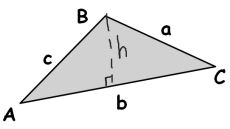
## 10-5 Law of Sines

May 19

**Law of Sines (for non-right triangles only)**




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

Proof:

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

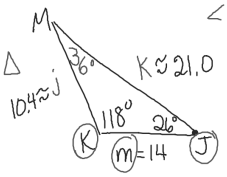
$a \sin A = h$, $h = a \sin C$

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

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

$\angle M = 36°$

ASA $\Delta$




$\frac{\sin M}{m} = \frac{\sin J}{j}$

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

$j \sin 36° = 14 \sin 26°$

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

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

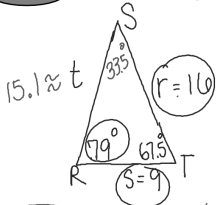
$K \sin 36° = \frac{14 \sin 118°}{\sin 36°}$

$K \approx 21.0$

May 20, 2014

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

SSA $\Delta$




$\frac{\sin 79°}{16} = \frac{\sin 67.5°}{t}$

$t = \frac{16 \sin 67.5°}{\sin 79°} \approx 15.1$

$9\left(\frac{\sin 79°}{16}\right) = \left(\frac{\sin S}{9}\right)9$

$\frac{9 \sin 79°}{16} = \sin S$

$\sin^{-1}\left(\frac{9 \sin 79°}{16}\right) = \angle S \approx 33.5°$ (ANS)

$\angle T \approx 67.5°$