Heron’s Formula for the Area of a Triangle
The area of a triangle with sides $a$, $b$, and $c$ is

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

where $s$ is one-half its perimeter: $s = \frac{1}{2}(a + b + c)$.

1) Find the area. Round to the nearest tenth.

Perimeter = 6.1 + 14 + 11.1
\[ P = 31.2 \]
\[ s = \frac{1}{2} \text{perimeter} = \frac{1}{2}(31.2) = 15.6 \]

\[
\text{Area} = \sqrt{15.6(15.6-6.1)(15.6-14)(15.6-11.1)}
\]
\[
\text{Area} = \sqrt{15.6(9.5)(1.6)(4.5)}
\]
\[
\text{Area} = \sqrt{1067.04}
\]
\[
\text{Area} = 32.7 \text{ ft}^2
\]

Assignment: HW 5.09 #1-8 all

2) Find the area. Round to the nearest tenth.

Find $b$ first in order to use Heron’s Formula.

\[ b^2 = a^2 + c^2 - 2ac \cos B \]
\[ b^2 = 15^2 + 13^2 - 2 \cdot 15 \cdot 13 \cdot \cos 46^\circ \]
\[ b^2 = 225 + 169 - 390 \cdot \cos 46^\circ \]
\[ b^2 = 394 - 390 \cdot \cos 46^\circ \]
\[ b = 11.1 \]

Perimeter = 15 + 11.1 + 13
\[ P = 39.1 \]
\[ s = 19.55 \]

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\[
\text{Area} = \sqrt{19.55(4.55)(8.45)(6.55)}
\]
\[
\text{Area} = 70.2 \text{ in}^2
\]