EUCLID'S GEOMETRY

Euclid of Alexandria developed one of the most beautiful and the most interesting treatise of mathematics – Elements. Euclid was a Greek mathematician regarded as the 'Father of Modern Geometry'.

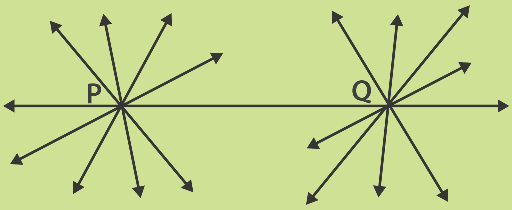
AXIOMs/COMMON NOTIONS

These are the assumptions used throughout mathematics and not specifically linked to geometry. Some of the common axioms are:

1. Things which are equal to the same thing are equal to one another.
2. If equals are added to equals, the wholes are equal.
3. If equals are subtracted from equals, the remainders are equal.
4. Things which coincide with one another are equal to one another.
5. The whole is greater than the part.
6. Things which are double of the same things are equal to one another.
7. Things which are halves of the same things are equal to one another.

Euclid's Five Postulates

Postulate 1 : A straight line may be drawn from any one point to any other point.



Postulate 2 : A terminated line can be produced indefinitely.

Postulate 3 : A circle can be drawn with any centre and any radius.

Postulate 4 : All right angles are equal to one another.

Postulate 5 : If a straight line falling on two straight lines makes the interior angles on the same side of it taken together less than two right angles, then the two straight lines, if produced indefinitely, meet on that side on which the sum of angles is less than two right angles.

Consistency of System of Axioms

A system of axioms is called consistent, if it is impossible to deduce from these axioms a statement that contradicts any axiom or previously proved statement. So, when any system of axioms is given, it needs to be ensured that the system is consistent.

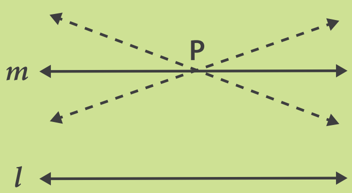
Propositions/Theorems

After Euclid stated his postulates and axioms, he used them to prove other results. Then using these results, he proved some more results by applying deductive reasoning. The statements that were proved are called propositions or theorems.

example: Two distinct lines cannot have more than one point in common.

Equivalent Versions of Euclid's Fifth Postulate

'Playfair's Axiom': 'For every line l and for every point P not lying on l, there exists a unique line m passing through P and parallel to l'



Or

Two distinct intersecting lines cannot be parallel to the same line.