(1) This proof of the Pythagorean Theorem is due to the 12th century Hindu mathematician Bhaskara: Assemble copies of a right triangle into the figure below.

(a) Verify that the large quadrilateral is a square.
(b) Verify that the inner quadrilateral is a square.
(c) Equate the area of the large square with the total areas of the small square and the four triangles to prove the Pythagorean Theorem.

(2) Here is a proof using similarity that is accredited to 17th century British mathematician John Wallis.

(a) From A draw altitude AD to the hypotenuse to create \( \triangle ACD \sim \triangle BAC \sim \triangle BDA \)
(b) Conclude that \( \frac{b}{c} = \frac{a}{b} \) and that \( \frac{c}{b} = \frac{a}{c} \). From this, complete the proof.
(3) Our last proof of the Pythagorean Theorem uses a circle inscribed in the right triangle $\triangle BAC$.

![Diagram of a circle inscribed in a right triangle]

(a) Note that $\triangle BOD \cong \triangle BOF$ and $\triangle COE \cong \triangle COF$ and that $AEOD$ is a square.
(b) Explain why $b + c - 2r = a$ and solve for $r$.
(c) Decompose $\triangle BAC$ into a square and two pairs of congruent triangles and show that $\text{area}(\triangle BAC) \cdot r = b + c - r$.
(d) Equate your answer from (c) to the area found the usual way, $\text{area}(\triangle BAC) = \frac{bc}{2}$, substitute $r$ from (b), and do some algebra to derive the Pythagorean Theorem.

(4) Is it possible to rewrite and prove, using modern notation, the Pythagorean Theorem in terms of circles constructed on the sides of a right triangle?