

## GEOMETRY

## Why

We need some basic geometric concepts.<sup>1</sup>

## **Definitions**

A point is that which has no part.<sup>2</sup> A line is a breadthless length. The extremities of a line<sup>3</sup> are points. A straight line is a line which lies evenly with the points on itself. A surface is that which has length and breadth only. The extremities of a surface are lines.

A plane surface is a surface which lies evenly with the straight lines on itself. 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. And when teh lines containing the angle are straight, the angle is called rectilineal. When a straight line set up 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 side is called a perpendicular to that on which it stands.

A boundary is that which is an extremity of any thing. A figure is that which is contained by any boundary or boundaries. A circle is a plane figure contained by one line such that

<sup>&</sup>lt;sup>1</sup>This sheet will be expanded into several in future editions.

<sup>&</sup>lt;sup>2</sup>This and all that follows is taken (nearly) verbatim from Heath's translation of Book I of Euclid's Elements. In future editions, there will be a reference to the Litterae manuscript of this text.

<sup>&</sup>lt;sup>3</sup>We have departed from Heath and made extremity here a term.

all the straight lines falling upon it from one point among those lying withing the figure are equal to one another. The point is called the *center* of the circle. A *diameter* of the circle is any straight line drawn through the center and terminated in both directions by the circumference of the circle, and such a straight line also bisects the circle.<sup>4</sup>

<sup>&</sup>lt;sup>4</sup>We end here. Of course, Euclid goes on to discuss semicircles, rectilineal figures, etc.

