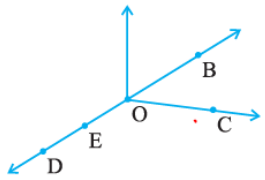
NCERT solution for Basic Geometrical Ideas

Exercise 4.1

Question 1
Use the figure to name:
(a) Five points
(b) A line
(c) Four rays
(d) Five-line segments



Solution

Point	**A point determines a location. It is usually denoted by a capital letter**
Line segment	A line segment corresponds to the shortest distance between two points. The line segment joining points X and X is denoted by XY.
Line	A line segment extended on both side to indefinitely is called line
Ray	A ray is a portion of line starting at a point and going in one direction endlessly.

a) D, E, O,B,C

b) $\overleftrightarrow{BD}$

c) $\overrightarrow{OD}$, $\overrightarrow{OB}$, $\overrightarrow{OC}$, $\overrightarrow{ED}$

d) $\overline{OE}$, $\overline{BE}$, $\overline{OD}$, $\overline{OB}$, $\overline{OC}$

Question 2

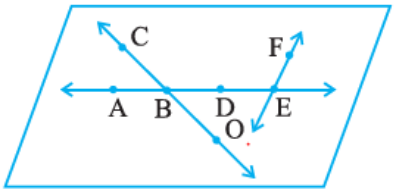
Name the line given in all possible (twelve) ways, choosing only two letters at a time from the four given

Solution

$\overrightarrow{AB}$, $\overrightarrow{BC}, \overrightarrow{CD}, \overrightarrow{AD}, \overrightarrow{BD}, \overrightarrow{AC}, \overrightarrow{BA}, \overrightarrow{CB}, \overrightarrow{DC}, \overrightarrow{DB}, \overrightarrow{CA}, \overrightarrow{DA},$

Question 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.



Solution

a) $\overleftrightarrow{FE}$

b) $\overleftrightarrow{AE}$

c) $\overleftrightarrow{OC}$

d) $\overleftrightarrow{AD}$ and $\overleftrightarrow{OC}$

$\overleftrightarrow{AE}$ and $\overleftrightarrow{OF}$

Question 4

How many lines can pass through (a) one given point? (b) two given points?

Solution

(i) There are infinite lines which can pass through one point.

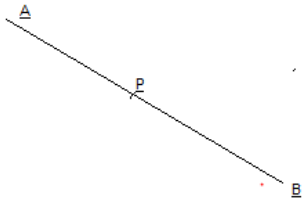
(ii) There is only one line which can pass through two given points.

Question 5

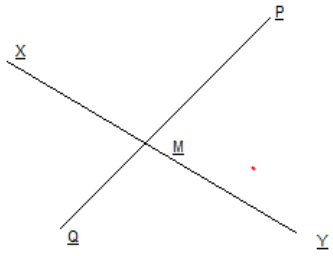
Draw a rough figure and label suitably in each of the following cases:
(a) Point P lies on $\overline{AB}$
(b) $\overleftrightarrow{XY}$ and $\overleftrightarrow{PQ}$ intersect at M.
(c) Line *l* contains E and F but not D.
(d) $\overleftrightarrow{OP}$ and $\overleftrightarrow{OQ}$ meet at O.

Solution

a)

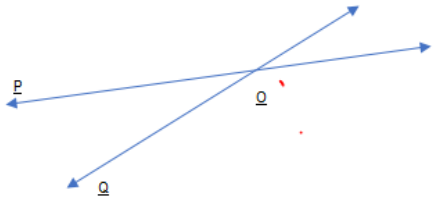


b)



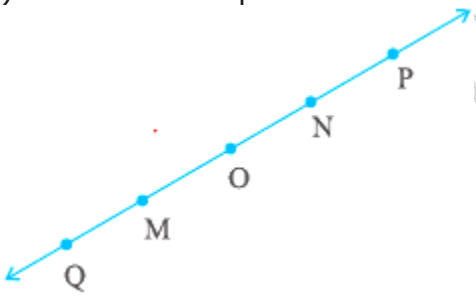
c)

d)



Question 6

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

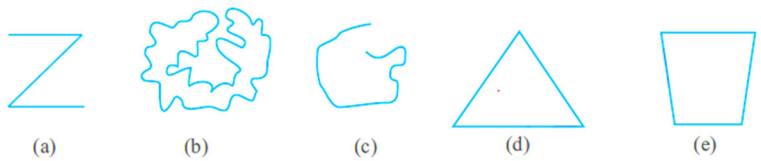


Solution
(a) True
(b) True
(c) True
(d) False
(e) False
(f) False
(g) True
(h) False
(i) False
(j) False
(k) True

Exercise 4.2

Question 1

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



Solutions

Open	**A curve is called open if its ends are not joined**
Closed	A curve is called close if its ends are joined

(a) Open

(b)Closed

(c)Open

(d)Closed

(e)Closed

Question 2

Draw rough diagrams to illustrate the following:
(a) Open curve (b) Closed curve.

