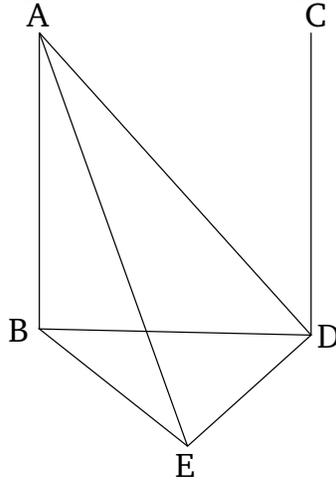


Book 11

Proposition 8

If two straight-lines are parallel, and one of them is at right-angles to some plane, then the remaining (one) will also be at right-angles to the same plane.



Let AB and CD be two parallel straight-lines, and let one of them, AB , be at right-angles to a reference plane. I say that the remaining (one), CD , will also be at right-angles to the same plane.

For let AB and CD meet the reference plane at points B and D (respectively). And let BD have been joined. AB , CD , and BD are thus in one plane [Prop. 11.7]. Let DE have been drawn at right-angles to BD in the reference plane, and let DE be made equal to AB , and let BE , AE , and AD have been joined.

And since AB is at right-angles to the reference plane, AB is thus also at right-angles to all of the straight-lines joined to it which are in the reference plane [Def. 11.3]. Thus, the angles ABD and ABE [are] each right-angles. And since the straight-line BD has met the parallel (straight-

lines) AB and CD , the (sum of the) angles ABD and CDB is thus equal to two right-angles [Prop. 1.29]. And ABD (is) a right-angle. Thus, CDB (is) also a right-angle. CD is thus at right-angles to BD . And since AB is equal to DE , and BD (is) common, the two (straight-lines) AB and BD are equal to the two (straight-lines) ED and DB (respectively). And angle ABD (is) equal to angle EDB . For each (is) a right-angle. Thus, the base AD (is) equal to the base BE [Prop. 1.4]. And since AB is equal to DE , and BE to AD , the two (sides) AB , BE are equal to the two (sides) ED , DA , respectively. And their base AE is common. Thus, angle ABE is equal to angle EDA [Prop. 1.8]. And ABE (is) a right-angle. EDA (is) thus also a right-angle. Thus, ED is at right-angles to AD . And it is also at right-angles to DB . Thus, ED is also at right-angles to the plane through BD and DA [Prop. 11.4]. And ED will thus make right-angles with all of the straight-lines joined to it which are also in the plane through BDA . And DC is in the plane through BDA , inasmuch as AB and BD are in the plane through BDA [Prop. 11.2], and in which (ever plane) AB and BD (are found), DC is also (found). Thus, ED is at right-angles to DC . Hence, CD is also at right-angles to DE . And CD is also at right-angles to BD . Thus, CD is standing at right-angles to two straight-lines, DE and DB , which meet one another, at the (point) of section, D . Hence, CD is also at right-angles to the plane through DE and DB [Prop. 11.4]. And the plane through DE and DB is the reference (plane). CD is thus at right-angles to

the reference plane.

Thus, if two straight-lines are parallel, and one of them is at right-angles to some plane, then the remaining (one) will also be at right-angles to the same plane. (Which is) the very thing it was required to show.