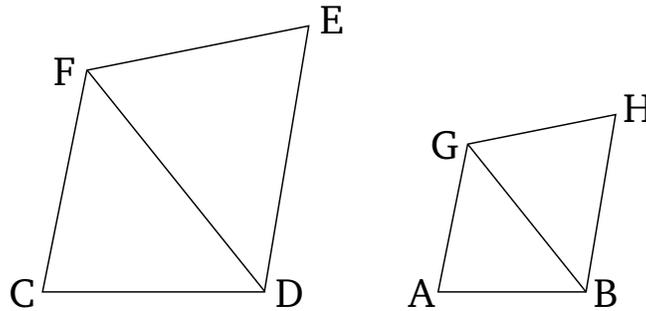


Book 6 Proposition 18

To describe a rectilinear figure similar, and similarly laid down, to a given rectilinear figure on a given straight-line.



Let AB be the given straight-line, and CE the given rectilinear figure. So it is required to describe a rectilinear figure similar, and similarly laid down, to the rectilinear figure CE on the straight-line AB .

Let DF have been joined, and let GAB , equal to the angle at C , and ABG , equal to (angle) CDF , have been constructed on the straight-line AB at the points A and B on it (respectively) [Prop. 1.23]. Thus, the remaining (angle) CFD is equal to AGB [Prop. 1.32]. Thus, triangle FCD is equiangular to triangle GAB . Thus, proportionally, as FD is to GB , so FC (is) to GA , and CD to AB [Prop. 6.4]. Again, let BGH , equal to angle DFE , and GBH equal to (angle) FDE , have been constructed on the straight-line BG at the points G and B on it (respectively) [Prop. 1.23]. Thus, the remaining (angle) at E is equal to the remaining (angle) at H [Prop. 1.32]. Thus, triangle FDE is equiangular to triangle GHB . Thus, proportionally, as FD is to GB , so

FE (is) to GH , and ED to HB [Prop. 6.4]. And it was also shown (that) as FD (is) to GB , so FC (is) to GA , and CD to AB . Thus, also, as FC (is) to AG , so CD (is) to AB , and FE to GH , and, further, ED to HB . And since angle CFD is equal to AGB , and DFE to BGH , thus the whole (angle) CFE is equal to the whole (angle) AGH . So, for the same (reasons), (angle) CDE is also equal to ABH . And the (angle) at C is also equal to the (angle) at A , and the (angle) at E to the (angle) at H . Thus, (figure) AH is equiangular to CE . And (the two figures) have the sides about their equal angles proportional. Thus, the rectilinear figure AH is similar to the rectilinear figure CE [Def. 6.1].

Thus, the rectilinear figure AH , similar, and similarly laid down, to the given rectilinear figure CE has been constructed on the given straight-line AB . (Which is) the very thing it was required to do.