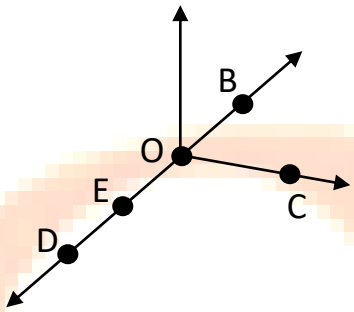
Chapter 4: Basic Geometrical Ideas
Exercise 4.1

Question 1:

Use the figure to name:

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



Answer 1:

a) Five points are: O, B, C, D, E
b) A line: $\overline{DE}$, $\overline{DB}$, $\overline{OE}$, $\overline{OB}$
c) Four rays: $\overrightarrow{OD}$, $\overrightarrow{OE}$, $\overrightarrow{OC}$, $\overrightarrow{OB}$
d) Four line segments: $\overline{DE}$, $\overline{OE}$, $\overline{OC}$, $\overline{OB}$, $\overline{OD}$1

Question 2:

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

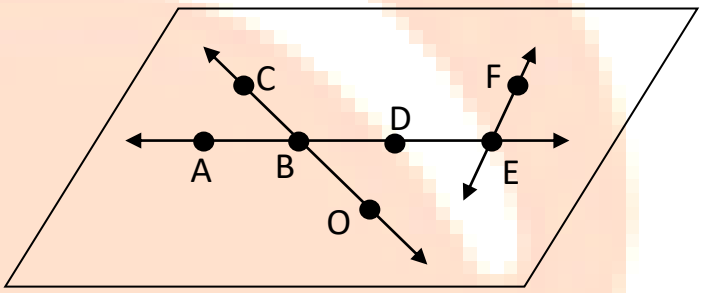
Answer 2:

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

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.



Answer 3:

a) A line containing E = $\overline{AE}$ or $\overline{FE}$
b) A line passing through A = $\overline{AE}$ or $\overline{DE}$
c) A line on which O lies = $\overline{CO}$ or $\overline{OC}$
d) Two pairs of intersecting lines are : $\overline{AD}$, $\overline{CO}$ and $\overline{AE}$, $\overline{FE}$

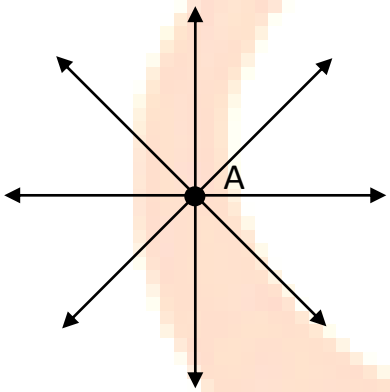
Question 4:

How many lines can pass though:

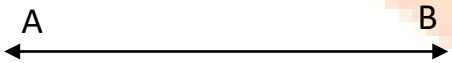
a) one given point?
b) two given points

Answer 4:

a) Infinite number of lines can pass through one given point.



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



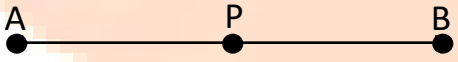
Question 5:

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

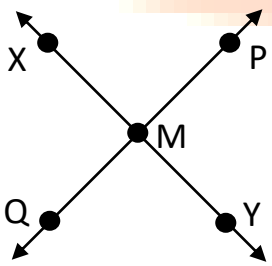
a) Point P lies on AB.
b) XY and PQ intersect at M.
c) Line l contains E and F but not D.
d) OP and OQ meet at O.

