



Proving the Pythagorean Theorem

Archived Information

Patty Benitez

Before, During, After



The Pythagorean Theorem Three Part Lesson

Before

Getting Ready

- Get Students mentally ready to work on the task
- Be sure all expectations for products are clear

During

Students Work

- Let go!
- Listen carefully
- Provide hints
- Observe and asses

After

Class Discourse

- Accept student solutions without evaluation
- Conduct discussion as students justify and evaluate results and methods



Enduring Understanding

- **What is the length of the side of a square of a certain area?**
- **What is the relationship among the lengths of the sides of a right triangle?**
- **How can the Pythagorean Theorem be used to solve problems?**



Accountable Talk

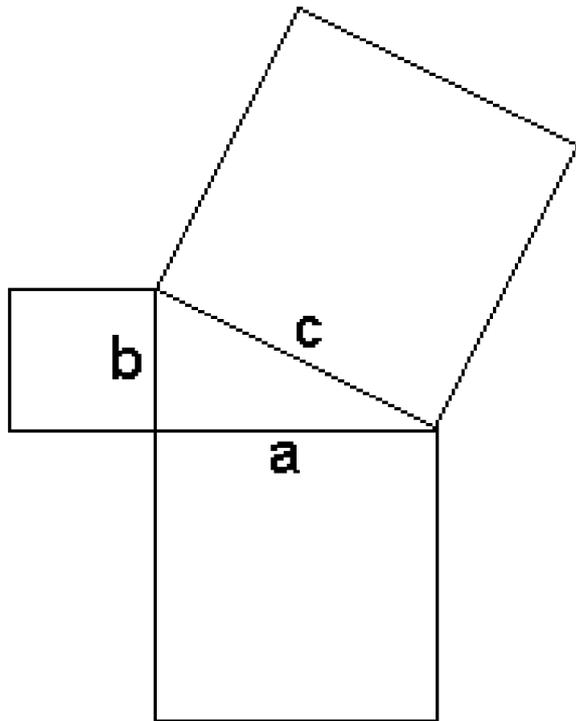
- **When I don't understand**
- **When I agree**
- **When I disagree**
- **To paraphrase**
- **Conclusions**
- **To praise and acknowledge**



Introduction/Before

- You will explore side lengths and areas of right triangles and squares. Your explorations will lead you to discover one of the most important relationships in all of mathematics:
the Pythagorean Theorem
- You will use what you are learning to solve interesting problems. Example:
Horace is the catcher for the Humbolt Bees baseball team. Sally, the star of the Canfield Cats, is on first base. The pitcher throws a fastball, and the batter swings and misses. Horace catches the pitch as Sally takes off for second base. How far must Horace throw the baseball to get Sally out at second base?

The Pythagorean Relationship (During)



- Draw a right triangle with the given leg length on dot paper. Then draw a square on each side of the triangle.
- Find the areas of the squares on the legs and on the hypotenuse. Record your results in the table.
- Look for a pattern in the relationship among the areas of the three squares drawn for each triangle. Make a conjecture about the relationship among the areas.

Proofs of the Pythagorean Relationship (During)



- Cut out the puzzle pieces. Examine a triangular piece and the three square pieces.
- How do the side lengths of the squares compare to side lengths of the triangle?
- Arrange the 11 puzzle pieces to fit exactly into the two puzzle frames. Use four triangles in each frame.
- Carefully study the arrangements in the two frames. What conclusion can you draw about the relationship among the areas of the three square puzzle pieces?
- What does the conclusion you reached in part C mean in terms of the side lengths of the triangles?

Summary of Lesson (After)



■ Presentation of Proofs

Credits



Lappan, Glenda. Fey, James T. Fitzgerald, William M. Friel, Susan N. Phillips, Elizabeth D. *Connected Mathematics: Looking for Pythagoras* (2004).

Van De Walle, John A. *Elementary and Middle School Mathematics, Teaching Developmentally* Fifth Edition (2004).