Chapter 4:

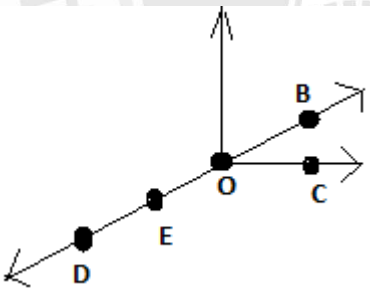
Basic Geometrical Ideas

SOLUTIONS:

Exercise 4.1

1. Use the figure to name:

a) **Five points**
b) **A line**
c) **Four rays**
d) **Five line segments**



Solutions:

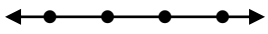
a) The five points are D, E, O, B and C

b) A line $\overleftrightarrow{DB}$

c) Four rays are $\overrightarrow{OB}$, $\overrightarrow{OC}$, $\overrightarrow{OD}$, and $\overrightarrow{OE}$.

d) Five line segments are $\overline{DE}$, $\overline{EO}$, $\overline{OB}$, $\overline{OC}$, $\overline{DO}$

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



A B C D

Solution: The lines are AB, AC, AD, BC, BD, CD, BA, CA, DA, CB, DB, DC.

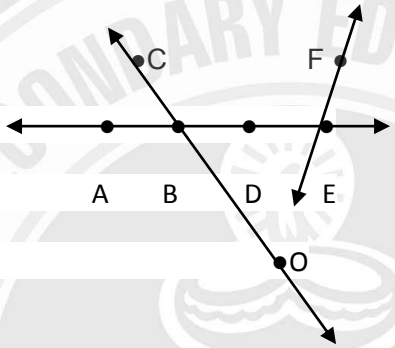
3. Use the figure to name:

(a) Line containing point E.

(b) Line passing through A.

(c) Line on which O lies

(d) Two pairs of intersecting lines.



Solutions:

a) Line containing point E is $\overleftrightarrow{AE}$ or $\overleftrightarrow{FE}$

b) Line passing through A is $\overleftrightarrow{AD}$ or $\overleftrightarrow{AE}$

c) Line on which O lies is $\overleftrightarrow{CO}$ or $\overleftrightarrow{BO}$

d) Two pairs of intersecting lines are $\overleftrightarrow{CO}$ and $\overleftrightarrow{AD}$, $\overleftrightarrow{FE}$ and $\overleftrightarrow{AE}$.

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

Solutions:

(a) Indefinite lines can pass through a given point.

(b) Only one line can pass through a two given points.

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

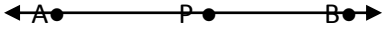
(a) Point P lies on $\overline{AB}$.

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

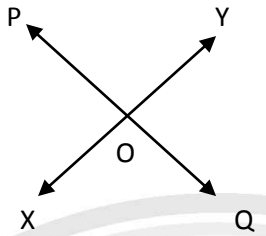
(c) Line *l* contains E and F but not D.

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

Solutions:

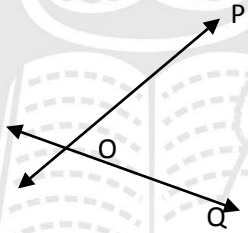


(b)



(c)

(d)



6. Consider the following figure of line. 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 $\overrightarrow{OP}$.

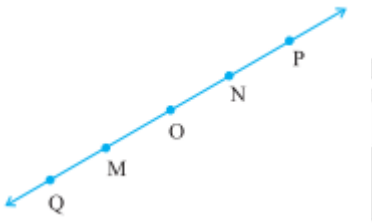
(g) Ray $\overrightarrow{OP}$ is different from ray $\overrightarrow{QP}$.

(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 $\overline{NP}$ and $\overline{NM}$.

