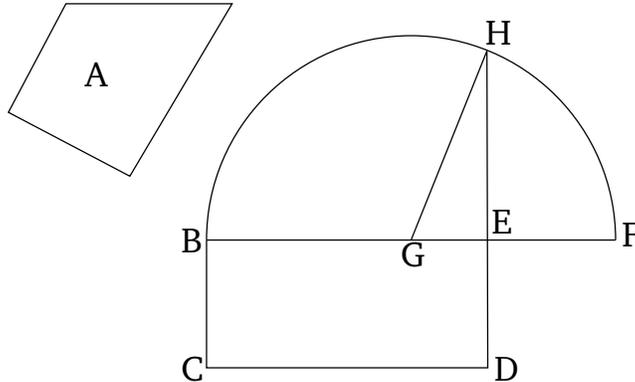


# Book 2

## Proposition 14

To construct a square equal to a given rectilinear figure.



Let  $A$  be the given rectilinear figure. So it is required to construct a square equal to the rectilinear figure  $A$ .

For let the right-angled parallelogram  $BD$ , equal to the rectilinear figure  $A$ , have been constructed [Prop. 1.45]. Therefore, if  $BE$  is equal to  $ED$  then that (which) was prescribed has taken place. For the square  $BD$ , equal to the rectilinear figure  $A$ , has been constructed. And if not, then one of the (straight-lines)  $BE$  or  $ED$  is greater (than the other). Let  $BE$  be greater, and let it have been produced to  $F$ , and let  $EF$  be made equal to  $ED$  [Prop. 1.3]. And let  $BF$  have been cut in half at (point)  $G$  [Prop. 1.10]. And, with center  $G$ , and radius one of the (straight-lines)  $GB$  or  $GF$ , let the semi-circle  $BHF$  have been drawn. And let  $DE$  have been produced to  $H$ , and let  $GH$  have been joined.

Therefore, since the straight-line  $BF$  has been cut—equally at  $G$ , and unequally at  $E$ —the rectangle con-

tained by  $BE$  and  $EF$ , plus the square on  $EG$ , is thus equal to the square on  $GF$  [Prop. 2.5]. And  $GF$  (is) equal to  $GH$ . Thus, the (rectangle contained) by  $BE$  and  $EF$ , plus the (square) on  $GE$ , is equal to the (square) on  $GH$ . And the (sum of the) squares on  $HE$  and  $EG$  is equal to the (square) on  $GH$  [Prop. 1.47]. Thus, the (rectangle contained) by  $BE$  and  $EF$ , plus the (square) on  $GE$ , is equal to the (sum of the squares) on  $HE$  and  $EG$ . Let the square on  $GE$  have been taken from both. Thus, the remaining rectangle contained by  $BE$  and  $EF$  is equal to the square on  $EH$ . But,  $BD$  is the (rectangle contained) by  $BE$  and  $EF$ . For  $EF$  (is) equal to  $ED$ . Thus, the parallelogram  $BD$  is equal to the square on  $HE$ . And  $BD$  (is) equal to the rectilinear figure  $A$ . Thus, the rectilinear figure  $A$  is also equal to the square (which) can be described on  $EH$ .

Thus, a square—(namely), that (which) can be described on  $EH$ —has been constructed, equal to the given rectilinear figure  $A$ . (Which is) the very thing it was required to do.