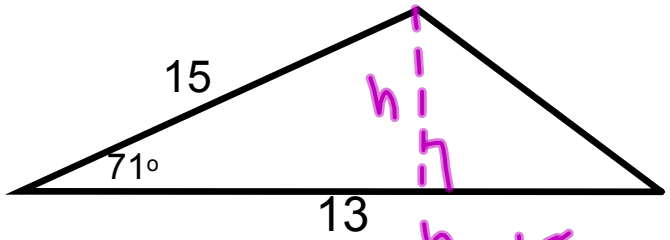
6.5 Area of Oblique Triangles

~~Essential Question:~~ How do I find the area of triangles without a known base or height?



$15 \cdot \sin 71° = \frac{h}{15} \cdot \cancel{15}$

$A = \frac{1}{2}bh$

$A = \frac{1}{2}(13)(15 \sin 71)$

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SAS $$A = \frac{1}{2}ab\sin C$$

↑ angle between 2 known sides

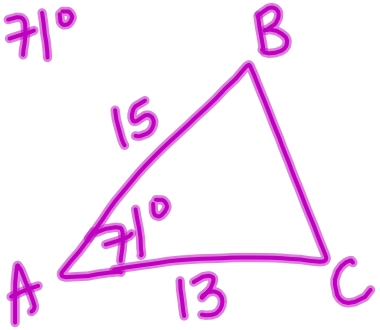
ex. Find the area of a triangle with the given parameters.

1< diff letters

m<A = 71°

c = 15

b=13



Area = $\frac{1}{2}(15)(13)\sin 71°$

$\boxed{92.19 \text{ units}^2}$

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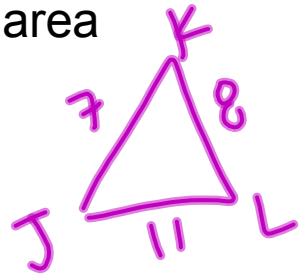
Heron's Formula $A = \sqrt{s(s-a)(s-b)(s-c)}$

SSS

$s \rightarrow$ semi-perimeter (half perimeter)

ex. Find the area

j = 8
k = 11
l = 7



$s = \frac{7+8+11}{2} = 13$

$A = \sqrt{13(13-11)(13-7)(13-8)}$

$\boxed{A = 27.93 \text{ units}^2}$

6.5 Area of Oblique Triangles

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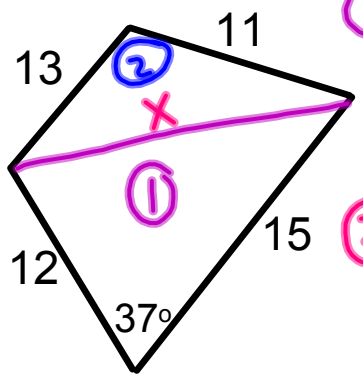
ex. Find the area of the quadrilateral.



① $A_1 = \frac{1}{2}(12)(15)\sin 37°$

$A_1 = 54.16 \text{ units}^2$

② $x^2 = 12^2 + 15^2 - 2(12)(15)\cos 37°$

$x = 9.03$

$s = \frac{13+11+9.03}{2} = 16.52$

$A_2 = \sqrt{16.52(16.52-13)(16.52-11)(16.52-9.03)}$

$A_2 = 48.71 \text{ units}^2$

$A_{TOTAL} = A_1 + A_2$

$\boxed{102.87 \text{ units}^2}$