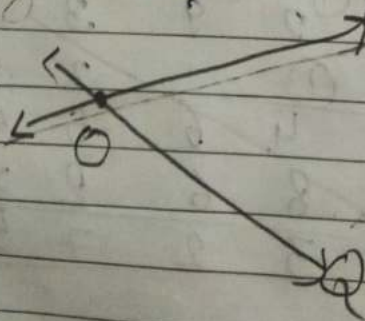
(b)  $\overleftrightarrow{XY}$  and  $\overleftrightarrow{PQ}$  intersect at M.



(c) Line L contains E and F but not D.

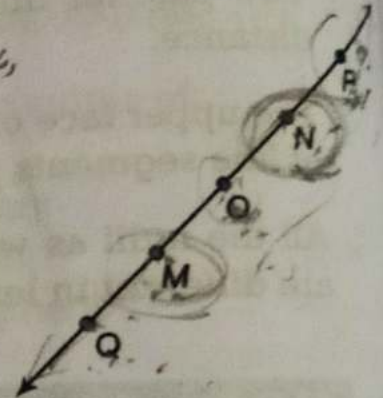


(d)  $\overleftrightarrow{OP}$  and  $\overleftrightarrow{OQ}$  meet at O.



(c) Line  $l$  contains  $E$  and  $F$  but not  $D$ .

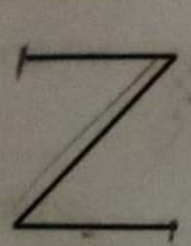
6 Consider the following figure of line  $\overline{MN}$ . Say whether following statements are true or false in the context of the given figure:



- (a)  $Q, M, O, N, P$  are points on the line  $\overline{MN}$ .  $\rightarrow$  True
- (b)  $M, O, N$  are points on a line segment  $\overline{MN}$ .  $\rightarrow$  True
- (c)  $M$  and  $N$  are end points of line segment  $\overline{MN}$ .  $\rightarrow$  True
- (d)  $O$  and  $N$  are end points of line segment  $\overline{OP}$ .  $\rightarrow$  False
- (e)  $M$  is one of the end points of line segment  $\overline{QO}$ .  $\rightarrow$  False
- (f)  $M$  is point on ray  $\overrightarrow{OP}$ .  $\rightarrow$  False
- (g) Ray  $\overrightarrow{OP}$  is different from ray  $\overrightarrow{QP}$ .  $\rightarrow$  True
- (h) Ray  $\overrightarrow{OP}$  same as ray  $\overrightarrow{OM}$ .  $\rightarrow$  False
- (i) Ray  $\overrightarrow{OM}$  is not opposite to ray  $\overrightarrow{OP}$ .  $\rightarrow$  False
- (j)  $O$  is not an initial point of  $\overrightarrow{OP}$ .  $\rightarrow$  False
- (k)  $N$  is the initial point of  $\overrightarrow{NP}$  and  $\overrightarrow{NM}$ .  $\rightarrow$  True

### Exercise 4.2

1 Classify the following curves as (i) Open or (ii) Closed.



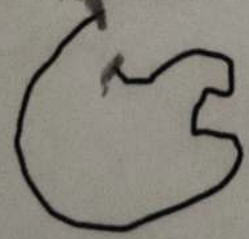
(a)

open  
curve



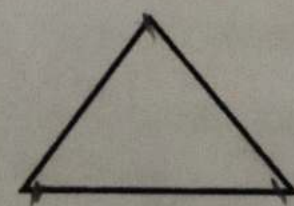
(b)

closed  
curve



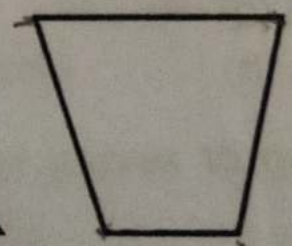
(c)

open  
curve



(d)

closed  
curve



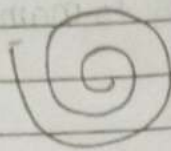
(e)

closed  
curve

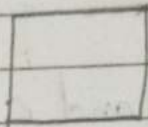
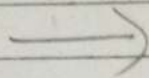
Eu-4.2

Q2. Draw rough diagram to illustrate the following.