Answer 5:

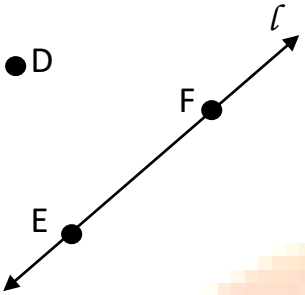
a)



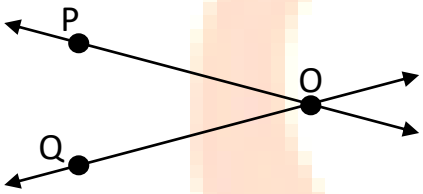
b)



c)



d)



Question 6:

Consider the following figure of line 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 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 OP.
h) Ray OP same as ray OM.
i) Ray OM is not opposite to ray OP.
j) O is not an initial point of NP and NM .3

Answer 6:

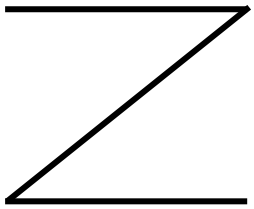
a) True
b) True
c) True
d) False
e) False
f) False
g) True
h) False
i) False
j) False
k) True

Exercise 4.2

Question 1:

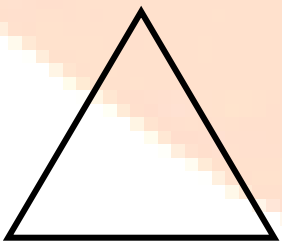
Classify the following curves as

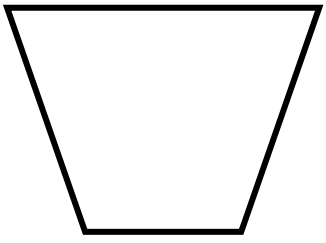
i. Open
ii. Closed.

a) 

b) 

c) 

d) 

e) 

Answer 1:

a) Open curve
b) Closed curve
c) Open curve
d) Closed curve
e) Closed curve

Question 2:

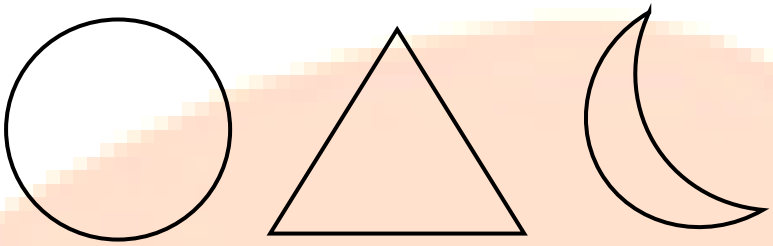
Draw rough diagrams to illustrate the following:

a) Open curve
b) Closed curve

Answer 2:

a) Open curves:

b) Closed curves

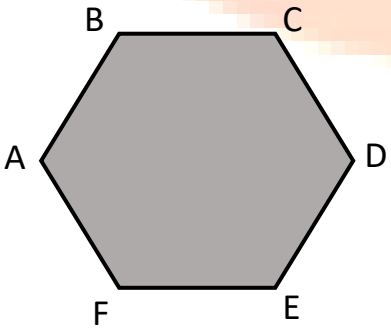


Question 3:

Draw any polygon and shade its interior.

Answer 3:

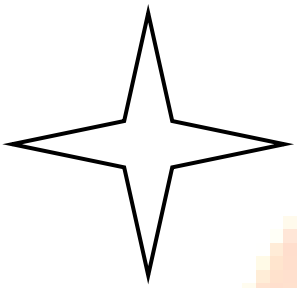
Polygon ABCDEF



Question 4:

Consider the given figure and answer the questions:

a) Is it a curve?
b) Is it closed?



Answer 4:

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

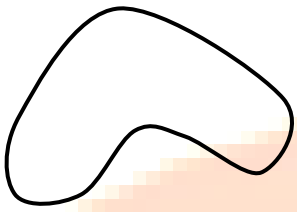
Question 5:

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

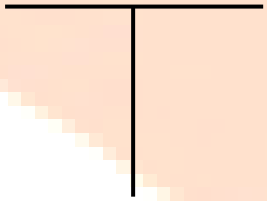
a) A closed curve that is not a polygon.
b) An open curve made up entirely of line segments.
c) A polygon with two sides.

Answer 5:

a)



b)

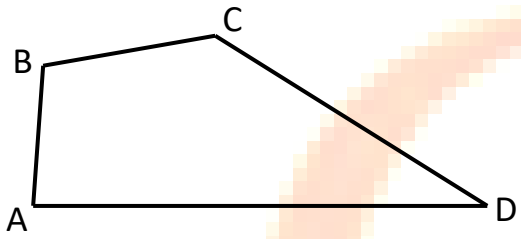


c) Polygon with two sides cannot be drawn.

