[Pythagoras's Theorem – an algebraic proof]

This proof of Pythagoras's theorem uses the algebraic polynomial expansion. We start with a square, which has a length (a+b). The area of the square is hence:

$$(a + b)^2 = a^2 + 2ab + b^2$$

(and remember it's not just $a^2 + b^2$, a mistake that many keep on making).

Now if we connect the points where a and b connect, we should be able to verify that what we have in the middle here is a square that has a length the same as the hypotenuse.

By rearranging the triangles, we can work out that the area is 2ab, and so subtracting this from the expansion of (a+b)^2, we are left with a^2 + b^2, and so we have Pythagoras's theorem a^2 + b^2 = c^2.