The theorem of Apollonius by dissection.

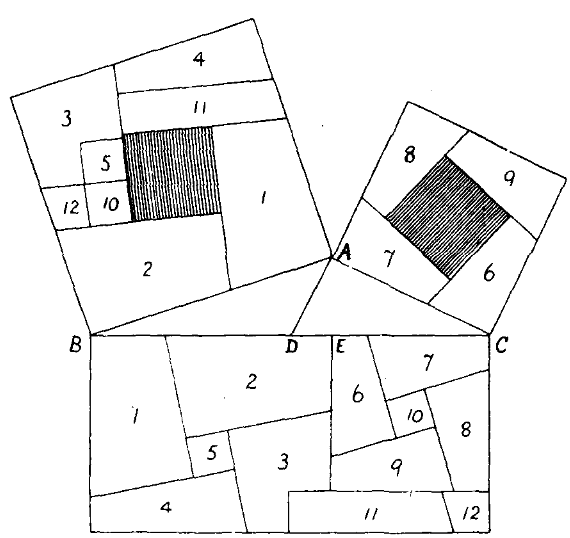
The figure shews the dissection in the form

$$(AB^2 - AD^2) + (AC^2 - AD^2) = 2BD^2.$$

Let m, x denote AD, DE, where E is the projection of A on BC.

Quadrilateral 1 is constructed with sides $\frac{1}{2}(c+x)$, $\frac{1}{2}(c-x)$, $\frac{1}{2}(m+\frac{1}{2}a+x)$, $\frac{1}{2}(m-\frac{1}{2}a-x)$; quadrilateral 6 with sides $\frac{1}{2}(b-x)$, $\frac{1}{2}(b+x)$, $\frac{1}{2}(m-\frac{1}{2}a-x)$, $\frac{1}{2}(m+\frac{1}{2}a-x)$. The square on AB is then dissected into four quadrilaterals equal to 1, plus the shaded square (AD^2); similarly for the square on AC. These quadrilaterals are reassembled in the squares on BE, EC respectively with the right-angled corners in the reversed positions, so as to enclose squares each equal to DE^2. Finally two quadrilaterals are subdivided (4, 11) and (3, 5, 10, 12) to fit in as shewn in the figure.

To avoid difficulties of overlapping in this method of dissection the triangle should be drawn with AD much smaller than either AB or AC.



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