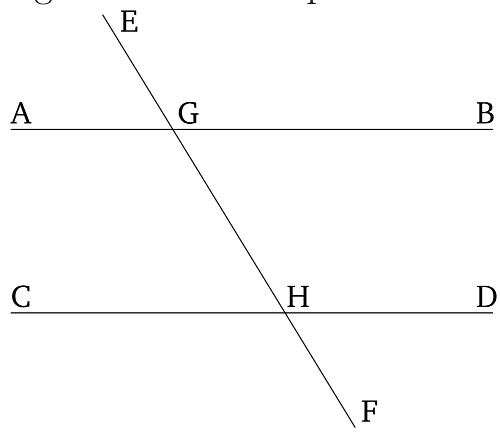
Book 1
Proposition 28

If a straight-line falling across two straight-lines makes the external angle equal to the internal and opposite angle on the same side, or (makes) the (sum of the) internal (angles) on the same side equal to two right-angles, then the (two) straight-lines will be parallel to one another.



For let EF, falling across the two straight-lines AB and CD, make the external angle EGB equal to the internal and opposite angle GHD, or the (sum of the) internal (angles) on the same side, BGH and GHD, equal to two right-angles. I say that AB is parallel to CD.

For since (in the first case) EGB is equal to GHD, but EGB is equal to AGH [Prop. 1.15], AGH is thus also equal to GHD. And they are alternate (angles). Thus, AB is parallel to CD [Prop. 1.27].

Again, since (in the second case, the sum of) BGH and GHD is equal to two right-angles, and (the sum of) AGH and BGH is also equal to two right-angles [Prop. 1.13], (the sum of) AGH and BGH is thus equal to (the sum of) BGH and GHD. Let BGH have been subtracted from both. Thus, the remainder AGH is equal to the remainder GHD. And they are alternate (angles). Thus, AB is parallel to CD [Prop. 1.27].

Thus, if a straight-line falling across two straight-lines makes the external angle equal to the internal and opposite angle on the same side, or (makes) the (sum of the) internal (angles) on the same side equal to two right-angles, then the (two) straight-lines will be parallel (to one another). (Which is) the very thing it was required to show.