

NOTES

CLASS 6

MATHS

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BASIC GEOMETRICAL IDEAS

I. Important Concepts/ Result

Point: A point determines a location.

Points are denoted by capital letter. Point P, Point Q etc

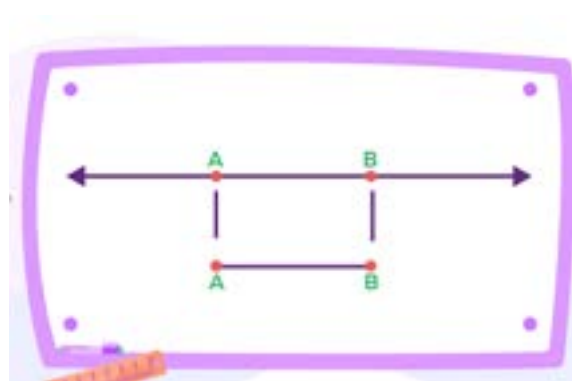
Models for point :



- **A Line Segment**

In geometry, a line segment is a part of a straight line that is bounded by two distinct end points, and contains every point on the line that is between its end points.

- Here AB is a line segment
- Length of line segment can be measured
- It is denoted by two capital letters,



- **A Line**

In geometry, a line is a straight one-dimensional figure that does not have a thickness, and it extends endlessly in both directions.

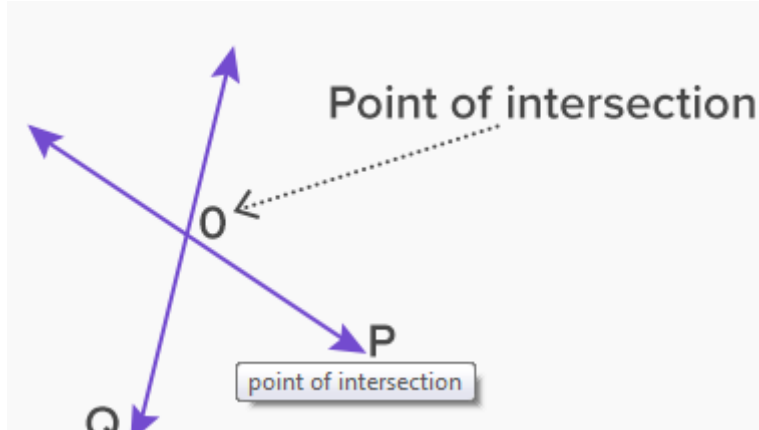


- It does not have end points
- It is extended infinitely in both directions
- The length of a line cannot be measured.
- If you extend line segment in both directions endlessly you obtain a line
- Line is denoted by a small letter or two capital letters.

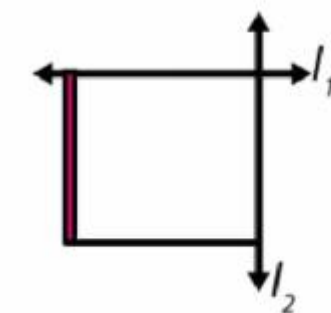
- **Intersecting Lines :**

When two or more lines cross each other in a plane, they are called intersecting lines. The intersecting lines share a common point, which exists on all the intersecting lines, and is called the point of intersection.

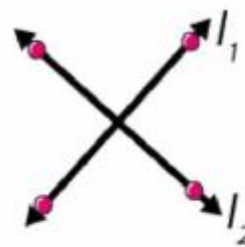
Here, lines P and Q intersect at point O, which is the point of intersection.



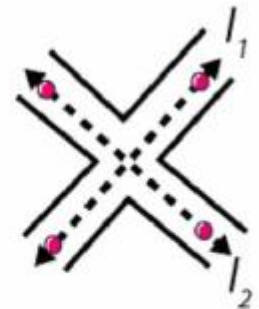
Examples of intersecting lines:



Two adjacent edges of your notepad



The letter X of the English alphabet



Crossing-roads



- **Parallel lines :**

Lines like these which do not meet are said to be parallel; and are called parallel lines.

