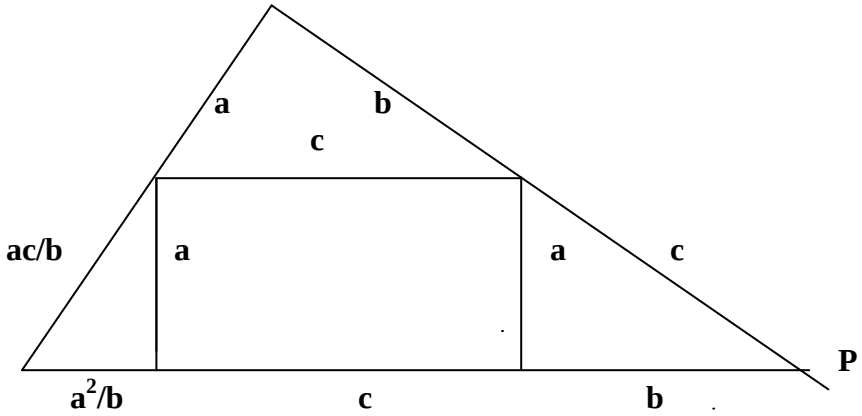
The Pythagorean Theorem

Construct, from an arbitrary right triangle, with sides $\mathbf{a \le b < c}$,
the following larger, similar triangle:

1. extend sides **a** and **b** ;
2. mark a point, **P** , a distance **c** on the extension of side **b** ;
3. construct a parallel to side **c** thru this point; and,
4. drop perpendiculars from each end of side **c** to this parallel.



The larger similar triangle, with sides **(a+ac/b)** , **(b+c)** , and **(b+c+a²/b)** , is a subdivided figure, where every interior angle is one of the three angles in the original triangle:

two congruent right triangles of sides, **a, b, c,** with the original on top;
a third, similar right triangle of sides, **a²/b, a, ac/b** ; and,
a rectangle of sides **a** and **c** .

The area of the large triangle may thus be written two ways:

(b+c)(a+ac/b)/2 and **ab/2 + ab/2 + ac + a³/2b**

(Set these equal and multiply by **2**)

(b+c)(a+ac/b) = 2ab + 2ac + a³/b (Expand left side)

ab + 2ac + ac²/b = 2ab + 2ac + a³/b (Cancel terms on both sides)

ac²/b = ab + a³/b (Multiply by **b/a**)

c² = b² + a² .

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