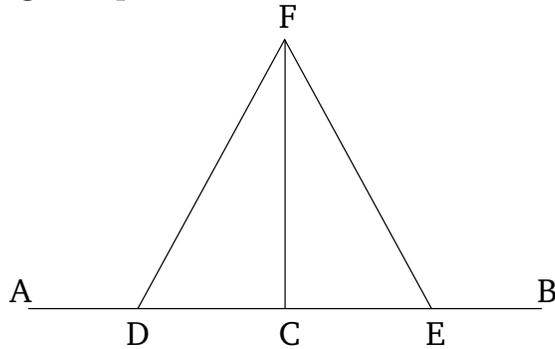


# Book 1

## 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. So it is required to draw a straight-line from the point  $C$  at right-angles to the straight-line  $AB$ .

Let the point  $D$  be have been taken at random on  $AC$ , and let  $CE$  be made equal to  $CD$  [Prop. 1.3], and let the equilateral triangle  $FDE$  have been constructed on  $DE$  [Prop. 1.1], and let  $FC$  have been joined. I say that the straight-line  $FC$  has been drawn at right-angles to the given straight-line  $AB$  from the given point  $C$  on it.

For since  $DC$  is equal to  $CE$ , and  $CF$  is common, the two (straight-lines)  $DC$ ,  $CF$  are equal to the two (straight-lines),  $EC$ ,  $CF$ , respectively. And the base  $DF$  is equal to the base  $FE$ . Thus, the angle  $DCF$  is equal to the angle  $ECF$  [Prop. 1.8], and they are adjacent. But when a straight-line stood on a(nother) straight-line makes the adjacent angles equal to one another, each of the equal angles is a right-angle [Def. 1.10]. Thus, each of the (angles)  $DCF$  and  $FCE$  is a right-angle.

Thus, the straight-line  $CF$  has been drawn at right-

angles to the given straight-line  $AB$  from the given point  $C$  on it. (Which is) the very thing it was required to do.