## MATH 11022: Finding the area of a triangle

Definition. An altitude of a triangle is a perpendicular line segment from a vertex of the triangle to the line of the opposite side. This opposite side is called the corresponding base of the triangle.


Note. Every triangle has three altitudes which will always intersect at a point called the orthocenter of the triangle. The orthocenter may lie inside or outside the triangle.


Note. A median of a triangle is the line segment from a vertex to the midpoint of the opposite side. The three medians of a triangle intersect at a point called the centroid of the triangle. The centroid always lies inside the triangle.



Heron's (or Hero's) Formula for the Area of a Triangle


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

where

$$
s=\frac{1}{2}(a+b+c)
$$

Example 1: Find the area of the following triangles. All measurements are in centimeters. Give answers to two decimal places. Note that all figures are not drawn to scale.
(a)

(b)

(c)

(d)


Example 2: Find the area of the following triangles. All measurements are in centimeters. Give answers to two decimal places. Note that all figures are not drawn to scale.
(a)


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(b)

(c)


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(d)


