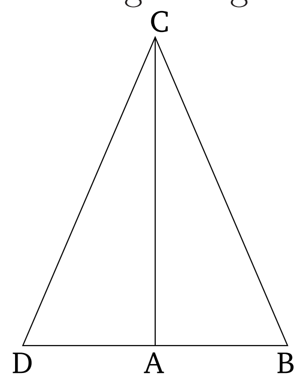
Book 1
Proposition 48

If the square on one of the sides of a triangle is equal to the (sum of the) squares on the two remaining sides of the triangle then the angle contained by the two remaining sides of the triangle is a right-angle.



For let the square on one of the sides, BC, of triangle ABC be equal to the (sum of the) squares on the sides BA and AC. I say that angle BAC is a right-angle.

For let AD have been drawn from point A at right-angles to the straight-line AC [Prop. 1.11], and let AD have been made equal to BA [Prop. 1.3], and let DC have been joined. Since DA is equal to AB, the square on DA is thus also equal to the square on AB.† Let the square on AC have been added to both. Thus, the (sum of the) squares on DA and AC is equal to the (sum of the) squares on BA and AC. But, the (square) on DC is equal to the (sum of the squares) on DA and AC. For angle DAC is a right-angle [Prop. 1.47]. But, the (square) on BC is equal to (sum of the squares) on BA and AC. For (that) was assumed. Thus, the square on DC is equal to the square on BC. So side DC is also equal to (side) BC. And since DA is equal to AB, and AC (is) common, the two (straight-lines) DA, AC are equal to the two (straight-lines) BA, AC. And the base DC is equal to the base BC. Thus, angle DAC [is] equal to angle BAC [Prop. 1.8]. But DAC is a right-angle. Thus, BAC is also a right-angle.

Thus, if the square on one of the sides of a triangle is equal to the (sum of the) squares on the remaining two sides of the triangle then the angle contained by the remaining two sides of the triangle is a right-angle. (Which is) the very thing it was required to show.