

NCERT Class 6 Mathematics | Chapter 4 Solutions | Basic Geometrical Ideas

Points – A point determines a location. It is usually denoted by a capital letter.

A Line Segment – A line segment corresponds to the shortest distance between two points.

A Line – A line is obtained when a line segment is extended on both sides indefinitely.

Intersecting lines – Two distinct lines meeting at a point are called intersecting lines.

Parallel lines – Two lines in a plane are said to be parallel if they do not meet.

Ray – A ray is a portion of line starting at a point and going in one direction endlessly.

EXERCISE 4.1

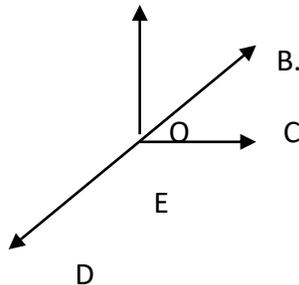
1. Use the figure to name:

a) Five points

b) A line

c) Four rays

d) Five line segments



Ans.

a) O, B, C, D, E

b) Many answers are possible. Some are DE, DO, DB, EO etc.

c) Many answers are possible. Some are DB, DE, OB, OE, EB etc.

d) Many answers are possible. Some are DE, DO, EO, OB, EB etc.

2. Name the line given in all possible (twelve) ways, choosing only two letters at a time from the four given.

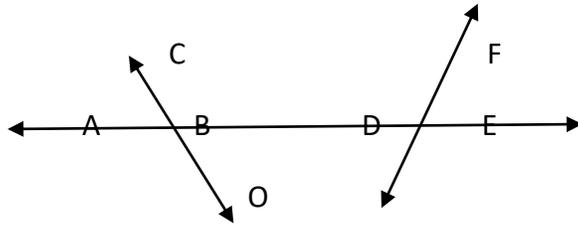


Ans. AB, AC, AD, BA, BC, BD, CA, CB, CD, DA, DB, DC.

3. Use the figure to name:

a) Line containing point E

- b) Line passing through A
- c) Line on which O lies
- d) Two pairs of intersecting lines



Ans.

- a) Many answers. One answer is AE.
- b) Many answers. One answer is AE.
- c) CO or OC.
- d) Many answers are possible. Some are CO, AE, and EF.

4. How many lines can pass through

- a) one given point?
- b) two given points?

Ans.

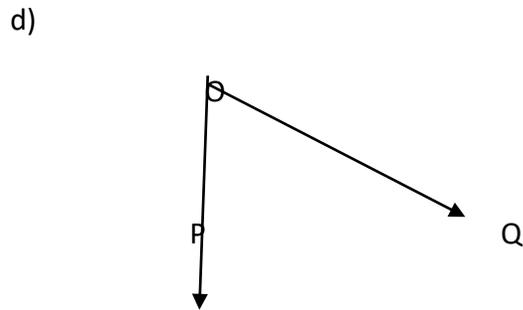
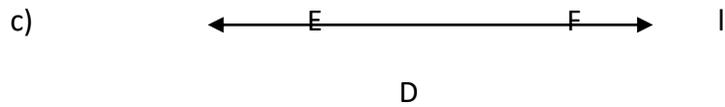
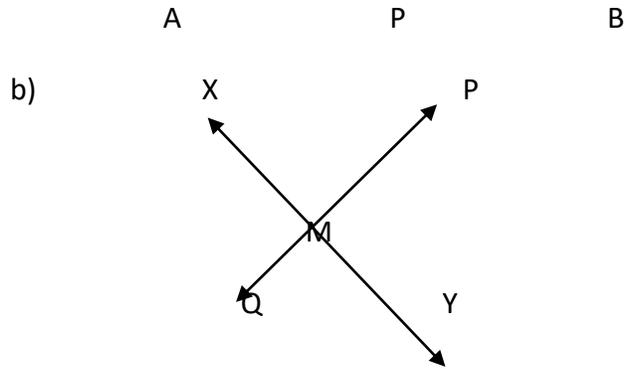
- a) Countless
- b) Only one.