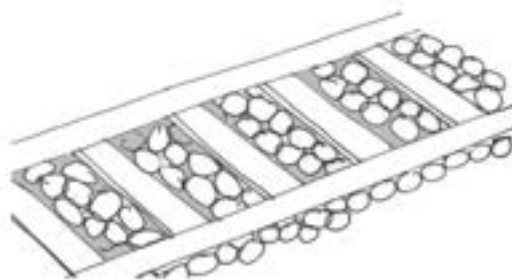
Examples Parallel lines:



The opposite edges of ruler (scale)



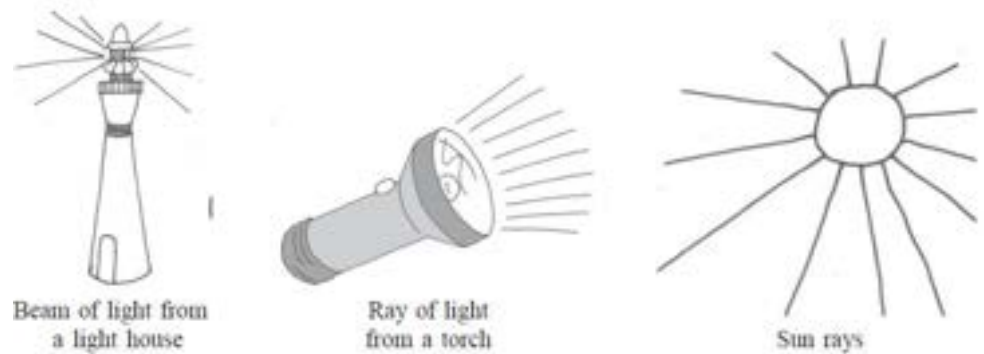
The cross-bars of this window



Rail lines

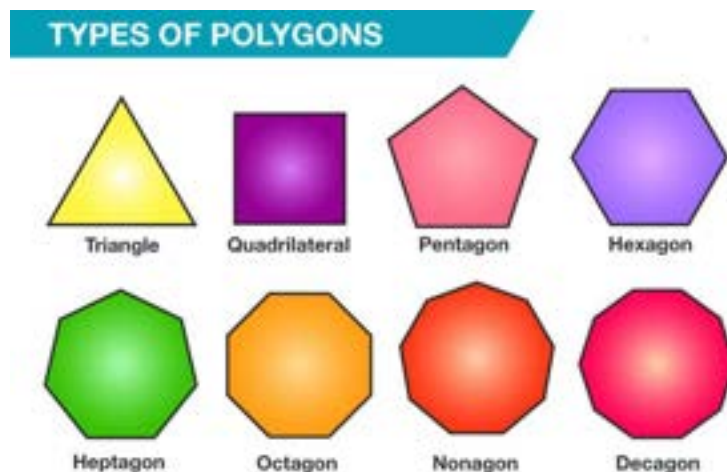
- **Ray** :A ray is a portion of a line. It starts at one point (called starting point) and goes endlessly in a direction.

Examples of Ray:



- **Curves:** You can draw some of these drawings without lifting the pencil from the paper and without the use of a ruler. These are all curves
- **Polygons**

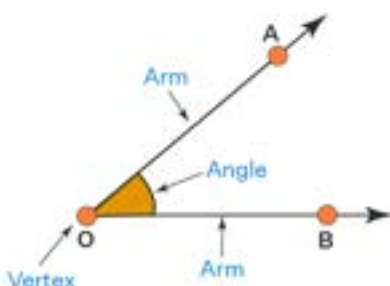
A figure is a polygon if it is a simple closed figure made up entirely of line segments.



Angles

An angle is made up of two rays starting from a common end point.
The two rays forming the angle are called the **arms** or sides of the angle.
The common end point is the **vertex** of the angle.

Parts of an Angle



New information

The word “angle” is derived from the Latin word “angulus”, which means “corner”.

Note: Angle is denoted using one capital letter or three capital letter.

II. Some illustrations/Examples (with solution) preferably of different types.

i) MCQs : 4

Question 1.

Least number of line segments required to make a polygon is

- (a) 1(b) 2(c) 3(d) 4

Answer: (c) 3

Question 2.

How many lines can be drawn through given two points?

- (a) Only one(b) 2(c) 4(d) Countless

Answer: (a) Only one

Question 3.

How many vertices are there in a triangle?

- (a) 1(b) 2(c) 3(d) 4

Answer: (c) 3

Question 4.

Find 'False' statement.

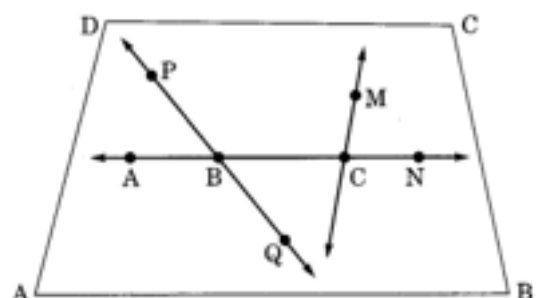
- (a) Two lines intersect in a point(b) The line segment has two end points.
(c) The ray has one initial point.(d) Polygon is a open figure made of line segments only.

