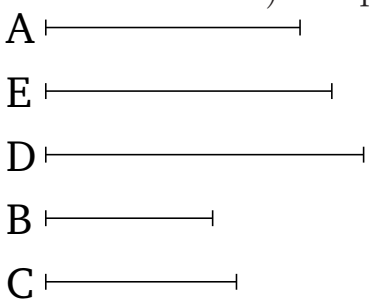
Book 10
Proposition 10

To find two straight-lines incommensurable with a given straight-line, the one (incommensurable) in length only, the other also (incommensurable) in square.



Let A be the given straight-line. So it is required to find two straight-lines incommensurable with A, the one (incommensurable) in length only, the other also (incommensurable) in square.

For let two numbers, B and C, not having to one another the ratio which (some) square number (has) to (some) square number—that is to say, not (being) similar plane (numbers)—have been taken. And let it be contrived that as B (is) to C, so the square on A (is) to the square on D. For we learned (how to do this) [Prop. 10.6 corr.]. Thus, the (square) on A (is) commensurable with the (square) on D [Prop. 10.6]. And since B does not have to C the ratio which (some) square number (has) to (some) square number, the (square) on A thus does not have to the (square) on D the ratio which (some) square number (has) to (some) square number either. Thus, A is incommensurable in length with D [Prop. 10.9]. Let the (straight-line) E (which

is) in mean proportion to A and D have been taken [Prop. 6.13]. Thus, as A is to D, so the square on A (is) to the (square) on E [Def. 5.9]. And A is incommensurable in length with D. Thus, the square on A is also incommensurble with the square on E [Prop. 10.11][1]. Thus, A is incommensurable in square with E.

Thus, two straight-lines, D and E, (which are) incommensurable with the given straight-line A, have been found, the one, D, (incommensurable) in length only, the other, E, (incommensurable) in square, and, clearly, also in length. [(Which is) the very thing it was required to show.]

[1]Since this references a **later** Proposition, no arrow is displayed in the graph.