

Heron's Formula

Heron's Formula is used to find the area of triangles when all you know are the side lengths.

$$K = \sqrt{s(s-a)(s-b)(s-c)}$$

where $s = \frac{a+b+c}{2}$ ← semiperimeter

Find the area of the given triangle to the nearest thousandth.

1. $a = 9, b = 10, c = 11$ $s = \frac{9+10+11}{2} = \frac{30}{2} = 15$

$$\sqrt{15(15-9)(15-10)(15-11)} = \sqrt{15(6)(5)(4)} = \sqrt{1800} \approx \boxed{42.426}$$

2. $a = 68, b = 77, c = 105$ $\frac{68+77+105}{2} = 125$

$$\sqrt{125(125-68)(125-77)(125-105)}$$

$$* \sqrt{125(57)(48)(20)} = \sqrt{6840000}$$

$$\approx \boxed{2615.339}$$

Find the length of the altitude from A to BC. Round to the nearest thousandth.

3. $a = 12, b = 18, c = 27$

$$s = 28.5$$

$$\sqrt{28.5(28.5-12)(28.5-18)(28.5-27)} \approx 86.061$$

Set area equal to the standard area formula

$$86.061 = \frac{12h}{2}$$

$$* \frac{86.061}{6} = \frac{6h}{6} \quad \boxed{h = 14.343}$$

