

# Introduction to Euclid's Geometry

## Exercise 3A

### Question 1:

A theorem is a statement that requires a proof. Whereas, a basic fact which is taken for granted, without proof, is called an axiom.

**Example of Theorem:** Pythagoras Theorem

Example of axiom: A unique line can be drawn through any two points.

### Question 2:

**(i) Line segment:** The straight path between two points is called a line segment.

**(ii) Ray:** A line segment when extended indefinitely in one direction is called a ray.

**(iii) Intersecting Lines:** Two lines meeting at a common point are called intersecting lines, i.e., they have a common point.

**(iv) Parallel Lines:** Two lines in a plane are said to be parallel, if they have no common point, i.e., they do not meet at all.

**(v) Half-line:** A ray without its initial point is called a half-line.

**(vi) Concurrent lines:** Three or more lines are said to be concurrent, if they intersect at the same point.

**(vii) Collinear points:** Three or more than three points are said to be collinear, if they lie on the same line.

**(viii) Plane:** A plane is a surface such that every point of the line joining any two points on it, lies on it.

### Question 3:

(i) Six points: A, B, C, D, E, F

(ii) Five line segments:  $\overline{EG}, \overline{FH}, \overline{EF}, \overline{GH}, \overline{MN}$

(iii) Four rays:  $\overrightarrow{EP}, \overrightarrow{GR}, \overrightarrow{GB}, \overrightarrow{HD}$

(iv) Four lines:  $\overleftrightarrow{AB}, \overleftrightarrow{CD}, \overleftrightarrow{PQ}, \overleftrightarrow{RS}$

(vi) Four collinear points: M, E, G, B

**Question 4:**

(i)  $(\overleftrightarrow{EF}, \overleftrightarrow{GH})$  and their corresponding point of intersection is R.

$(\overleftrightarrow{AB}, \overleftrightarrow{CD})$  and their corresponding point of intersection is P.

(ii)  $\overleftrightarrow{AB}, \overleftrightarrow{EF}, \overleftrightarrow{GH}$  and their point of intersection is R.

(iii) Three rays are:  $\overrightarrow{RB}, \overrightarrow{RH}, \overrightarrow{RG}$

(iv) Two line segments are:  $\overline{RQ}, \overline{RP}$

**Question 5:**

(i) An infinite number of lines can be drawn to pass through a given point.

(ii) One and only one line can pass through two given points.

(iii) Two given lines can at the most intersect at one and only one point.

(iv)  $\overline{AB}, \overline{BC}, \overline{AC}$

**Question 6:**

(i) False

(ii) False

(iii) False

(iv) True

(v) False

(vi) True

(vii) True

(viii) True

(ix) True

(x) False

(xi) False

(xii) True