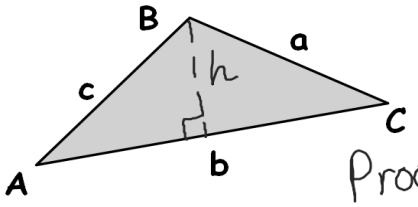
13-5 Law of Sines

Trig. 13.0

Law of Sines (for non-right triangles only)



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

Proof: $\sin A = \frac{h}{c}$, $\sin C = \frac{h}{a}$

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

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

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

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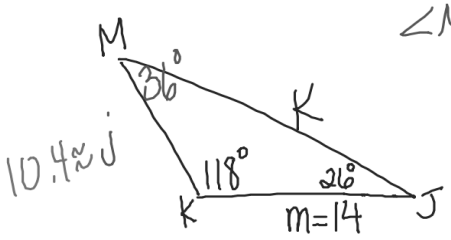
ex. 1 Solve ΔJKM, if $\angle K = 118°$, $\angle J = 26°$, $m = 14$.

$\angle M = 36°$



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

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

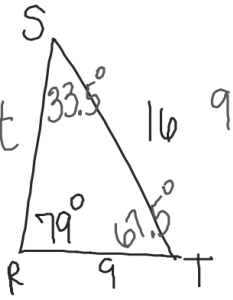
$K = \frac{14 \sin 118°}{\sin 36°}$

$K \approx 21.0$

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

$j \approx 10.4$

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



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

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

$$t \approx 15.1$$

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

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

$$\sin^{-1}(\text{dec}) = \angle S$$

ANS

$$\angle S \approx 33.5^\circ$$

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