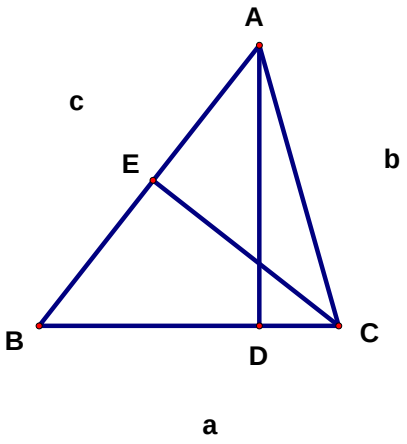
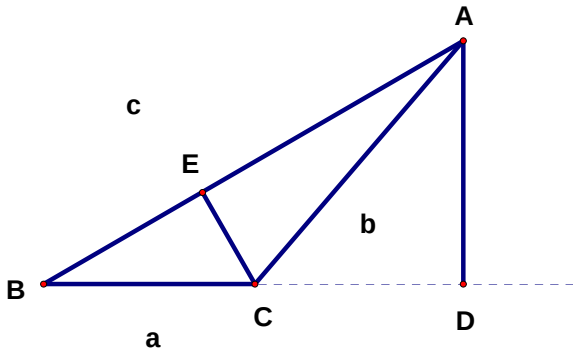
LAW OF SINES



$AB = c$
$AC = b$
$BC = a$
$AD = h$
$CE = h'$



$\sin B = \frac{h}{c} \qquad \sin C = \frac{h}{b}$

$\therefore h = c\sin B = b\sin C$ Divide by $\sin B \sin C$

$\frac{c\sin B}{\sin B\sin C} = \frac{b\sin C}{\sin B\sin C} \qquad \frac{c}{\sin C} = \frac{b}{\sin B}$

Similarly

$\sin B = \frac{h'}{a} \qquad \sin A = \frac{h'}{b}$

$\therefore h' = a\sin B = b\sin A$ Divide by $\sin A \sin B$

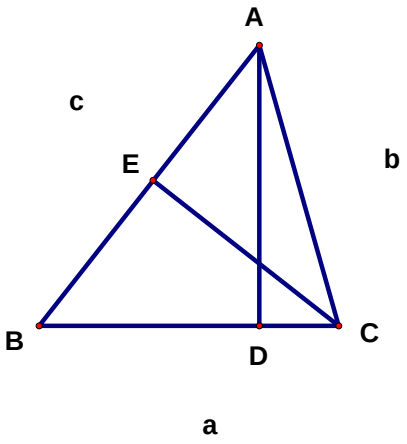
$\frac{a\sin B}{\sin A\sin B} = \frac{b\sin A}{\sin A\sin B} \qquad \frac{a}{\sin A} = \frac{b}{\sin B}$

So

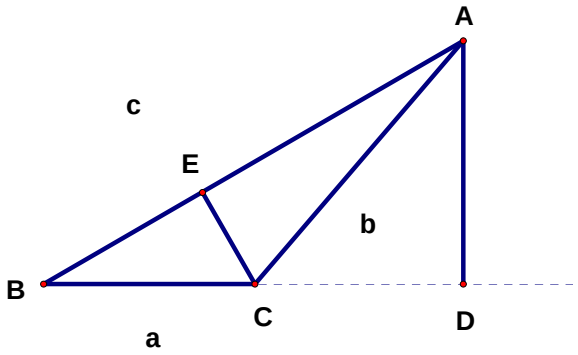
$$\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$$

USES: Given two angles and any side (ASA or AAS) or two sides and an unincluded angle (SSA) which produces the potentially ambiguous case.

LAW OF SINES



$AB = c$
$AC = b$
$BC = a$
$AD = h$
$CE = h'$



$\sin B = \frac{h}{c} \qquad \sin C = \frac{h}{b}$

$\therefore h = c\sin B = b\sin C$ Divide by bc

$\frac{c\sin B}{bc} = \frac{b\sin C}{bc} \qquad \frac{\sin C}{c} = \frac{\sin B}{b}$

Similarly

$\sin B = \frac{h'}{a} \qquad \sin A = \frac{h'}{b}$

$\therefore h' = a\sin B = b\sin A$ Divide by ab

$\frac{a\sin B}{ab} = \frac{b\sin A}{ab} \qquad \frac{\sin A}{a} = \frac{\sin B}{b}$

So

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

USES: Given two angles and any side (ASA or AAS) or two sides and an unincluded angle (SSA) which produces the potentially ambiguous case.