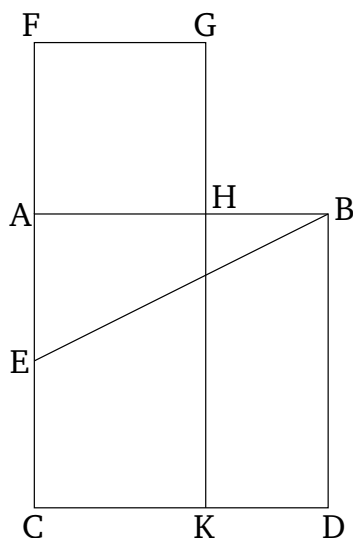# Book 2
Proposition 11

To cut a given straight-line such that the rectangle contained by the whole (straight-line), and one of the pieces (of the straight-line), is equal to the square on the remaining piece.

Let AB be the given straight-line. So it is required to cut AB such that the rectangle contained by the whole (straight-line), and one of the pieces (of the straight-line), is equal to the square on the remaining piece.

For let the square $ABDC$ have been described on AB [Prop. 1.46], and let AC have been cut in half at point E [Prop. 1.10], and let BE have been joined. And let CA have been drawn through to (point) F, and let EF be made equal to BE [Prop. 1.3]. And let the square FH have been described on AF [Prop. 1.46], and let GH have been drawn through to (point) K. I say that AB has been cut at H such as to make the rectangle

contained by AB and BH equal to the square on AH.

For since the straight-line AC has been cut in half at E, and FA has been added to it, the rectangle contained by CF and FA, plus the square on AE, is thus equal to the square on EF [Prop. 2.6]. And EF (is) equal to EB. Thus, the (rectangle contained) by CF and FA, plus the (square) on AE, is equal to the (square) on EB. But, the (sum of the squares) on BA and AE is equal to the (square) on EB. For the angle at A (is) a right-angle [Prop. 1.47]. Thus, the (rectangle contained) by CF and FA, plus the (square) on AE, is equal to the (sum of the squares) on BA and AE. Let the square on AE have been subtracted from both. Thus, the remaining rectangle contained by CF and FA is equal to the square on AB. And FK is the (rectangle contained) by CF and FA. For AF (is) equal to FG. And AD (is) the (square) on AB. Thus, the (rectangle) FK is equal to the (square) AD. Let (rectangle) AK have been subtracted from both. Thus, the remaining (square) FH is equal to the (rectangle) HD. And HD is the (rectangle contained) by AB and BH. For AB (is) equal to BD. And FH (is) the (square) on AH. Thus, the rectangle contained by AB and BH is equal to the square on HA.

Thus, the given straight-line AB has been cut at (point) H such as to make the rectangle contained by AB and BH equal to the square on HA. (Which is) the very thing it was required to do.