Common Core Geometry Proof – Triangles_1

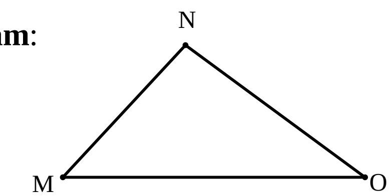
Measures of Interior Angles of a Triangle

Theorem: If a figure is a triangle, then the measures of the interior angles sum to 180°.

Given: $\triangle MNO$

Prove: $m\angle NMO + m\angle MNO + m\angle NOM = 180°$

Diagram:



Statements	Reasons
1. $\triangle MNO$	1. Given
2. Construct $\overleftrightarrow{PQ}$ parallel to $\overline{MO}$ through N.	2. Postulate: Given a line and a point not on the line, one and only one line can be drawn through the given point that is parallel to the given line.
3. $\angle PNQ$ is a straight angle and $m\angle PNQ=180^\circ$	3. Definition of Straight Angle
4. $m\angle PNM + m\angle MNO + m\angle QNO = m\angle PNQ$	4. Partition Postulate
5. $m\angle PNM + m\angle MNO + m\angle QNO = 180^\circ$	5. Substitution Axiom
6. $\angle PNM$ and $\angle NMO$ are alternate interior angles & $\angle QNO$ and $\angle NOM$ are alternate interior angles	6. Definition of Alternate Interior Angles
7. $\angle PNM \cong \angle NMO$ & $\angle QNO \cong \angle NOM$	7. Theorem: If parallel lines are cut by a transversal, then the alternate interior angles formed are congruent.
8. $m\angle PNM = m\angle NMO$ & $m\angle QNO = m\angle NOM$	8. Definition of Congruent Angles
9. $m\angle NMO + m\angle MNO + m\angle NOM = 180°$	9. Substitution Axiom

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