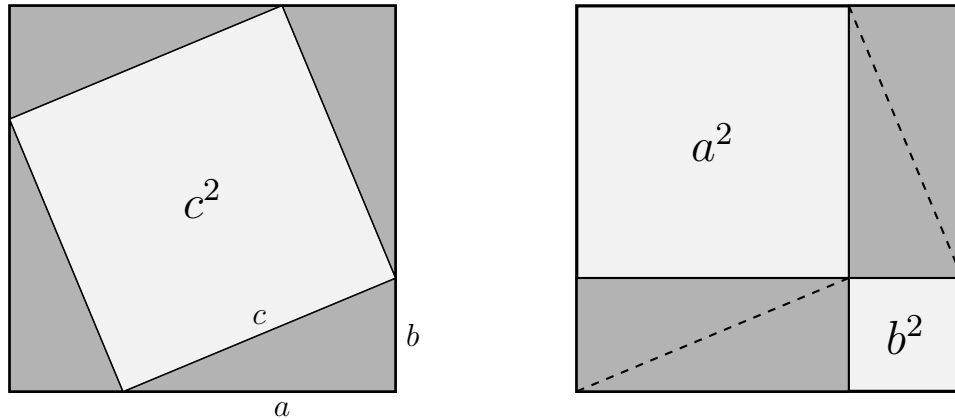


Math 111 - Student Proofs of the Pythagorean Theorem

Solution #1 The two pictures explain why the Pythagorean theorem is true because the first picture depicts c^2 while the second picture depicts a^2 and b^2 . If you disregard the shaded figures (which take up the same amount of space in each picture), you would be left with $c^2 = a^2 + b^2$, or the Pythagorean theorem: $a^2 + b^2 = c^2$.



This proof is good. One possible improvement would be to explain that the pictures depict a^2 , b^2 , and c^2 because those values are the areas of the three lighter squares.

Solution #2 Since we know that all the triangles are the same we can figure the area of the square in figure 1 is c^2 . Also that the total area of the the squares a^2 and b^2 in figure 2 are equivalent to c^2 . The area of square a^2 plus the area of square b^2 equals the area of square c^2 .

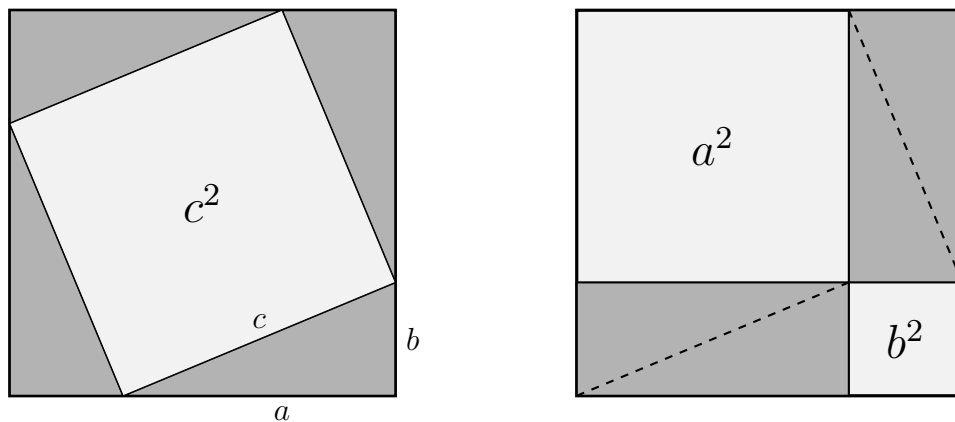
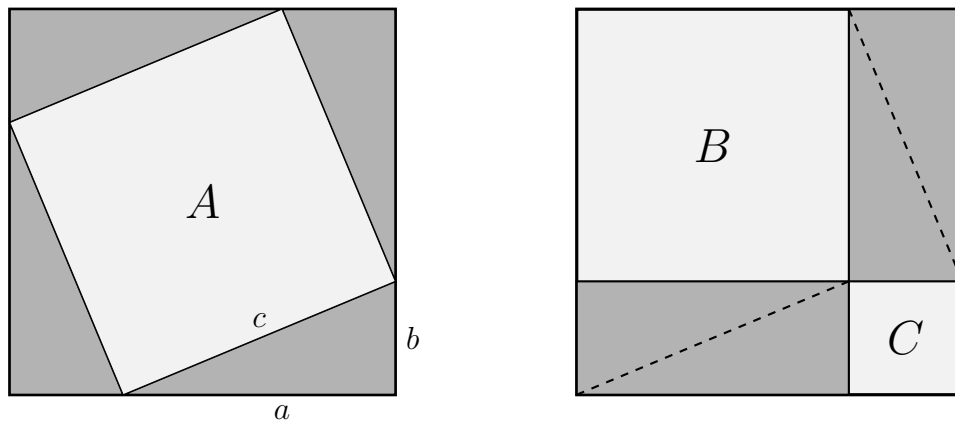


Figure 1

Figure 2

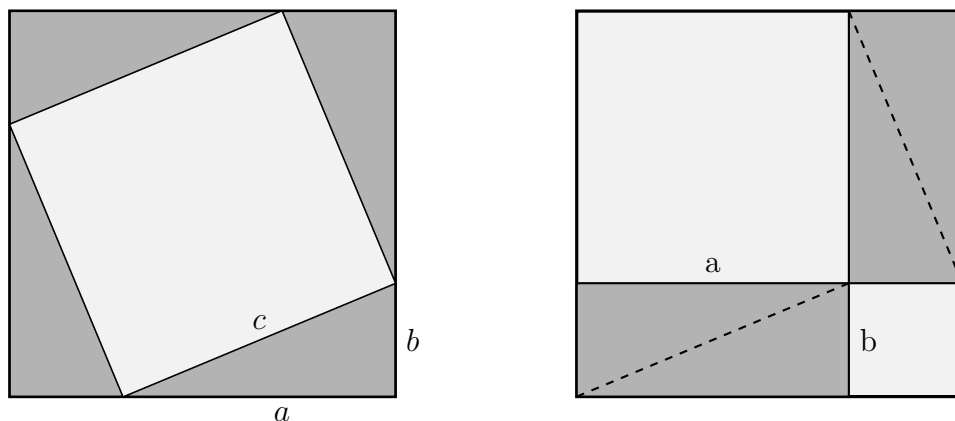
This proof is very good. It would have been better to give the three white squares names, instead of referring to them as square a^2 , square b^2 , and square c^2 . That is not the best way to talk about a square, since it confuses the square with its area.

Solution #3 The areas of $B + C = A$. So, therefore $a^2 + b^2 = c^2$. Side b^2 of C plus side a^2 of B equals side c^2 of A .



This solution would have been excellent (and shorter) if not for the last sentence. Referring to the sides of the squares as side b^2 , side a^2 and side c^2 is confusing. Usually you refer to a side of a square by its length, not the square of the length.

Solution #4 It is true because the area of a plus the area of b equal the area of c . ($a^2 + b^2 = c^2$) The first picture shows the area of c and the second picture shows the area of b and a . The white square is the area of the a, b , and c . Therefore the line a, b , and c are really just edges of a square. Area is length and height, that is why we use a^2, b^2, c^2 .



This solution shows that student understands why the two pictures prove the Pythagorean theorem. However, the way the three light squares are referred to (square a , square b , and square c) is not precise. The three squares should be clearly labeled, and better yet, they should be given names (like A, B , and C in solution #3). There are also several grammatical mistakes and some word choices are imprecise (e.g., area is length times height, not length and height). Remember, proofs are like short essays. They should use correct grammar and complete sentences.