Geometry Postulates (Axioms)

Postulates (or axioms) are accepted as true without proof; these are very much like the "rules" of a game. The game is then to prove or disprove statements using these postulates. Such proved statements are called theorems.

Postulate 1 (Ruler Postulate)

1. The points on a line can be paired with the real numbers in such a way that any two points can have coordinates 0 and 1.
2. Once a coordinate system has been chosen in this way, the distance between any two points equals the absolute value of the difference of their coordinates.

Postulate 2 (Segment Addition Postulate)

If B is between A and C, then AB + BC = AC.

Postulate 3 (Protractor Postulate)

On $\overleftrightarrow{AB}$ in a given plane, choose any point O between A and B. Consider $\overrightarrow{OA}$ and $\overrightarrow{OB}$ and all the rays that can be drawn from O on one side of AB. These rays can be paired with the real numbers from O to 180 in such a way that:

a. $\overrightarrow{OA}$ is paired with O, and $\overrightarrow{OB}$ with 180.

b. If $\overrightarrow{OP}$ is paired with x , and $\overrightarrow{OQ}$ with y , then m∠POQ = | x − y |.

Postulate 4 (Angle Addition Postulate)

If point B lies in the interior of ∠AOC, then m∠AOC, then m∠AOC + m∠BOC = m∠AOC.

If ∠AOC is a straight angle and B is any point not on AC, then m∠AOB + m∠BOC = 180.

Postulate 5

A line contains at least two points; a plane contains at least three points not all in one line; space contains at least four points not all in one plane.

Postulate 6

Through any two points there is exactly one line.

Postulate 7

Through any three points there is at least one plane, and through any three noncollinear points there is exactly one plane.

Postulate 8

If two points are in a plane, then the line that contains the points is in that plane.

Postulate 9

If two planes intersect, then their intersection is a line.

Postulate 10
If two lines are cut by a transversal and corresponding angles are congruent, then the lines are parallel.

Postulate 11 (SSS Postulate)
If three sides of one triangle are congruent to three sides of another triangle, then the triangles are congruent.

Postulate 12 (SAS Postulate)
If two sides and the included angle of one triangle are congruent to two sides and the included angle of another triangle, then the triangles are congruent.

Postulate 13 (ASA Postulate)
If two angles and the included side of one triangle are congruent to two angles and the included side of another triangle, then the triangles are congruent.

Postulate 14 (AA Similarity Postulate)
If two angles of one triangle are congruent to two angles of another triangle, then the triangles are similar.

Postulate 15 (Arc Addition Postulate)
The measure of the arc formed by two adjacent arcs is the sum of the measure of those two arcs.

Postulate 16
The area of a square is the square of a length of a side. ($A = s^2$)

Postulate 17 (Area Congruence Postulate)
If two figures are congruent, then they have the same area.

Postulate 18 (Area Addition Postulate)
The area of a region is the sum of the areas of its non-overlapping parts.