Exercise 4.3

Question 1:

Name the angles in the given figure:



Answer 1:

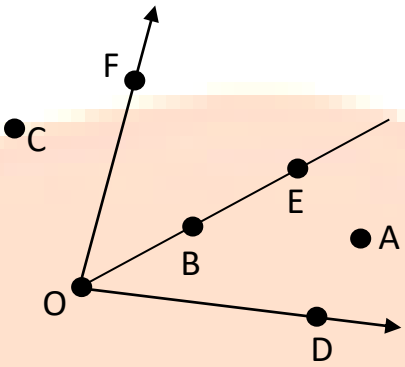
There are four angles in given figure:

∠ABC, ∠CDA, ∠DAB, ∠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.



Answer 2:

a) Point interior of ∠DOE : A
b) Points exterior of ∠ EOF : C, A, D
c) Points on ∠ EOF : E, O, B, F

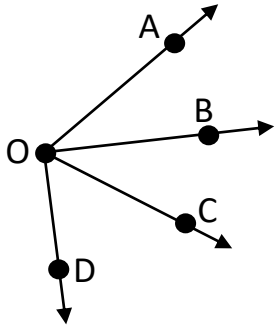
Question 3:

Draw rough diagrams of two angles such that they have:

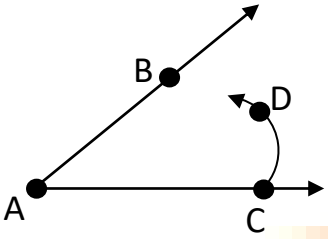
a) One point in common.
b) Two points in common.
c) Three points in common.
d) Four points in common.
e) One ray in common.

Answer 3:

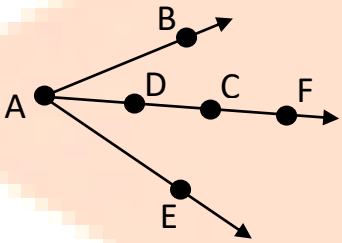
a)



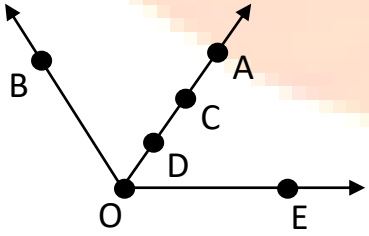
b)



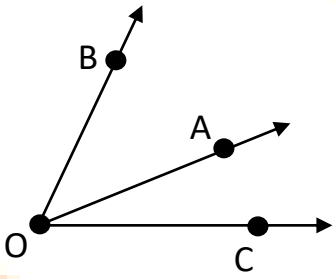
c)



d)



e)



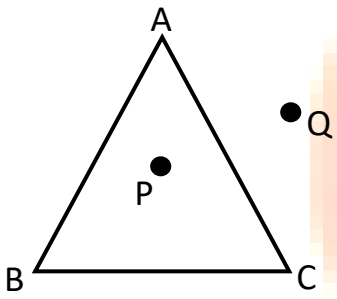
Exercise 4.4

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?

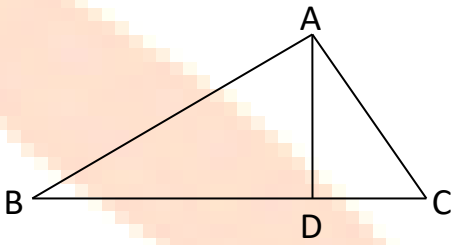
Answer 1:

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



Question 2:

a) Identify three triangles in the figure:
b) Write the names of seven angles.
c) Write the names of sic line segments.
d) Which two triangles have ∠ B as common?



