Area of Olique Triangles

Two ways to find the Area of a triangle:

1. $K = \frac{1}{2}ab\sin C$ ***Given 2 sides and 1 angle – all letters different; a, b = sides, C = angle***

Example: Find the area: a = 6.8 in, b = 16 in, C = 111°

$K = \frac{1}{2}(6.8)(16)\sin 111 =$ **50.8 in²**

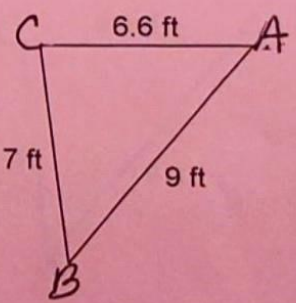
2. ***Heron's Area Formula - Given 3 sides of the triangle***

The area of a triangle with sides of length *a*, *b*, and *c* is

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

Where $s = \frac{1}{2}(a+b+c)$. The variable *s* is called the *semiperimeter*, or half-perimeter, of the triangle

Example: Find the area of the triangle to the right (nearest tenth).



① $s = \frac{1}{2}(6.6+9+7) = 11.3$

② $\sqrt{11.3(11.3-6.6)(11.3-7)(11.3-9)}$

$A = 22.9\ ft^2$

Examples. Your Turn. **Find the area of the triangle to the nearest tenth (show work).**

1. In ΔABC, $a = 14$, $b = 12$, $c = 9$

① $s = \frac{1}{2}(14+12+9) = 17.5$

② $K = \sqrt{17.5(17.5-14)(17.5-12)(17.5-9)}$

$= 53.5\ units^2$

2. In ΔABC, $a = 8$, $b = 17$, $m\angle C = 82°$

$K = \frac{1}{2}(8)(17)\sin 82$

$K = 67.3\ units^2$