Answer: (d) Polygon is a open figure made of line segments only.

ii) Case based study: 1

Using the given figure, name the following:

- (a) Line containing point M.
(b) Line passing through four points.
(c) Line passing through three points.



(d) Two pairs of intersecting lines.

Solution:

(a) MC is the line containing the point M.(b) AN is the line passing through four points A, B, C and N.

(c) PQ is the line passing through three points P, B and Q.(d) Pairs for intersecting lines are

(i) AN and PQ(ii) AN and MC

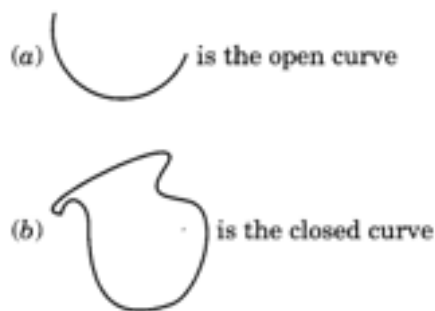
iii) Short answer type question:

Question 1.

Draw a rough sketch of:

(a) open curve(b) closed curve

Solution:



Question 2.

Give two examples of line segments and ray from day to day life.

Question 3

Give four examples of intersecting lines from day to day life.



iv) Long answer type questions: 2

Question 1

Explain the following terms: Line segment, Line, Intersecting lines, Parallel lines

Solution:

Line segment: A straight line drawn from any point to any other point is called as line segment.

Line: Line is a straight path of points that goes on forever in two directions. It has infinite length, but no breadth and height.

Intersecting lines: Intersecting lines are lines that pass through the same point.

Parallel lines: Parallel lines are never cross and always stay the same distance apart.

Question 2

In the given figure, l, m and n are three parallel lines, x and y intersect these lines.

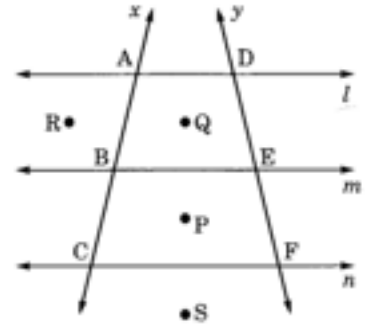
(i) Name the points lying on the line x .

(ii) Name the points lying on the line y .

(iii) Name the points inside the quadrilateral $ABED$.

(iv) Name the points outside the quadrilaterals $ABED$ and $BCFE$.

(v) Name the lines passing through three points.



Solution:

(i) A , B and C lie on the line x . (ii) D , E and F lie on the line y .

(iii) Q is the point inside quadrilateral $ABED$

(iv) Points R and S are outside the quadrilaterals $ABED$ and $BCFE$.

(v) Lines x and y pass through the three points A , B , C and D , E , F respectively.

III .Questions for Practice:

i) MCQs :

Question 1.

Least number of line segments required to make a quadrilateral is

(a) 1 (b) 2 (c) 3 (d) 4

Question 2.

How many lines can be drawn through a given point?

(a) Only one (b) 2 (c) 4 (d) Countless

Question 3.

How many vertices are there in a triangle?

(a) 1 (b) 2 (c) 3 (d) 4

Question 4.

Which of the following has no end points?

(a) Line (b) Ray (c) Line-segment (d) None of these

Question 5.

The number of arms a ray has



- (A) 1 (B) 0 (C) 2 (D) 4

Question 6

If the sum of two angles is greater than 180° , then which of the following is not possible for the two angles?

- (A) One obtuse angle and one acute angle (B) One reflex angle and one acute angle
(C) Two obtuse angles (D) Two right angles.

Question 7

The number of right angles in a straight angle is

- (A) 1 (B) 2 (C) 3 (D) 4

Question 8

Find out the incorrect statement, if any, in the following: An angle is formed when we have

- (a) two rays with a common end-point (b) two line segments with a common end-point
(c) a ray and a line segment with two common end-point (d) none

Question 9

Which is a mode of perpendicular lines?

- (A) letter A (B) letter Z (C) letter O (D) letter L

Question 10

Railway line is an example of

- (A) intersecting lines (B) straight lines (C) parallel lines (D) none

ii) Short answer type question

State whether the statements given in questions 1 to 5 are true (T) or false (F):

1. A horizontal line and a vertical line always intersect at right angles.
2. Ray is a polygon.
3. Two parallel lines meet each other at a point.
4. A ray is a portion of a line.
5. Triangle is a closed curve.