Answer 2:

a) The three triangles are: ΔABC, ΔABD, ΔADC
b) Angles are: ∠ ADB, ∠ ADC, ∠ ABD, ∠ ACD, ∠ BAD, ∠ CAD, ∠ BAC
c) Line segments are: $\overline{AB}$, $\overline{AC}$, $\overline{AD}$, $\overline{BD}$, $\overline{DC}$, $\overline{BC}$
d) Triangles having common ∠ B: ΔABC, ΔABD

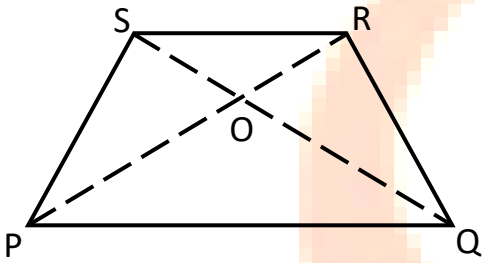
Exercise 4.5

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?

Answer 1:

Diagonal PR and diagonal SQ meet at O, which is inside the quadrilateral.



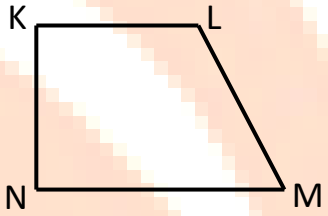
Question 2:

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.

Answer 2:

a) Pair of opposite sides: KL and MN, KN and LM
b) Pair of opposite angles: ∠K and ∠M, ∠L and ∠N
c) Pair of adjacent sides: KN and NM, KL and LM
d) Pair of adjacent angles: ∠K and ∠N, ∠L and ∠M



Question 3:

Investigate:
Use strip and fasteners to make a triangle and a quadrilateral.
Try to push inward at any one vertex of the triangle. Do the same to the quadrilateral.
Is the triangle distorted? Is the quadrilateral distorted? Is the triangle rigid?
Why is it that structures like electric towers make use of triangular shapes and not quadrilateral?

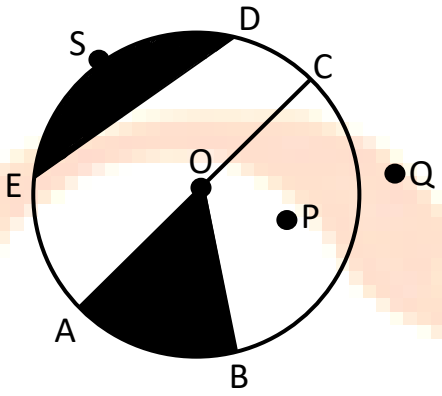
Answer 3:

O is common to both the angles ∠AOC and ∠BOC.
No, the triangle is not distorted but the quadrilateral is distorted and also the triangle is rigid.
Structures like electric towers make use of triangular shape so that they could not be distorted and they could be rigid.

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.

Answer 1:

a) Centre: O
b) Three radii: $\overline{OA}$, $\overline{OB}$ and $\overline{OC}$
c) A diameter: $\overline{AC}$
d) A chord: $\overline{ED}$
e) Interior points: O, P
f) Exterior point: Q
g) A sector: OAB
h) A segment: ESDE

Question 2:

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

Answer 2:

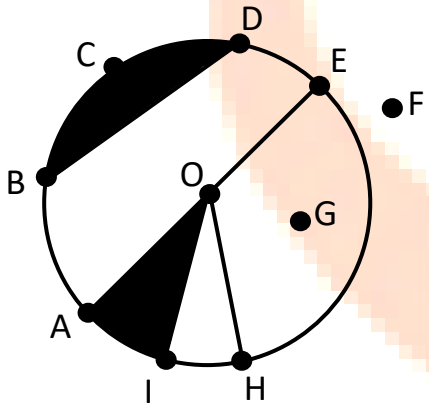
a) Yes, every diameter of a circle is also a chord.
b) No, every chord of a circle is not a diameter.

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

Answer 3:



a) Centre: O
b) Radius: $\overline{OH}$
c) Diameter: $\overline{EA}$
d) Sector: OAI
e) Segment: BCDB
f) A point in its interior: G
g) A point in its exterior: F
h) An Arc: $\overset{\frown}{BCD}$

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.

Answer 4:

a) True
b) True