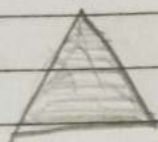
(a) Open Curve



(b) Closed Curve



Q3. Draw any Polygon and shade its Interior.

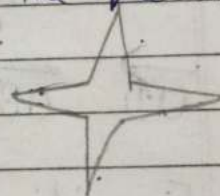


(The below fig. is the polygon with interior shade).

Q4. Consider the given fig. and answer the questions:-

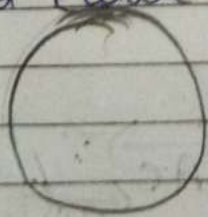
(a) If is a Curve? Ans → Yes.

(b) If is closed? Ans → Yes.



Q5. Illustrate, if possible, each one of the following with a rough diagram:-

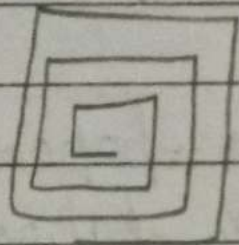
(a) A closed curve that is not a Polygon:



Circle.

(b) An open curve made up entirely of line segments.

As



(c) A polygon with two sides.

Not possible, as the polygon having least number of sides is a triangle which has 3 sides.

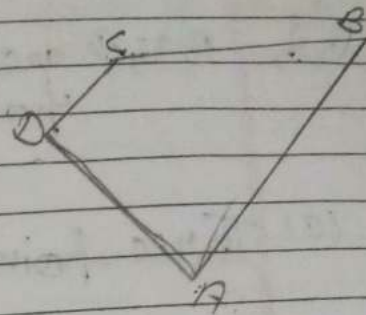


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Ex - 4.3

Q1. Name the angles in the given fig.

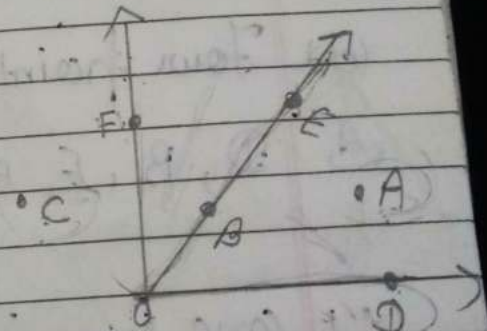


Sol. The angles are  $\angle DAB$ ,  $\angle ABC$ ,  $\angle BCD$  and  $\angle CDA$ .

Q2. In the given diagram, name the point(s):

(a) In the interior of  $\angle DOE$ .

As The point in the interior of  $\angle DOE$  is A.



(b) In the exterior of  $\angle EOF$ .

The point in the exterior of  $\angle EOF$  is C, A and D.

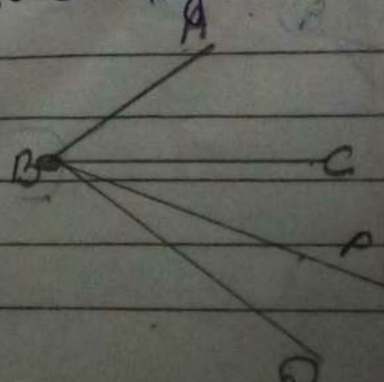
(c) on  $\angle EOF$

The point on  $\angle EOF$  are E, B, O and F.

Q3. Draw rough diagrams of two angles such that they have:

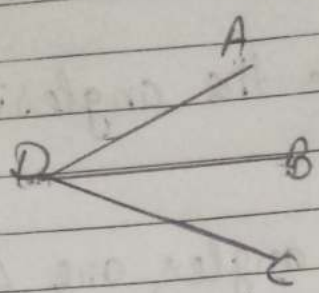
(a) one point in common.

B is a common point.



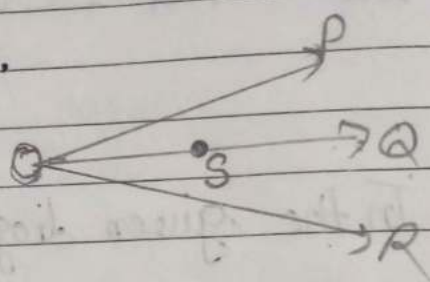
(b) Two points in Common.

