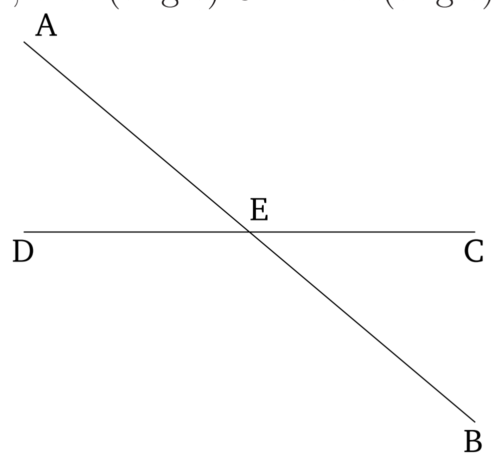
Book 1
Proposition 15

If two straight-lines cut one another then they make the vertically opposite angles equal to one another.

For let the two straight-lines AB and CD cut one another at the point E. I say that angle AEC is equal to (angle) DEB, and (angle) CEB to (angle) AED.



For since the straight-line AE stands on the straight-line CD, making the angles CEA and AED, the (sum of the) angles CEA and AED is thus equal to two right-angles [Prop. 1.13]. Again, since the straight-line DE stands on the straight-line AB, making the angles AED and DEB, the (sum of the) angles AED and DEB is thus equal to two right-angles [Prop. 1.13]. But (the sum of) CEA and AED was also shown (to be) equal to two right-angles. Thus, (the sum of) CEA and AED is equal to (the sum of) AED and DEB [C.N. 1]. Let AED have been subtracted from both. Thus, the remainder CEA is equal to the remainder BED [C.N. 3]. Similarly, it can be shown that CEB and DEA are also equal.

Thus, if two straight-lines cut one another then they make the vertically opposite angles equal to one another. (Which is) the very thing it was required to show.