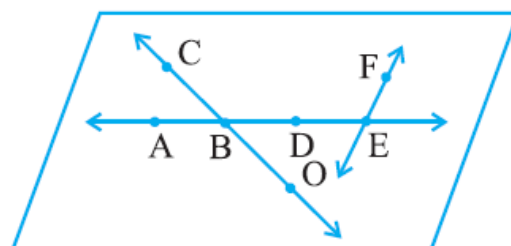
Fill in the blanks from questions 6 to 10

- i. An angle greater than 180° and less than a complete angle is called _____.
- ii. An angle greater than 90° and less than a 180° angle is called _____.
- iii. An angle is made up of two rays starting from a common end point.
- iv. The two rays forming the angle are called the _____ of the angle.
- v. A line has _____ end points

iii) Long answer type questions

1. Use the figure to name :

- (a) Line containing point F.
(b) Line passing through B.



(c) Line on which D lies

(d) Two pairs of intersecting lines.

2. Draw three models for intersecting lines

3. Draw three polygons having sides 4, 5 and 6 sides.

4. 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.

5. 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.

6. 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.



Multiple Choice Questions (Q 1 to Q 5)

$1 \times 5 = 5$

- How many lines pass through one given point?
a. 1 b. 2 c. countless d. none
- Which of the following is a model of intersecting lines ?
a. Letter C b. letter X c. letter O d. none
- Which of the following has to end points?
a. line b. triangle c. line segment d. none
- The example of intersecting lines
a. X c. O
b. C d. none
- Pentagon has
a. 3 sides b. 4 sides c. 5 sides d. 6 sides

Say True or False (Q 6 to Q 10)

$1 \times 5 = 5$

- A point indicates a definite position.
- A line segment is a part of a plane.
- Two lines in a plane always intersect in a point.
- Line has two end points.
- A ray has two arms.

Answer in one word or sentence (Q 11 to Q 14)

$1 \times 4 = 4$

- Can we draw a polygon using two line segments? Say Yes or No
- What is polygon?
- How many initial points does a ray has ?
- Name the two rays that form an angle?

Two marks Questions

- Name the vertex and arms of $\angle PQR$ in the figure.
- Give two real examples of ray and line segment
- Write two difference between line and line segment



$2 \times 2 = 4$

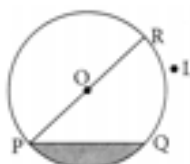
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CLASS TEST-2 M.M.: 30
BASIC GEOMETRICAL IDEAS

Multiple Choice Questions (Q 1 to Q 6)

$6 \times 1 = 6$

- Which of the following has one end point?
(a) Line
(b) Ray
(c) Line-segment
(d) None of these
- In given fig. PQ is



- (a) line segment
 - (b) ray
 - (c) angle
 - (d) none
3. Cross –roads is an example of
- (a) Parallel lines (c) intersecting lines
 - (b) Straight lines (d) none
4. How many points does a line have?
- a. 1 b. 2 c. countless d. none
5. Two intersecting lines have
- a. 1 point common c 2point common
 - b. No point in common d. none
6. A polygon is a closed figure made of
- a. line segment b. line c. ray d. none

Say True or False (Q 7 to Q 12)

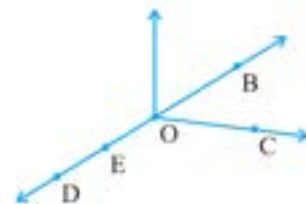
$$6 \times 1 = 6$$

- 7. Two intersecting lines have two points in common.
- 8. We can count the number of points on the line
- 9. One can draw polygon using two line segments.
- 10. An angle is made up of two rays with common initial point.
- 11. Hexagon is a polygon of seven sides.
- 12. Sun rays are example of ray

Two marks Questions (Q 13 to Q 17)

$$5 \times 2 = 10$$

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



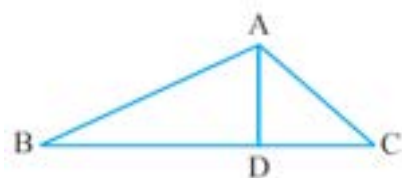
- 14. Give two examples of parallel lines and intersecting
- 15. Draw rough diagrams to illustrate the following :
 - (a) Open curve (b) Closed curve.
- 16. Draw a rough sketch of $\angle ABC$. Mark a point P in its interior and a point Q in its exterior.
- 17. Draw parallel lines and write an example of parallel lines.

lines.

Four marks Questions (Q 18 to Q 19)

$$2 \times 4 = 8$$

- (a) Name the vertices in the figure.
 - (b) Write the names of seven angles.
 - (c) Write the names of six line segments.
19. 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) One ray in common.



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