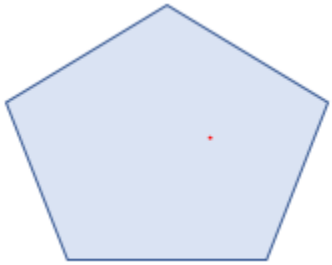
Solution

a)

b)

Question 3
Draw any polygon and shade its interior.

Solution



Question 4
Consider the given figure and answer the questions:
(a) Is it a curve? (b) Is it closed?

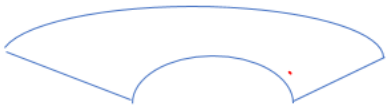
Solution
a) it is curve
b) it is closed

Question 5.
Illustrate, if possible, each one of the following with a rough diagram:
(a) A closed curve that is not a polygon.

(b) An open curve made up entirely of line segments.
(c) A polygon with two sides.

Solution

a)



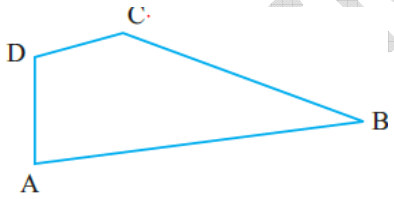
b)

c) It cannot be drawn

Exercise 4.3

Question 1

Name the angles in the given figure.



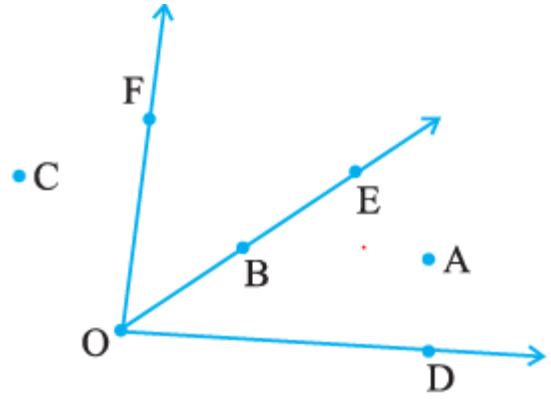
Solution

∠DAB, ∠CBA, ∠ADC, ∠DCB

Question 2

In the given diagram, name the point(s)
(a) In the interior of ∠∠DOE

(b) In the exterior of ∠∠EOF
(c) On ∠∠EOF



Solution

(a) Point interior of ∠ DOE : A

(b) Points exterior of ∠ EOF: C, A, D

(c) Points on ∠ EOF: E, O, B, F

Question 3

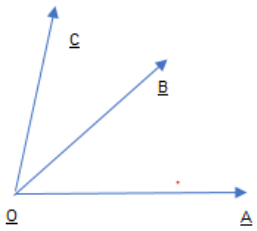
Draw rough diagrams of two angles such that they have
(a) One point in common.
(b) Two points in common.
(c) Three points in common.
(d) Four points in common.
(e) One ray in common.

Solution

a)

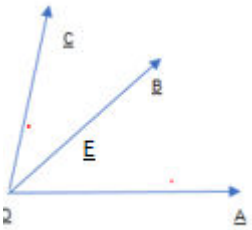
O is the common point for two angles ∠AOB and ∠DOC

b)



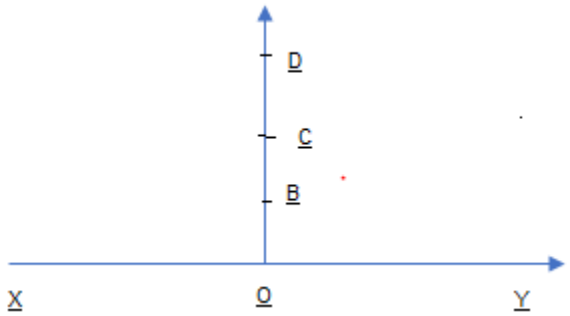
O and B are the common point for two angles ∠AOB and ∠BOC

c)