Ans B & D are Two common points.



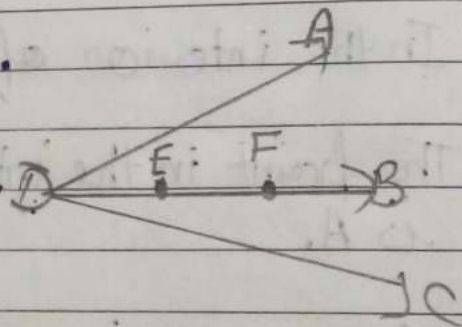
(c) Three points in Common.

Ans O, S, Q are Common.



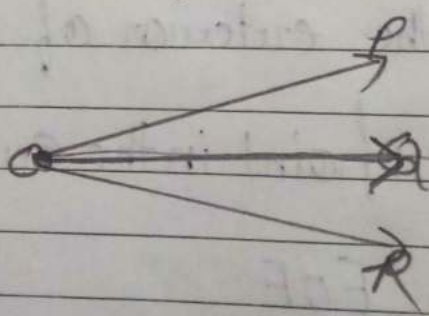
(d) Four points in Common.

Ans D, B, E, F are common.



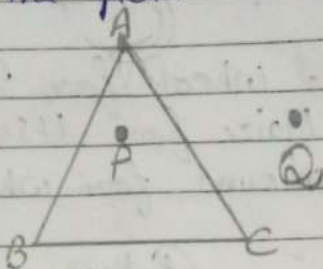
(e) One ray in Common.

Ans OQ is Common.



Ex. 4.4

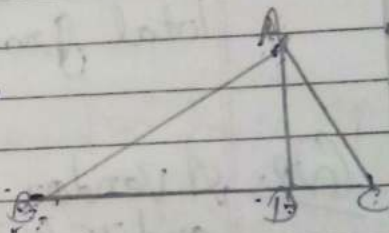
Q1. Draw a rough sketch of a triangle ABC. Mark a point P in its interior and a point Q in its exterior. Is the point A in its exterior or its interior?



A Point A lies on the given triangle ABC. It lies neither in interior nor exterior.

Q2. (a) Identify three triangles in the fig.

Ans The three triangles are  $\triangle ABC$  and  $\triangle ABD$  and  $\triangle ADC$ .



(b) The angles or write the names of seven angles.

Ans The angles are  $\angle BAC$ ,  $\angle BAD$ ,  $\angle CAD$ ,  $\angle ADB$ ,  $\angle ADC$ ,  $\angle ABC$ ,  $\angle ACB$ .

(c) Write the names of six line segments.

Ans The line segments are  $\overline{AB}$ ,  $\overline{AC}$ ,  $\overline{AD}$ ,  $\overline{BD}$ ,  $\overline{BC}$ ,  $\overline{DC}$ .

(d) Which two triangles have  $\angle B$  as common?

Ans  $\triangle ABD$  and  $\triangle ABC$  are triangles which have  $\angle B$  as common.

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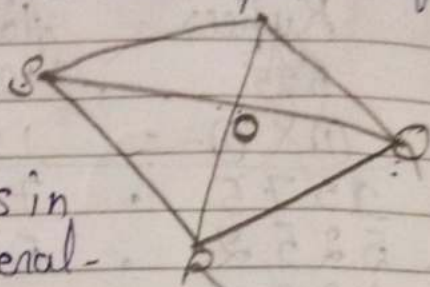
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Ex - 4.5

Q1. Draw a rough sketch of a quadrilateral PQRS. Draw its diagonals. Name them. Is the meeting point of diagonals in the interior or exterior of the quadrilateral?

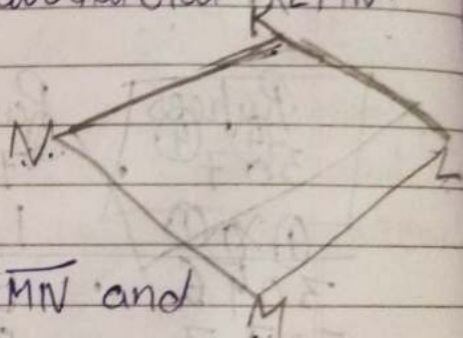
Sol. PR and QS are the diagonals. They meet at point O which is in the interior of the quadrilateral.