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

- a) Point P lies on AB.
- b) XY and PQ intersect at M.
- c) Line l contains E and F but not D.
- d) OP and OQ meet at O.

Ans.

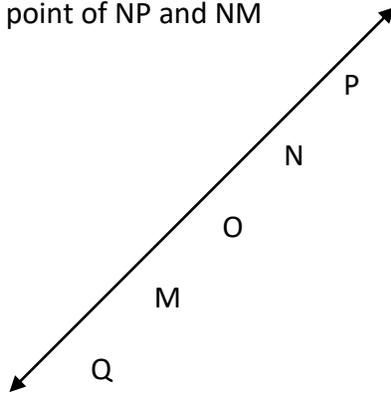
- a) 



6. Consider the following figure of line MN. Say whether following statements are true or false in context of the given figure.

- a) Q, M, O, N, P are points on the line MN.
- b) M, O, N are points on a line segment MN.
- c) M and N are end points of line segment MN.
- d) O and N are end points of line segment OP.
- e) M is one of the end points of line segment QO.
- f) M is point on ray OP.

- g) Ray OP is different from ray QP.
- h) Ray OP is same as ray OM
- i) Ray OM is not opposite to ray OP
- j) O is not an initial point of OP.
- k) N is the initial point of NP and NM



Answer:

- a) True
- b) True
- c) True
- d) False
- e) False
- f) False
- g) True
- h) False
- i) False
- j) False
- k) True

Curves – Any drawing (straight or non – straight) done without lifting the pencil may be called a curve. In this sense, a line is also a curve.

Simple curve – A Simple curve is one that does not cross itself.

Closed and open curve – A curve is said to be closed if its ends are joined: otherwise it is said to be open.

POLYGONS:

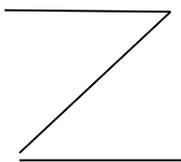
A Polygon is a simple closed curve made up of line segments .Here,

- i) The line segments are the sides of the polygon.
- ii) Any two sides with a common end point are adjacent sides.
- iii) The meeting point of a pair of sides is called a vertex.
- iv) The end points of the same side are adjacent vertices.
- v) The join of any two non – adjacent vertices is a diagonal.

Exercise 4.2

1. Classify the following curves as

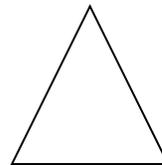
- i) Open or
- ii) Closed.



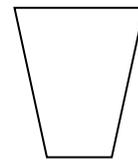
(a)



(b)



(c)



(d)

Ans. (a) and (b) are open curves

(c) and (d) are closed curves.

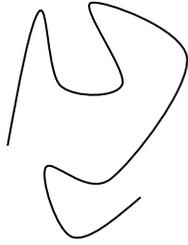
2. Draw rough diagrams to illustrate the following:

- a) Open curve
- b) Closed curve



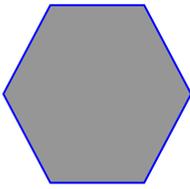
Ans

a)



b)

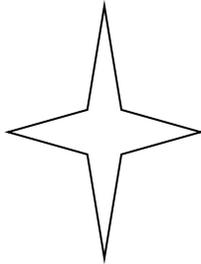
3. Draw any polygon and shade its interior.



4. Consider the given figure and answer the questions:

a) Is it a curve?

b) Is it closed?



Ans. a) Yes

b) Yes, it is a closed curve.

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

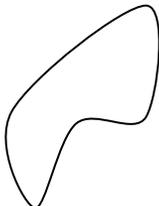
a) A closed curve that is not a polygon.

b) A n open curve made up entirely of line segments.

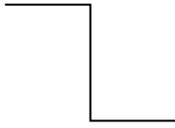
c) A polygon with two sides.

Ans.

a)



b)



c) Not possible.

ANGLES

An angle is made up of two rays starting from a common starting/initial point.

