Farrah Rahman
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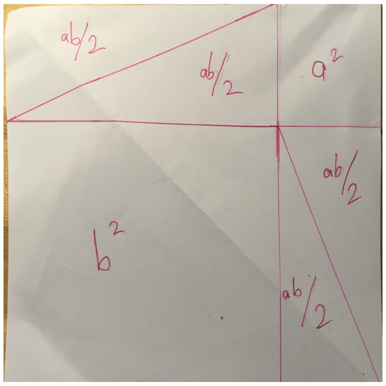
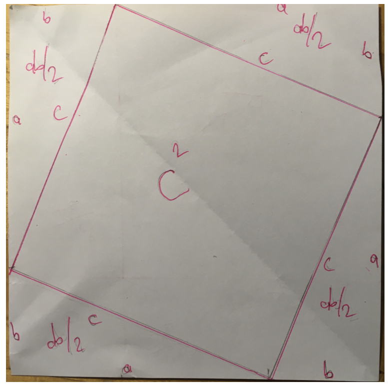
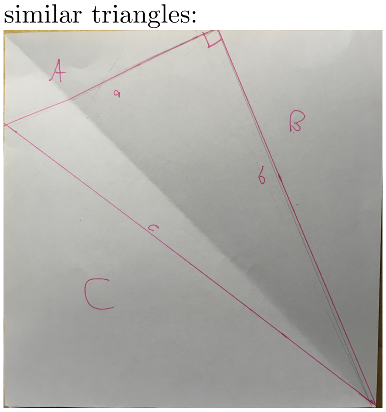
1. side 1 side 2





2. similar triangles:



3. $\{\langle m, n\rangle \in \mathbb{N} \times \mathbb{N} \mid 2mn = 120, m \geq n\}$
   m, n factors of 60: $\langle 60, 1\rangle, \langle 30, 2\rangle, \langle 20, 3\rangle, \langle 15, 4\rangle, \langle 12, 5\rangle, \langle 10, 6\rangle$

   triples:

   $\langle 60, 1\rangle : \langle 120, 3599, 3601\rangle$
   $\langle 30, 2\rangle : \langle 120, 896, 904\rangle$
   $\langle 20, 3\rangle : \langle 120, 391, 409\rangle$
   $\langle 15, 4\rangle : \langle 120, 209, 241\rangle$
   $\langle 12, 5\rangle : \langle 120, 119, 169\rangle$
   $\langle 10, 6\rangle : \langle 120, 64, 164\rangle$

4. It is known that there exists one set of positive integers a, b, c for which $a^2 + b^2 = c^2$ holds true: $a = 3, b = 4, c = 5$, as $3^2 + 4^2 = 25 = 5^2$. For some arbitrary integer k, multiple both sides of $3^2 + 4^2 = 5^2$ by k^2:

$$k^2(3^2 + 4^2) = k^2(5^2)$$
$$k^2 3^2 + k^2 4^2 = k^2 5^2$$
$$(3k)^2 + (4k)^2 = (5k)^2$$

Define $d = 3k$, $e = 4k$, and $f = 5k$. Because the product of integers is an integer, d, e, and f are all integers. Thus, for positive integers d, e, f, $d^2 + e^2 = f^2$, making this another pythagorean triple.

5. Fermat

6. Euler

7. Fermat

8. Andrew Wiles