



**Problem 1 – Proof of the Pythagorean Theorem**

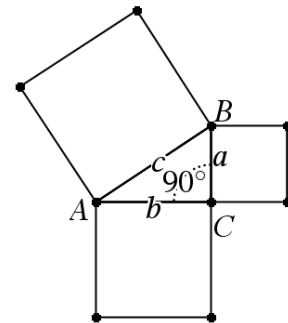
We will begin this activity by looking at a right triangle and the square formed by each of the three sides of the right triangle. Start the *Cabri Jr.* application by pressing [APPS] and selecting **CabriJr.** Open the file **PYTHAGORA** by pressing [Y=], selecting **Open...**, and selecting the file. You are given right triangle *ABC*.

- Grab and drag point *B*, and move the point to 4 different positions and record the data you collected in the table below.

Position	Area A ( $a^2$ )	Area B ( $b^2$ )	Area C ( $c^2$ )	$a^2 + b^2$
1				
2				
3				
4				

- What do the squares on each side of right triangle *ABC* represent?

- How does the area of the two smaller squares compare to the larger square?



- How are  $a^2$  and the square on side *a* (side *BC*) related?

- How are  $a^2 + b^2$  and  $c^2$  related?

- State the Pythagorean Theorem.

**Problem 2 – Proof by Dissection of the Pythagorean Theorem**

Open the file **PYTHAGO**. You are given right triangle  $ABC$ . You are given right triangle  $ABC$  and three squares representing  $a^2$ ,  $b^2$ , and  $c^2$ . Using **PYTHAGO**, answer the following questions.

7. What square represents  $c^2$ ?

8. What square represents  $b^2$ ?

9. What square represents  $a^2$ ?

Move points  $A$ ,  $D$ ,  $E$ , and  $B$  to point  $R$ .

10. What does this dissection tell you about the area of  $c^2$  and the areas of  $a^2$  and  $b^2$ ?

11. How does the dissection relate to the Pythagorean Theorem?

**Problem 3 – President Garfield’s Proof of the Pythagorean Theorem**

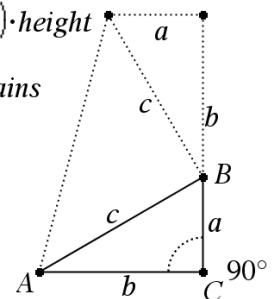
In the figure to the right, you are given right triangle  $ABC$  and a congruent triangle with a segment connecting them to form a trapezoid. You will use the area of a trapezoid and the area of the three triangles to prove the Pythagorean Theorem.

12. Using the formulas for area, set the area of the trapezoid equal to the sum of the area of all three triangles and simplify. Remember that the area of a triangle is  $\frac{1}{2}(\text{base})(\text{height})$ .

*Area of a Trapezoid*

$$A = \frac{1}{2}(\text{base 1} + \text{base 2}) \cdot \text{height}$$

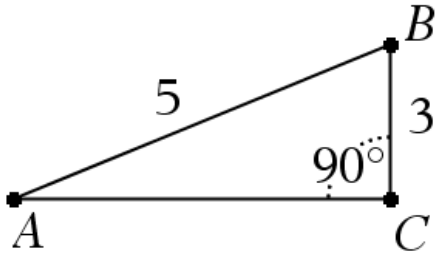
*The trapezoid contains  
3 right triangles.*



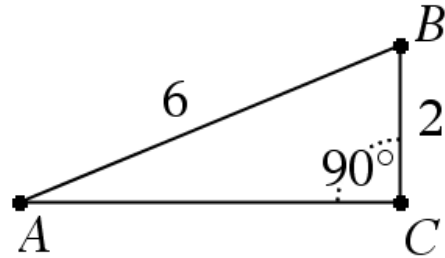
**Problem 4 – Application of the Pythagorean Theorem**

Find the length of the third side given two sides of the triangle.

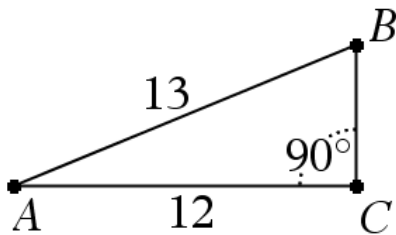
13.



14.



15.



16.

