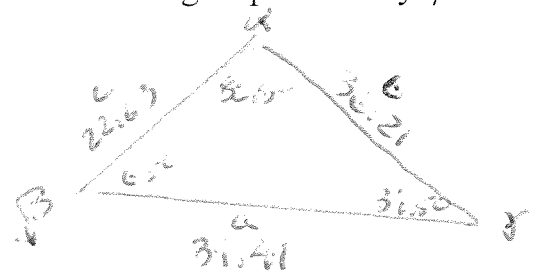
Name Mine Date

Math 112: #40 A/B/C/D

A) Solve the triangle specified by $\beta = 65°$, c = 22.63, b = 36.21.



b > c

opp. side adj. side

Therefore only 1 triangle

$\frac{\sin 65^\circ}{36.21} = \frac{\sin \gamma}{22.63}$

$\frac{22.63 \sin 65^\circ}{36.21} = \frac{36.21 \sin \gamma}{36.21}$

$\sin^{-1}\left(\frac{22.63 \sin 65^\circ}{36.21}\right) = \gamma = 34.50^\circ$

$\alpha = 180^\circ - 34.50^\circ - 65^\circ = 80.5^\circ$

$\frac{\sin 65^\circ}{36.21} = \frac{\sin 32.5^\circ}{a}$

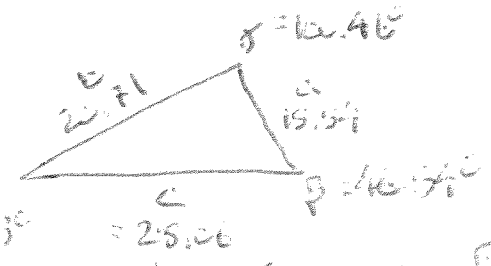
$\frac{a \sin 65^\circ}{\sin 65^\circ} = \frac{36.21 \sin 32.5^\circ}{\sin 65^\circ}$

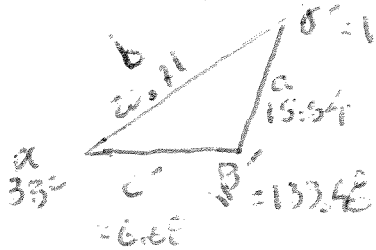
$a = 39.41$

B) Solve the triangle specified by $\alpha = 33°$, $b = 20.71$, $a = 15.54$.

$h = b \sin \alpha = 20.71 \sin 33^\circ = 11.28$

h < a < b therefore 2 triangles





$\frac{\sin 33^\circ}{15.54} = \frac{\sin \beta}{20.71}$

$\sin^{-1}\left(\frac{20.71 \sin 33^\circ}{15.54}\right) = \beta = 46.54^\circ$

$\gamma = 180^\circ - 33^\circ - 46.54^\circ = 100.46^\circ$

$\frac{\sin 33^\circ}{15.54} = \frac{\sin 100.46^\circ}{c}$

$c = \frac{15.54 \sin 100.46^\circ}{\sin 33^\circ} = 28.06$

$\beta' = 180^\circ - \beta = 133.46^\circ$

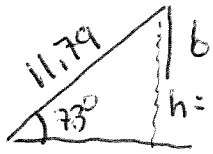
$\gamma' = 180^\circ - 133.46^\circ - 33^\circ = 13.54^\circ$

$\frac{\sin 33^\circ}{15.54} = \frac{\sin 13.54^\circ}{c'}$

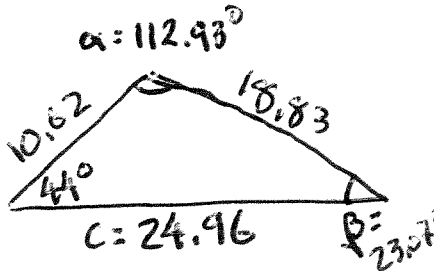
$c' = \frac{15.54 \sin 13.54^\circ}{\sin 33^\circ} = 6.65$

C) Solve the triangle specified by $\beta = 73°$, a = 11.79, b = 10.27.

$h = 11.79 \sin 73° = 11.27$ $\quad h > b$ No Triangles match this criteria



D) Solve the triangle specified by $\gamma = 44°$, b = 10.62, c = 18.83



$c > b$ so only 1 Δ

$$\frac{\sin 44°}{18.83} = \frac{\sin \beta}{10.62} \rightarrow \frac{10.62 \sin 44°}{18.83} = \frac{18.83 \sin \beta}{18.83}$$

$$\sin^{-1}\left(\frac{10.62 \sin 44°}{18.83}\right) = \beta = 23.07°$$

$\alpha = 180° - 23.07° - 44° = 112.93°$

$$\frac{\sin 44°}{18.83} = \frac{\sin 112.93°}{c} \qquad \frac{c \sin 44°}{\sin 44°} = \frac{\sin 112.93° \cdot 18.83}{\sin 44°}$$

$$c = \frac{\sin 112.93° \cdot 18.83}{\sin 44°} = 24.96$$