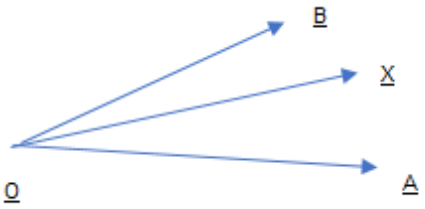
O , E and B are the common point for two angles ∠AOB and ∠BOC

d)



O, B, C and D are common points for two angles ∠XOD and ∠YOD

e)



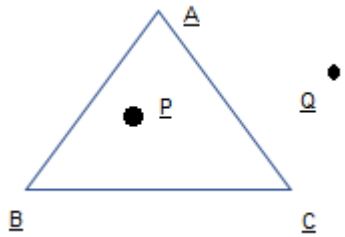
OX is the ray common between the angle ∠BOX and ∠AOX

Exercise 4.4

Question 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?

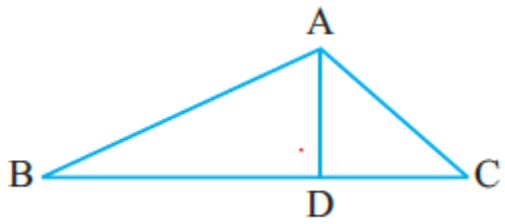
Solution



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

Question 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 ∠B as common?



Solution

a) Triangles are ABD, ADC and ABC

b) ∠ABD , ∠ADB, ∠BAD, ∠DAC, ∠ACD, ∠ADC

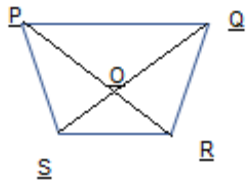
c) Line segments are AB, BD,AD,AC,DC,BC

d) ABC and ABD

Exercise 4.5

Question 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?

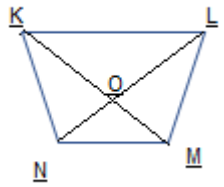
Solution



POR and QOS are the diagonals
Their meeting point is interior

Question 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.

Solution



a) KL and MN ,KN and ML

b) ∠NKL and ∠NML , ∠KNM and KLM

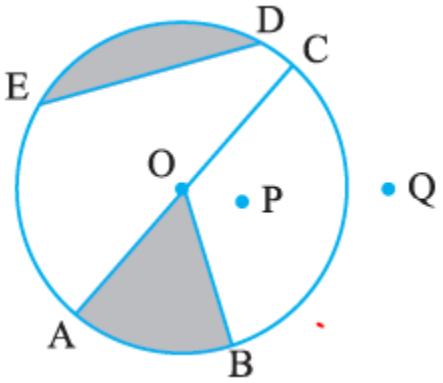
c) KN and NM, KL and LM

d) ∠NKL and ∠KLM , ∠KNM and NML

Exercise 4.6

Question 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



Solution

Circle	**A circle is the path of a point**

	moving at the same distance from a fixed point
Center	Fixed point is called center
Radius	the fixed distance
Chord	A chord of a circle is a line segment joining any two points on the circle
Diameter	A diameter is a chord passing through the centre of the circle.
Sector	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
Segment	A segment of a circle is a region in the interior of the circle enclosed by an arc and a chord.

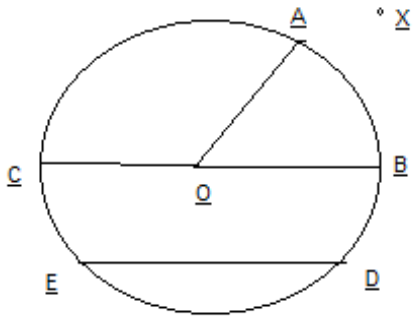
(a) the centre of circle O
(b) three radii OA, OB, OC
(c) a diameter AC
(d) a chord ED
(e) two points in the interior O and P
(f) a point in the exterior Q
(g) a sector OAB
(h) a segment ED

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

Solution
a) True
b) False

Question 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

Solution



a) Center O
b) Radius OA
c) Diameter BC
d) AOB is sector
e) ED is segment
f) O is point in it interior
h) X is the point exterior
g) AB is the arc

Question 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.

Solution

a) True

b) True