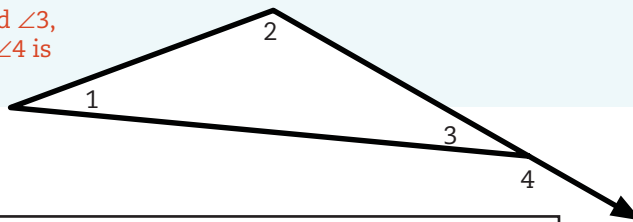


Given any triangle with interior angles, $\angle 1$, $\angle 2$, and $\angle 3$, and exterior angle, $\angle 4$, prove that the measure of $\angle 4$ is equal to the sum of the measures of $\angle 1$ and $\angle 2$.



<p>Statement:</p> <p>A triangle is given with interior angles $\angle 1$, $\angle 2$, and $\angle 3$, and exterior angle, $\angle 4$, as shown in the figure.</p>	<p>Reason:</p> <p>Hypothesis</p>
<p>Statement:</p> $m\angle 1 + m\angle 2 = m\angle 4$	<p>Reason:</p> <p>Conclusion</p>
<p>Statement:</p> $m\angle 1 + m\angle 2 + m\angle 3 = 180$	<p>Reason:</p> <p>Angle Sum of a Triangle Theorem: The sum of the measures of the interior angles of a triangle is 180°.</p>
<p>Statement:</p> $m\angle 1 + m\angle 2 - m\angle 4 = 0$	<p>Reason:</p> <p>Subtraction</p>
<p>Statement:</p> $m\angle 3 = 180 - m\angle 4$	<p>Reason:</p> <p>Solving for $m\angle 3$</p>
<p>Statement:</p> $m\angle 3 + m\angle 4 = 180$	<p>Reason:</p> <p>Definition of a linear pair</p>
<p>Statement:</p> $m\angle 1 + m\angle 2 + (180 - m\angle 4) = 180$	<p>Reason:</p> <p>Substitution</p>

Exterior Angle Proof Puzzle

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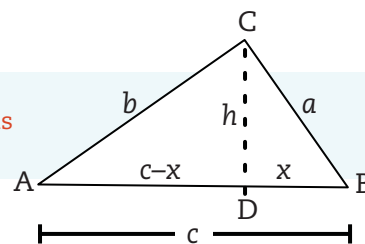
Exterior Angle Proof Puzzle

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In right triangle $\triangle ABC$ with legs of lengths a and b , and hypotenuse with length c , $a^2 + b^2 = c^2$. (Note: $\angle ACB$ is a right angle. Because \overline{CD} is an altitude, $\angle ADC$ and $\angle CDB$ are right angles.)



Statement: Right $\triangle ABC$ is given, with side lengths a and b , hypotenuse of length c , and altitude \overline{CD} .	Reason: Hypothesis
Statement: $\frac{b}{c-x} = \frac{c}{b}$	Reason: Corresponding parts of similar triangles are proportional.
Statement: Then $a^2 + b^2 = c^2$	Reason: Conclusion
Statement: $c^2 = cx + b^2$	Reason: Solving for c^2
Statement: $\angle BAC \cong \angle CAD$ $\angle ABC \cong \angle CBD$	Reason: Equal angles have equal measure so are congruent.
Statement: $a^2 = cx$	Reason: Cross-multiplication
Statement: $\angle ACB \cong \angle CDB \cong \angle ADC$	Reason: All right angles are congruent.
Statement: $c^2 = a^2 + b^2$	Reason: Substitution
Statement: $\triangle ABC \sim \triangle CBD \sim \triangle ACD$	Reason: AAA Similarity
Statement: $\frac{a}{x} = \frac{c}{a}$	Reason: Corresponding parts of similar triangles are proportional.
Statement: $b^2 = c^2 - cx$	Reason: Cross-multiplication
Statement: $\angle ABC \cong \angle ACD$ $\angle CAD \cong \angle BCD$	Reason: Two angles of a triangle are congruent to the corresponding angles of another triangle, so the remaining corresponding angles are congruent.

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