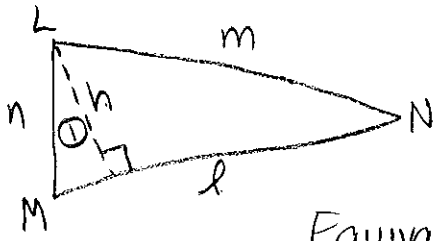
Foundations of Math 11

3.1

P. 117 #1-5

1. a)



① $\sin M = \frac{h}{n}$ ② $\sin N = \frac{h}{m}$

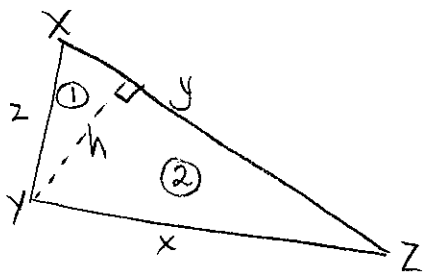
$n \sin M = h$ $m \sin N = h$

Equivalent ratios: $\frac{n \sin M}{\sin M} = \frac{m \sin N}{\sin M}$

$\frac{n}{\sin N} = \frac{m \sin N}{\sin M \sin N}$

$\frac{n}{\sin N} = \frac{m}{\sin M}$

b)



① $\sin X = \frac{h}{z}$ ② $\sin Z = \frac{h}{x}$

$z \sin X = h$ $x \sin Z = h$

equivalent ratios:

$\frac{z \sin X}{\sin X} = \frac{x \sin Z}{\sin X}$

$\frac{z}{\sin Z} = \frac{x \sin Z}{\sin X \sin Z}$

$\frac{z}{\sin Z} = \frac{x}{\sin X}$

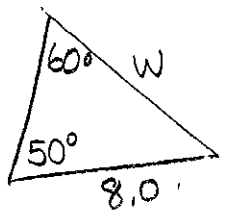
2. a) $\frac{w}{\sin 50°} = \frac{8.0}{\sin 60°}$

$\frac{w}{0.7660} = \frac{8.0}{0.8660}$

$w = \frac{8(0.7660)}{0.8660}$

$w = 7.076$

$w = 7.1$



In the sine law the angle and side in each ratio are across the triangle from each other.

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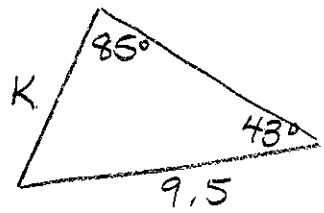
2. b) $\frac{k}{\sin 43^\circ} = \frac{9.5}{\sin 85^\circ}$

$\frac{k}{0.681998} = \frac{9.5}{0.99619}$

$k = \frac{9.5(0.681998)}{0.99619}$

$k = 6.5$



c) $\frac{6.0}{\sin M} = \frac{10.0}{\sin 72^\circ}$

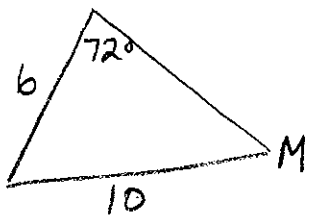
$6 \sin 72^\circ = 10 \sin M$

$\frac{6 \sin 72^\circ}{10} = \sin M$

$\frac{6(0.95106)}{10} = \sin M$

$0.57063 = \sin M$

$\angle M = 34.8^\circ$



use the $\sin^{-1}$ button to find the angle once you have the sine ratio

d) $\frac{12.5}{\sin Y} = \frac{14.0}{\sin 88^\circ}$

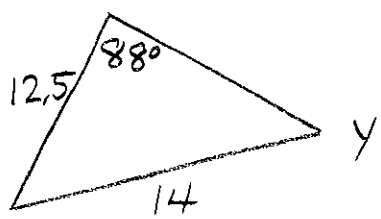
$12.5 \sin 88^\circ = 14 \sin Y$

$\frac{12.5 \sin 88^\circ}{14} = \sin Y$

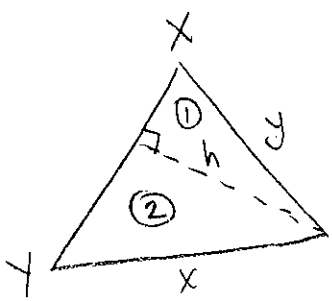
$\frac{12.5(0.99939)}{14} = \sin Y$

$0.892313 = \sin Y$

$\angle Y = 63.2^\circ$



3.



① $\sin X = \frac{h}{y}$

$y \sin X = h$

② $\sin Y = \frac{h}{x}$

$x \sin Y = h$

since both $y \sin X$ and $x \sin Y$ are equal to h, they must be equal to each other.

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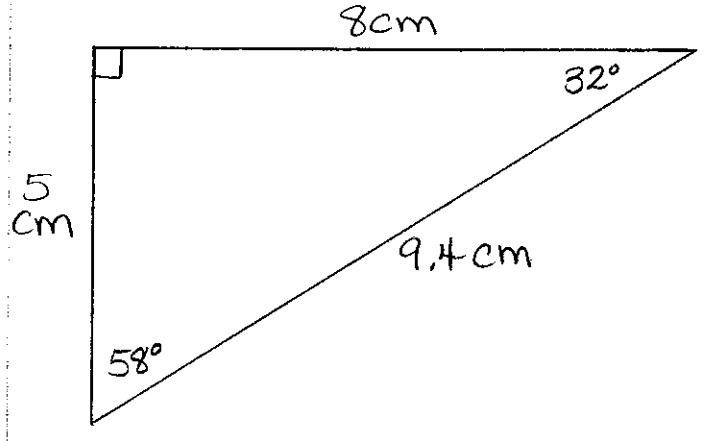
4. Using ratios to solve an acute triangle requires at least 3 pieces of information so that you can calculate the 4th. In those 3 given pieces of information you must know a side and an angle that are opposite each other in the triangle.

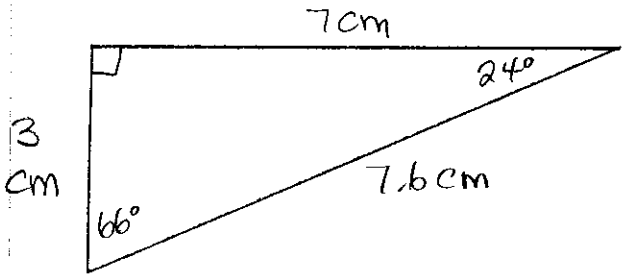
5.



$\frac{\sin 90°}{9.4} = \frac{1}{9.4} = 0.1064$

$\frac{\sin 32°}{5} = \frac{0.5299}{5} = 0.1060$

$\frac{\sin 58°}{8} = \frac{0.8480}{8} = 0.1060$



$\frac{\sin 90°}{7.6} = \frac{1}{7.6} = 0.1316$

$\frac{\sin 24°}{3} = \frac{0.4067}{3} = 0.1356$

$\frac{\sin 66°}{7} = \frac{0.9135}{7} = 0.1305$

The ratios are very close.