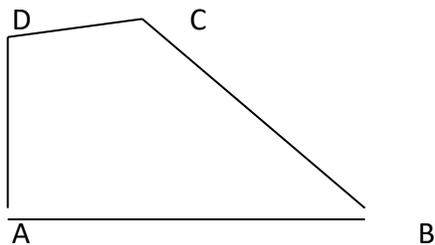
An angle leads to three divisions of a region:

On the angle, the interior of the angle and the exterior of the angle.

In specifying the angle, the vertex is always written as the middle letter.

EXERCISE 4.3

1. Name the angles in the given figure.



Ans.

Angle A or angle DAB

Angle B or angle ABC

Angle C or angle BCD

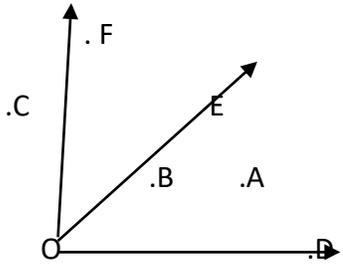
Angle D or angle CDA

2. In the given diagram, name the points

a) in the interior of angle DOE

b) in the exterior of angle EOF

c) on angle EOF



Ans.

a) A

b) A, C, D

c) E, B, O, F

3. Draw rough diagrams of two angles such that they have

a) One point in common

b) Two points in common

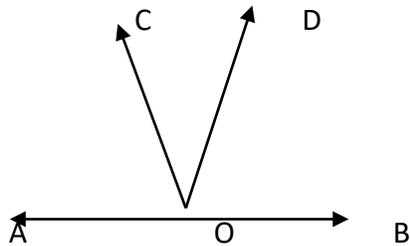
c) Three points in common

d) Four points in common

e) One ray in common.

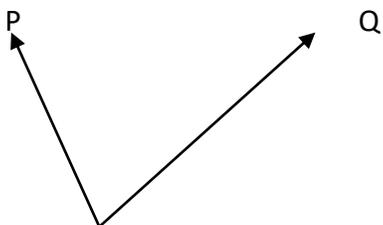
Ans.

a)



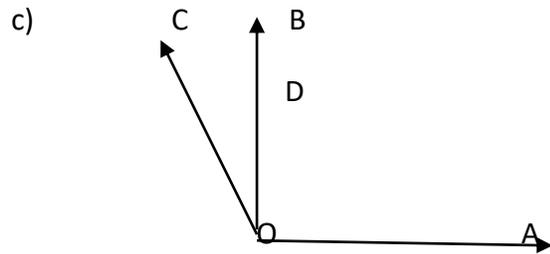
Angle AOC and Angle BOD have point O in common.

b)



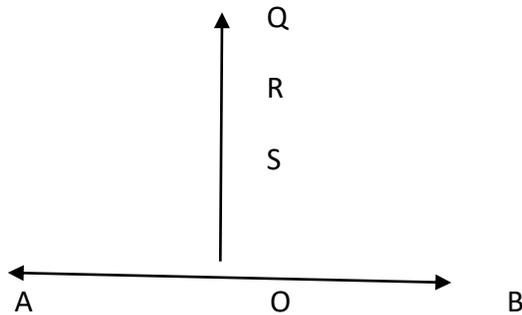


Angle POQ and angle QOR have points O and Q in common.



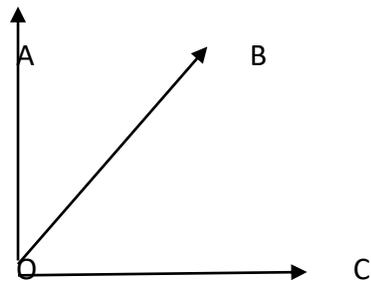
Angle BOC and angle AOB have points O, D, B in common.

d)



Angle AOQ and BOQ have points O, S, R, Q in common.

e)



Angle AOB and angle BOC have one ray OB in common.

TRIANGLES

A triangle is a three-sided polygon.

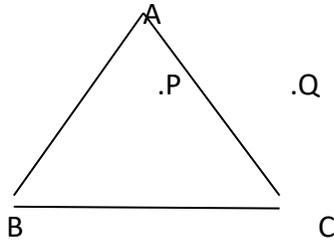
It is the polygon with the least number of sides.