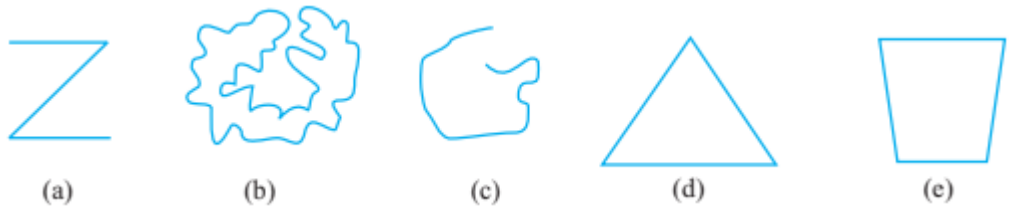


Solutions:

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

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



(a) (b) (c) (d) (e)

Solutions:

a) open
b) closed
c) open
d) closed
e) closed

2. Draw rough diagrams to illustrate the following:

(a) Open curve

(b) Closed curve.

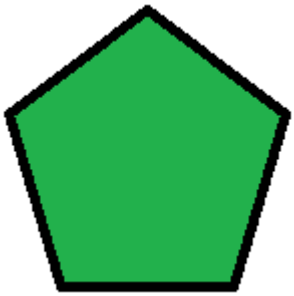
Solutions:

(a)

(b)

3. Draw any polygon and shade its interior.

Solutions:



4. Consider the given figure and answer the questions:

(a) Is it a curve?

(b) Is it closed?

Solutions:

a) Yes, it is a curve.
b) Yes, it is closed.

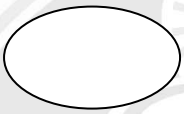
5. Illustrate, if possible, each one of the following with a rough diagram:

(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.

Solutions:

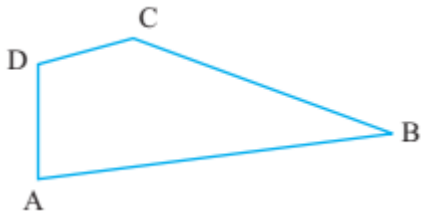


(b)

A polygon with two sides is not possible.

Exercise 4.3

1. Name the angles in the given figure.



Solutions:

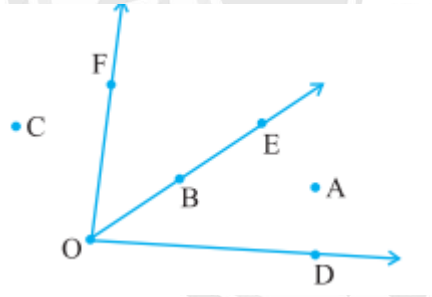
The angles are ∠DAB, ∠ABC, ∠BCD and ∠CDA

2. In the given diagram, name the points(s)

(a) In the interior of ∠DOE

(b) In the exterior of ∠EOF

(c) On ∠EOF



Solutions:

(a) The point in the interior of ∠DOE is A

(b) The point in the exterior of ∠EOF is A, C and D

(c) The points on ∠EOF are B, E, O and 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

Solutions:

(a)

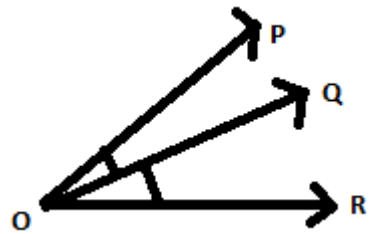
∠AOB and ∠BOC have one common point O.

(b) Not possible

(c) Not possible

(d) Not possible

(e)

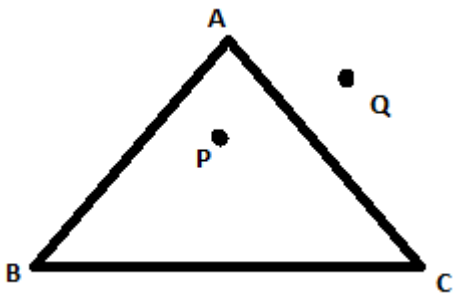


∠POQ and ∠QOR have one ray $\overrightarrow{OQ}$ in common.

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?

Solution:



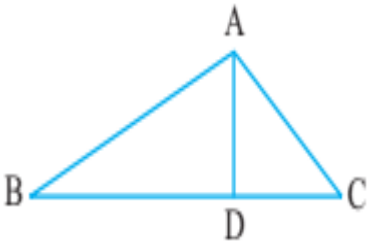
Here, P is in the interior of △ ABC, Q is in the exterior of △ ABC. A is on the △ ABC.

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?



