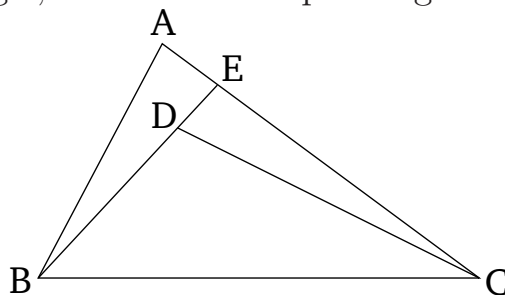# Book 1
Proposition 21

If two internal straight-lines are constructed on one of the sides of a triangle, from its ends, the constructed (straight-lines) will be less than the two remaining sides of the triangle, but will encompass a greater angle.

For let the two internal straight-lines BD and DC have been constructed on one of the sides BC of the triangle ABC, from its ends B and C (respectively). I say that BD and DC are less than the (sum of the) two remaining sides of the triangle BA and AC, but encompass an angle BDC greater than BAC.

For let BD have been drawn through to E. And since in any triangle (the sum of any) two sides is greater than the remaining (side) [Prop. 1.20], in triangle ABE the (sum of the) two sides AB and AE is thus greater than BE. Let EC have been added to both. Thus, (the sum of) BA and AC is greater than (the sum of) BE and EC. Again, since in triangle CED the (sum of the) two sides CE and ED is greater than CD, let DB have been added to both. Thus, (the sum of) CE and EB is greater than (the sum of) CD and DB. But, (the sum of) BA and AC was shown (to be) greater than (the sum of)

1

BE and EC. Thus, (the sum of) BA and AC is much greater than (the sum of) BD and DC.

Again, since in any triangle the external angle is greater than the internal and opposite (angles) [Prop. 1.16] , in triangle CDE the external angle BDC is thus greater than CED. Accordingly, for the same (reason), the external angle CEB of the triangle ABE is also greater than BAC. But, BDC was shown (to be) greater than CEB. Thus, BDC is much greater than BAC.

Thus, if two internal straight-lines are constructed on one of the sides of a triangle, from its ends, the constructed (straight-lines) are less than the two remaining sides of the triangle, but encompass a greater angle. (Which is) the very thing it was required to show.