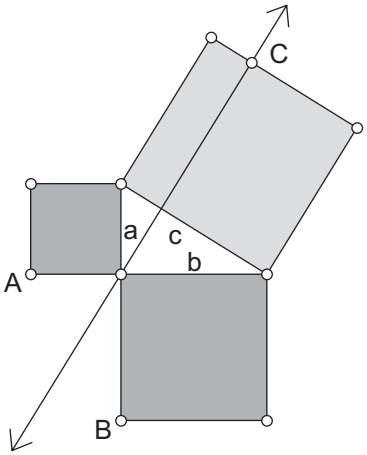
Visual Demonstration of the Pythagorean Theorem

For GSP5

In this activity you'll do a visual demonstration of the Pythagorean theorem based on Euclid's proof. By *shearing* the squares on the sides of a right triangle, you'll create congruent shapes without changing the areas of your original squares.

SKETCH AND INVESTIGATE

1. Open the sketch **Shear Pythagoras.gsp**. You'll see a right triangle with squares on its sides.

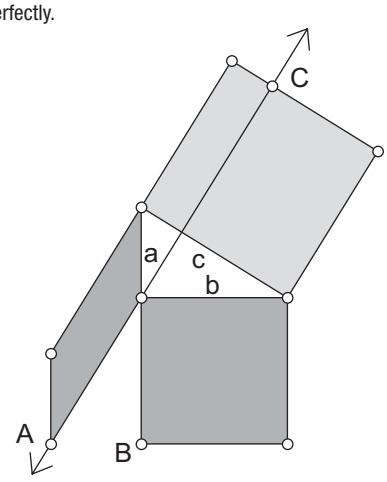


Click on an interior to select it. Then, in the Measure menu, choose **Area.**

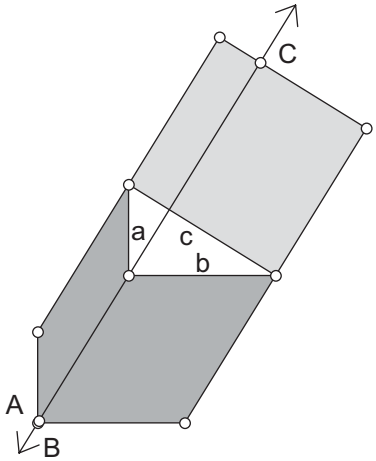
2. Measure the areas of the squares.
3. Drag point *A* onto the line that's perpendicular to the hypotenuse. Note that as the square becomes a parallelogram its area doesn't change.
4. Drag point *B* onto the line. It should overlap point *A* so that the two parallelograms form a single irregular shape.

To confirm that this shape is congruent, you can copy and paste it. Drag the pasted copy onto the shape on the legs to see that it fits perfectly.

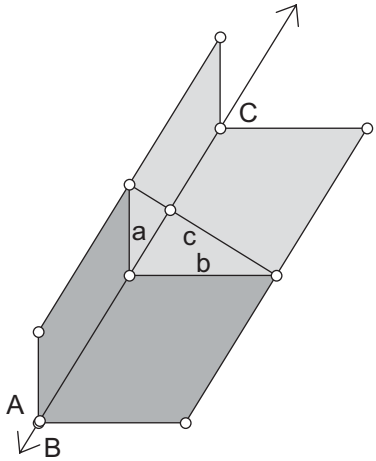
5. Drag point *C* so that the large square deforms to fill in the triangle. The area of this shape doesn't change either. It should appear congruent to the shape you made with the two smaller parallelograms.



Step 3



Step 4



Step 5

To confirm that this works for any right triangle, change the shape of the triangle and try the experiment again.

Q1 How do these congruent shapes demonstrate the Pythagorean theorem? (*Hint:* If the shapes are congruent, what do you know about their areas?)