

January 17, 2025

Euclid's Elements of Geometry

From Professor Joyce, Clark University: <http://aleph0.clarku.edu/~djoyce/java/elements/bookI/bookI.html>

Definition 1. A *point* is that which has no part.

Definition 2. A *line* is breadthless length.

Definition 3. The ends of a line are points.

Definition 4. A *straight line* is a line which lies evenly with the points on itself.

Definition 5. A *surface* is that which has length and breadth only.

Definition 6. The edges of a surface are lines.

Definition 7. A *plane surface* is a surface which lies evenly with the straight lines on itself.

Definition 8.

A *plane angle* is the inclination to one another of two lines in a plane which meet one another and do not lie in a straight line.

Definition 9. And when the lines containing the angle are straight, the angle is called *rectilinear*.

Definition 10.

When a straight line standing on a straight line makes the adjacent angles equal to one another, each of the equal angles is *right*, and the straight line standing on the other is called a *perpendicular* to that on which it stands.

Definition 11. An *obtuse angle* is an angle greater than a right angle.

Definition 12. An *acute angle* is an angle less than a right angle.

Common notion 1.

Things which equal the same thing also equal one another.

Common notion 2.

If equals are added to equals, then the wholes are equal.

Common notion 3.

If equals are subtracted from equals, then the remainders are equal.

Common notion 4.

Things which coincide with one another equal one another.

Common notion 5.

The whole is greater than the part.

Let the following be postulated:

Postulate 1.

To draw a straight line from any point to any point.

Postulate 2.

To produce a finite straight line continuously in a straight line.

Postulate 3.

To describe a circle with any center and radius.

Postulate 4.

That all right angles equal one another.

Postulate 5.

That, if a straight line falling on two straight lines makes the interior angles on the same side less than two right angles, the two straight lines, if produced indefinitely, meet on that side on which are the angles less than the two right angles.

Proposition 1.

To construct an equilateral triangle on a given finite straight line.

Proposition 2.

To place a straight line equal to a given straight line with one end at a given point.

Proposition 3.

To cut off from the greater of two given unequal straight lines a straight line equal to the less.