

Euclid's Geometry

Euclid



OVERVIEW

The Greek mathematician Euclid, who lived around 300 B.C., made many important contributions to the field of geometry. His most famous work is a treatise on mathematics called *The Elements of Geometry*. Here is a brief excerpt in which he describes a method for drawing a line at right angles to another line.

GUIDED READING As you read, consider the following: Euclid provides an axiom in this passage. An axiom is a rule that must be proven.

- What is the axiom that Euclid tries to prove?
 - Do you think he proves it? Why?
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PROPOSITION 11

To draw a straight line at right angles to a given straight line from a given point on it.

Let AB be the given straight line, and C the given point on it.

Thus it is required to draw from the point C a straight line at right angles to the straight line AB .

Let a point D be taken at random on AC ; let CE be made equal to CD ;
[I.3]

on DE let the equilateral triangle FDE be constructed, [I. 1] and let FC be joined;

I say that the straight line FC has been drawn at right angles to the given straight line AB from C the given point on it.

For, since DC is equal to CE ,
and CF is common,

the two sides DC , CF are equal to the two sides EC , CF respectively;
and the base DF is equal to the base FE ;

therefore the angle DCF is equal to the angle ECF ; [I. 8]

and they are adjacent angles.

But, 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; [Def. 10]

therefore each of the angles DCF , FCE is right.

Therefore the straight line CF has been drawn at right angles to the given straight line AB from the given point C on it.

Q. E. F.