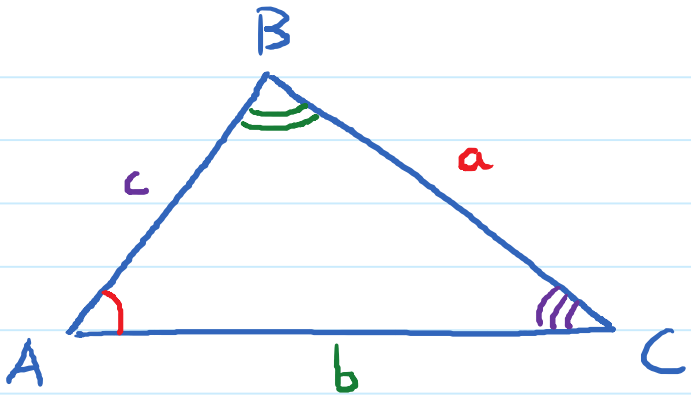
7.1. Law of Sines

Thursday, April 25, 2019 8:20 AM



Law of Sine:

$$\frac{a}{\sin(A)} = \frac{b}{\sin(B)} = \frac{c}{\sin(C)}$$

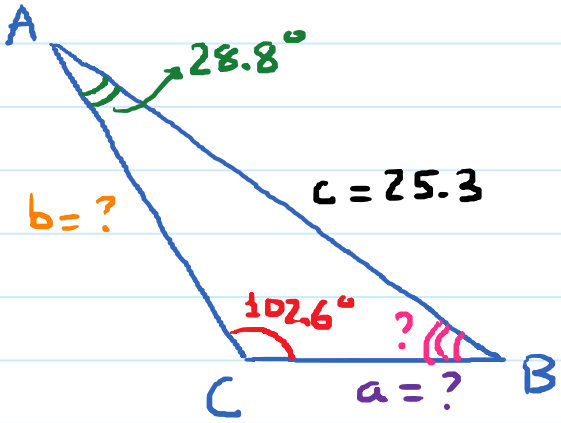
Variation:

$$\frac{\sin(A)}{a} = \frac{\sin(B)}{b} = \frac{\sin(C)}{c}$$

E.g. Solve a triangle given 1 side and 2 angles (SAA)

Solve triangle ABC if $\angle A = 28.8°$; $\angle C = 102.6°$

and $c = 25.3$.



$$\angle B = 180° - (28.8° + 102.6°)$$

$$\angle B = 48.6°$$

$$\frac{a}{\sin(A)} = \frac{c}{\sin(C)}$$

$$\rightarrow a = \frac{c}{\sin(C)} \cdot \sin(A) = \frac{25.3}{\sin(102.6°)} \cdot \sin(28.8°)$$

$\rightarrow \boxed{a \simeq 12.49}$

$$\frac{b}{\sin(B)} = \frac{c}{\sin(C)} \rightarrow b = \frac{c}{\sin(C)} \cdot \sin(B)$$

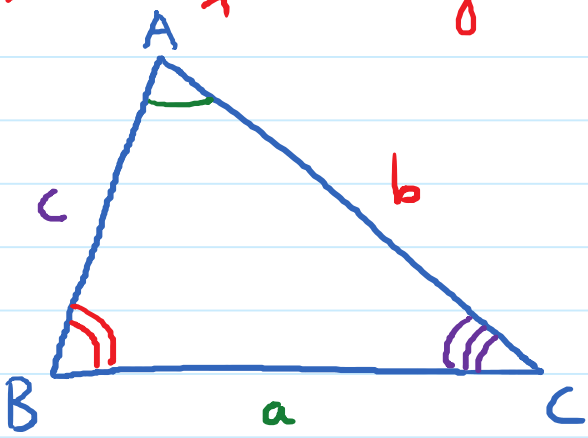
$$\rightarrow b = \frac{25.3}{\sin(102.6^\circ)} \cdot \sin(48.6^\circ) \simeq \boxed{19.45}$$

Ex. Solve triangle ABC given $\angle B = 38^\circ 40'$

$a = 19.7$; $\angle C = 91^\circ 40'$ (ASA)

(Solved on the board)

Area of a triangle



$$\text{Area} = \frac{1}{2} bc \cdot \sin(A)$$

$$= \frac{1}{2} ac \sin(B)$$

$$= \frac{1}{2} ab \sin(C)$$