

1077-A0-2560      **William Dunham\*** ([wdunham@muhlenberg.edu](mailto:wdunham@muhlenberg.edu)). *Heron, Newton, Euler, and Barney.*

Heron's formula, giving the area of a triangle in terms of the lengths of its sides, is one of the great, peculiar results of plane geometry. It is thus to be expected that, over the years, there have been many demonstrations of this remarkable formula.

Here, I consider four such proofs. Heron's original was a clever if convoluted exercise in Euclidean geometry. Centuries later, Isaac Newton gave a demonstration whose heavy lifting was done by algebra rather than geometry. Leonhard Euler's proof was geometric and exhibited his characteristic flair. Then in 1990 Barney Oliver, a former recipient of the National Medal of Science, shared with me an elegant trigonometric argument where the symmetry of the formula was mirrored by the symmetry of the proof itself.

The first two of these, Heron's and Newton's, I'll mention only briefly. The second pair, Euler's and Barney's, I'll prove in detail. Taken together, these should remind us why the history of our discipline is such a fine source for wonderful mathematics. (Received September 22, 2011)