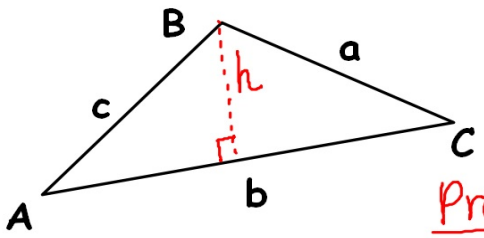
13-5 Law of Sines

Trig.

April 17

Law of Sines (for non-right triangles)



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

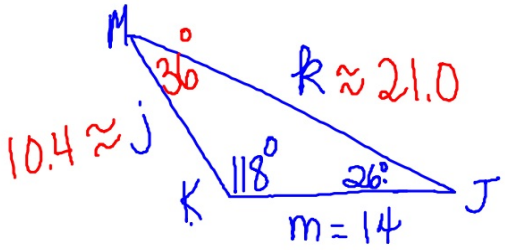
Proof:

$\sin A = \frac{h}{c}$ $\quad \sin C = \frac{h}{a}$

$c \sin A = h$ $\quad a \sin C = h$

$\frac{c \sin A}{ca} = \frac{a \sin C}{ca}$

ex. 1 Solve ΔJKM, if $\angle K = 118°$, $\angle J = 26°$, $m = 14$.



$\angle M = 36°$

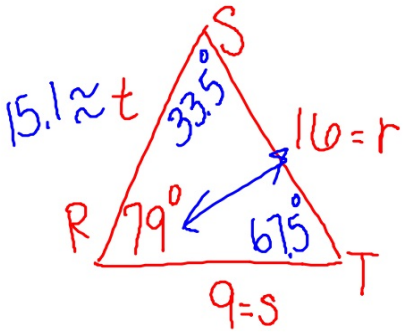
$$\frac{\sin 36°}{14} = \frac{\sin 26°}{j}$$

$$j = \frac{14 \sin 26°}{\sin 36°} \approx 10.4$$

$$\frac{\sin 36°}{14} = \frac{\sin 118°}{k}$$

$$k = \frac{14 \sin 118°}{\sin 36°} \approx 21.0$$

ex. 2 Solve ΔRST, if $\angle R = 79°$, $r = 16$, $s = 9$.



$$\frac{\sin 79^\circ}{16} = \frac{\sin S}{9}$$

$$\frac{9 \sin 79^\circ}{16} = \sin S$$

$$\sin^{-1}(\boxed{\text{ANS}}) \approx \angle S \approx 33.5^\circ$$

$$\angle T \approx 67.5^\circ$$

$$\frac{\sin 79^\circ}{16} = \frac{\sin 67.5^\circ}{t}$$

$$t = \frac{16 \sin 67.5^\circ}{\sin 79^\circ}$$

$$t \approx 15.1$$