Solutions:

a) **The three triangles are △ ABD, △ADC and △ ABC.**

b) **The seven angles are∠ ABD,∠ ACD, ∠BAD, ∠CAD,∠ BAC,∠ ADB, and ∠ADC.**

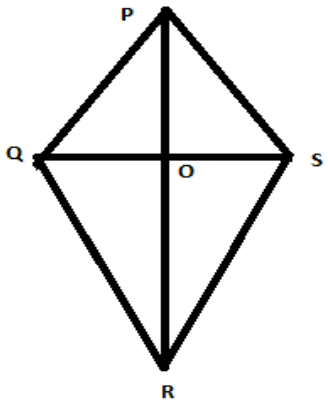
c) **The six line segments are $\overline{AB}$, $\overline{BC}$, $\overline{CA}$, $\overline{BD}$, $\overline{DC}$, and $\overline{AD}$.**

d) **△ ABD and △ ABC have** ∠B as common.

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?**

Solutions:



Here, PQRS is a quadrilateral. PR and QS are the diagonals. The meeting point O of the diagonal is in the interior of the quadrilateral.

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

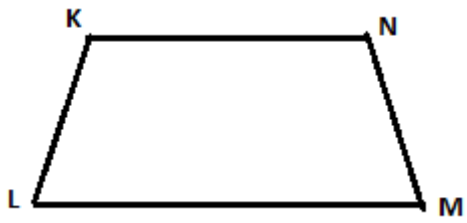
(a) two pairs of opposite sides,

(b) two pairs of opposite angles,

(c) two pairs of adjacent sides,

(d) two pairs of adjacent angles.

Solutions:



Here, KLMN is a quadrilateral.

a) **Two pairs of opposite sides are $\overline{KN}$ and $\overline{LM}$, $\overline{KL}$ and $\overline{NM}$.**
b) **Two pairs of opposite angles are∠ K and∠ M, ∠L and∠ N.**
c) **Two pairs of adjacent sides are $\overline{KL}$ and $\overline{LM}$, $\overline{MN}$ and $\overline{NK}$.**
d) **Two pairs of adjacent angles are∠ L and ∠M, ∠K and∠ N.**

Exercise 4.6

1. From the figure, identify:

(a) the centre of circle

(b) three radii

(c) a diameter

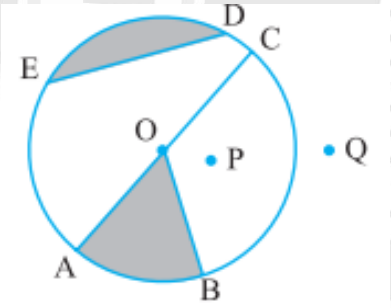
(d) a chord

(e) two points in the interior

(f) a point in the exterior

(g) a sector

(h) a segment



Solutions:

a) **O is the centre of the circle.**

b) **$\overline{OA}$, $\overline{OB}$ and $\overline{OC}$.**

c) **$\overline{AC}$ is a diameter.**

d) **$\overline{ED}$ is a chord.**

e) **O and P are the two points in the interior.**

f) **Q is a point in the exterior.**

g) **AOB is a sector.**

h) **ED is a segment.**

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

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

Solutions:

a) Yes, every diameter of a circle is also a chord. Diameter is also called as longest chord.

b) No, every chord is not a diameter.

3. Draw any circle and mark

(a) its centre

(b) a radius

(c) a diameter

(d) a sector

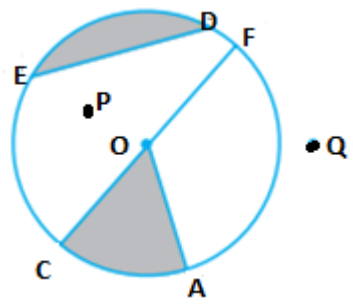
(e) a segment

(f) a point in its interior

(g) a point in its exterior

(h) an arc

Solutions:



Solutions:

a) is the centre of the circle.

b) $\overline{OA}$ is a radius.

c) CF is a diameter.

d) COA is a sector.

e) $\overline{DE}$ is a segment.

f) P is a point in the interior.

g) Q is a point in the exterior.

h) AC is an arc.

4. Say true or false:

a) **Two diameters of a circle will necessarily intersect.**

Ans: True

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

Ans: True.