

Name _____ Score _____/10

Please Print Clearly

1. Solve the triangle in Figure 1.

Use the Law of Sine to determine β

$$\frac{\sin \beta}{9.95} = \frac{\sin(41.2^\circ)}{7.03}$$

$$\text{so that } \sin \beta = 9.95 \left(\frac{\sin(41.2^\circ)}{7.03} \right)$$

$$\text{and then } \beta = \sin^{-1} \circ \sin \beta =$$

$$\sin^{-1} \left[9.95 \left(\frac{\sin(41.2^\circ)}{7.03} \right) \right]$$

$$= 68.79^\circ \text{ in Quadrant I}$$

and in Quadrant II

$$\beta_2 = 180^\circ - 68.79^\circ = 111.21^\circ$$

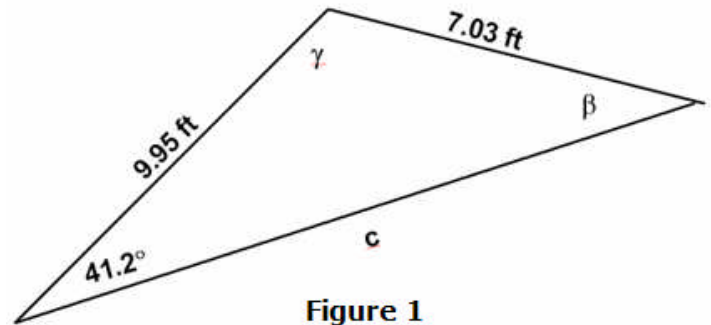
Because both $\beta + 41.2^\circ < 180^\circ$ and $\beta_2 + 41.2^\circ < 180^\circ$, there are two triangles

Figure 1
Not to Scale

Triangle I $\beta = 68.79^\circ$	Triangle I $\beta_2 = 111.21^\circ$
$\gamma = 180^\circ - 68.79^\circ - 41.2^\circ = 70.01^\circ$	$\gamma_2 = 180^\circ - 111.21^\circ - 41.2^\circ = 27.59^\circ$
Use the Law of Sines to calculate c Use the form $\frac{c}{\sin \gamma} = \frac{a}{\sin \alpha}$ or equivalently $c = a \frac{\sin \gamma}{\sin \alpha}$	Use the Law of Sines to calculate c Use the form $\frac{c}{\sin \gamma} = \frac{a}{\sin \alpha}$ or equivalently $c = a \frac{\sin \gamma}{\sin \alpha}$
$c = (7.03) \left(\frac{\sin(70.01^\circ)}{\sin(41.2^\circ)} \right) = 10.03$	$c_2 = (7.03) \left(\frac{\sin(27.59^\circ)}{\sin(41.2^\circ)} \right) = 4.94$
Or alternately Use the Law of Sines to calculate c Use the form $\frac{c}{\sin \gamma} = \frac{b}{\sin \beta}$ or equivalently $c = b \frac{\sin \gamma}{\sin \beta}$	Or alternately Use the Law of Sines to calculate c Use the form $\frac{c}{\sin \gamma} = \frac{b}{\sin \beta}$ or equivalently $c = b \frac{\sin \gamma}{\sin \beta}$
$c = (9.95) \left(\frac{\sin(70.01^\circ)}{\sin(68.79^\circ)} \right) = 10.03$	$c_2 = (9.95) \left(\frac{\sin(27.59^\circ)}{\sin(111.21^\circ)} \right) = 4.94$
Or alternately Use the Law of Cosines to calculate c $c = \sqrt{a^2 + b^2 - 2ab \cos \gamma}$	Or alternately Use the Law of Cosines to calculate c $c = \sqrt{a^2 + b^2 - 2ab \cos \gamma}$
$= \sqrt{(7.03)^2 + (9.95)^2 - (2)(7.03)(9.95) \cos(70.01)}$ $= 10.03$	$= \sqrt{(7.03)^2 + (9.95)^2 - (2)(7.03)(9.95) \cos(27.59)}$ $= 4.94$