8.G Converse of the Pythagorean Theorem

Task

A Pythagorean triple \((a, b, c)\) is a set of three positive whole numbers which satisfy the equation

\[ a^2 + b^2 = c^2. \]

Many ancient cultures used simple Pythagorean triples such as \((3, 4, 5)\) in order to accurately construct right angles: if a triangle has sides of lengths 3, 4, and 5 units, respectively, then the angle opposite the side of length 5 units is a right angle.

a. State the Pythagorean Theorem and its converse.

b. Explain why this practice of constructing a triangle with side-lengths 3, 4, and 5 to produce a right angle uses the converse of the Pythagorean Theorem.

c. Explain, in this particular case, why the converse of the Pythagorean Theorem is true.