- How many non-congruent triangles with perimeter 7 have integer side lengths?

(A) 1 **(B)** 2 **(C)** 3 **(D)** 4 **(E)** 5

2003 AMC 12 A, Number #7— "Use integer partitions and the triangle inequality"

- **Solution (B)** The perimeter 7 could possibly be written as the sums $5+1+1$, $4+2+1$, $3+3+1$, and $3+2+2$. The sum of the two shorter sidelengths must be greater than the third side length, so only $3+3+1$ and $3+2+2$ are possible triangles.

Difficulty: Medium-easy

NCTM Standard: Geometry Standard for 9-12: Analyze characteristics and properties of two- and three-dimensional geometric shapes and develop mathematical arguments about geometric relationships. Explore relationships (including congruence and similarity) among classes of two- and three-dimensional geometric objects, make and test conjectures about them, and solve problems involving them.

Mathworld.com Classification:
Discrete Mathematics > Combinatorics > Enumeration > Triangle Counting;
Geometry > Plane Geometry > Triangles > General Triangles > Triangle Counting