Q2. Draw a rough sketch of a quadrilateral KLMN. State,

(a) Two pairs of opposite sides,

As two pairs of opposite sides are  $\overline{KL}$ ,  $\overline{MN}$  and  $\overline{KN}$ ,  $\overline{LM}$ .



(b) Two pairs of opposite angles,

As  $\angle K$ ,  $\angle M$  and  $\angle N$ ,  $\angle L$ .

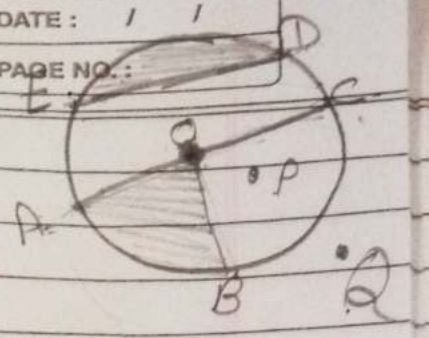
(c) Two pairs of adjacent sides,

As  $\overline{KL}$ ,  $\overline{KN}$  and  $\overline{NM}$ ,  $\overline{ML}$

(d) Two pairs of adjacent angles.  
As  $\angle K$ ,  $\angle L$  and  $\angle M$ ,  $\angle N$

Ex 4.6

Q1. From the fig. identify:-



(a) Centre of circle.  
 Ans O is the centre of circle.

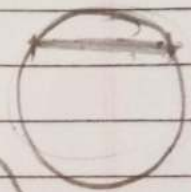
(b) three radii. (radius)  
 Ans  $\overline{OA}$ ,  $\overline{OB}$  and  $\overline{OC}$ .



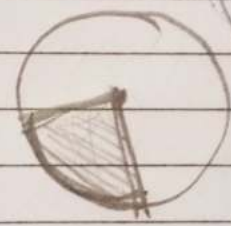
(c) a diameter.  
 Ans  $\overline{AC}$ .



(d) a chord.  
 Ans  $\overline{ED}$ .



(e) two points in the interior.  
 Ans O, P



(f) a point in the exterior.  
 Ans Q



(g) a sector.  
 Ans AOB is a sector.

(h) a segment.  
 Ans ED is a segment.

Q2. (a) Is every diameter of a circle also a chord?

Ans Yes

(b) Is every chord of a circle also a diameter?

Ans NO.

Q3. Draw any circle and mark.

(a) Its center

✓ The center of the circle is  $O$ .

(b) a radius.

✓  $OC$ , The radius.

(c) a diameter.

✓ A diameter is  $\overline{AB}$ .

(d) a sector.

✓ A sector is  $AOC$ .

(e) a segment.

✓ A segment is  $DE$ .

(f) a point in its interior

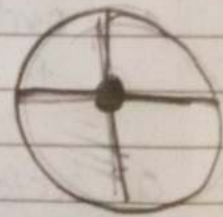
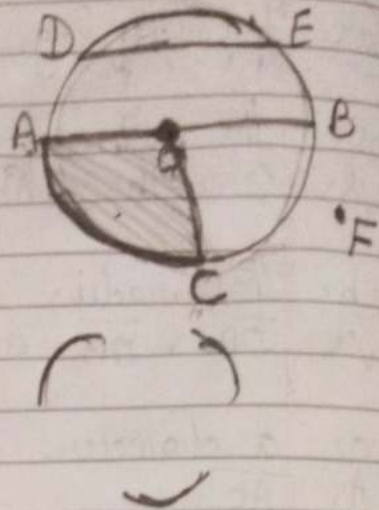
✓ A point in its interior is  $O$ .

(g) a point in its exterior

✓ A point in its exterior is  $F$ .

(h) an arc.

✓ An arc is  $\widehat{AC}$ .



Q4. Say true and false:

(a) Two diameters of a circle will necessarily intersect. (True)

(b) The centre of a circle is always in its interior. (True)