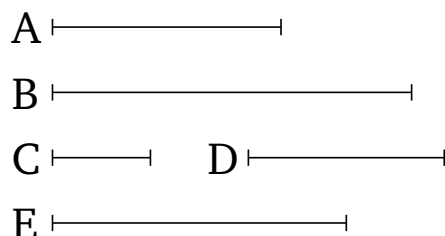


Book 8

Proposition 11

There exists one number in mean proportion to two (given) square numbers. And (one) square (number) has to the (other) square (number) a squared ratio with respect to (that) the side (of the former has) to the side (of the latter).



Let A and B be square numbers, and let C be the side of A , and D (the side) of B . I say that there exists one number in mean proportion to A and B , and that A has to B a squared ratio with respect to (that) C (has) to D .

For let C make E (by) multiplying D . And since A is square, and C is its side, C has thus made A (by) multiplying itself. And so, for the same (reasons), D has made B (by) multiplying itself. Therefore, since C has made A , E (by) multiplying C , D , respectively, thus as C is to D , so A (is) to E [Prop. 7.17]. And so, for the same (reasons), as C (is) to D , so E (is) to B [Prop. 7.18]. And thus as A (is) to E , so E (is) to B . Thus, one number (namely, E) is in mean proportion to A and B .

So I say that A also has to B a squared ratio with respect to (that) C (has) to D . For since A , E , B are three (continuously) proportional numbers, A thus has

to B a squared ratio with respect to (that) A (has) to E [Def. 5.9]. And as A (is) to E , so C (is) to D . Thus, A has to B a squared ratio with respect to (that) side C (has) to (side) D . (Which is) the very thing it was required to show.