Herons Formula

Formulation

Heron's formula states that the [area](https://en.wikipedia.org/wiki/Area) of a [triangle](https://en.wikipedia.org/wiki/Triangle) whose sides have lengths *a*, *b*, and *c* is

A = \sqrt{s(s-a)(s-b)(s-c)},

where *s* is the [semiperimeter](https://en.wikipedia.org/wiki/Semiperimeter" \o "Semiperimeter) of the triangle; that is,

s=\frac{a+b+c}{2}.

Example

Let △*ABC* be the triangle with sides *a* = 4, *b* = 13 and *c* = 15. The semiperimeter is *s* = 1/2(*a* + *b* + *c*) = 1/2(4 + 13 + 15) = 16, and the area is


\begin{align}
A &= \sqrt{s\left(s-a\right)\left(s-b\right)\left(s-c\right)} = \sqrt{16 \cdot (16-4) \cdot (16-13) \cdot (16-15)}\\
&= \sqrt{16 \cdot 12 \cdot 3 \cdot 1} = \sqrt{576} = 24.
\end{align}