A triangle has three sides and three angles.

Being a polygon, a triangle has an exterior and an interior.

EXERCISE 4.4

1. 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 in its interior?



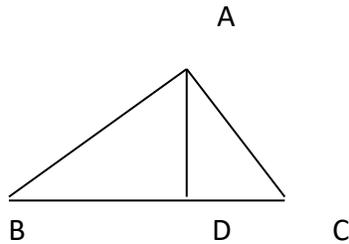
Ans. A is neither interior nor exterior of the triangle. It is a vertex.

2. a) Identify three triangles in the figure.

b) Write the names of seven angles.

c) Write the names of six line segments.

d) Which two triangles have angle B as common?



Ans. a) ABC, ABD, ACD

b) ABD, ADB, ADC, ACD, BAD, CAD, BAC

c) AB, BD, CD, AC, AD, BC

d) ABC & ABD

QUADRILATERALS

A quadrilateral is a four-sided polygon.

In any quadrilateral ABCD, AB & DC and AD & BC are pairs of opposite sides.

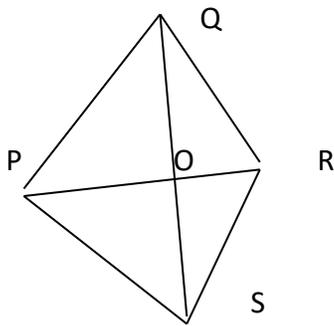
Angles A & C and B & D are pairs of opposite angles.

Angle A is adjacent to B & D: similar relations exist for other three angles.

EXERCISE 4.5

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

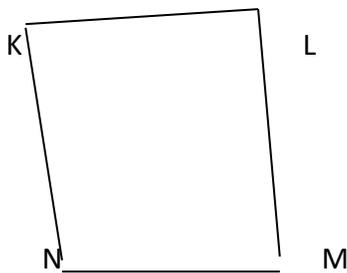
Ans.



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

2. Draw a rough sketch of a quadrilateral KLMN. State

- a) two pairs of opposite sides,
- b) two pairs of opposite angles,
- c) two pairs of adjacent sides,
- d) two pairs of adjacent angles.



- a) KL, NM and KN, ML
- b) K, M and L, N
- c) KL, LM and NM, NK
- d) K, L and M, N

CIRCLES

A circle is the path of a point moving at the same distance from a fixed point.

The fixed point is the **centre**, the fixed distance is the **radius** and the distance around the circle is the **circumference**.

A **chord** of a circle is a line segment joining any two points on the circle.

A **diameter** is a chord passing through the centre of the circle.

A **sector** is the region in the interior of a circle enclosed by an arc on one side and a pair of radii on the other two sides.

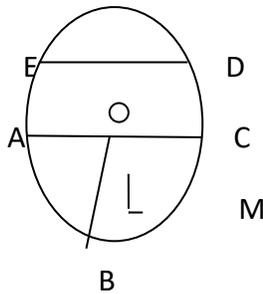
A **segment** of a circle is a region in the interior of the circle enclosed by an arc and a chord.

The diameter of a circle divides it into two semi-circles.

EXERCISE 4.6

1. From the figure, identify:

- a) the centre of circle
- b) three radii
- c) a diameter
- d) a chord
- e) two points in the interior
- f) a point in the exterior
- g) a sector
- h) a segment



Ans. a) O is the centre of circle

- b) OA, OB and OC are the three radii
- c) AC
- d) ED
- e) O & L
- f) M
- g) OAB
- h) region enclosed by chord ED and arc.

2.a) Is every diameter of a circle also a chord?

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

Ans. a) Yes

b) No

3. Draw any circle and mark

- a) its centre
- b) a radius
- c) a diameter
- d) a sector
- e) a segment
- f) a point in its interior
- g) a point in its exterior
- h) an arc

Ans: Same as the above figure

4. Say true or false:

- a) Two diameters of a circle will necessarily intersect
- b) The centre of a circle is always in its interior.

Ans.a) True

b) True