Dawson College: Civil Technology: 201-912-DW 02

October 2, 2009

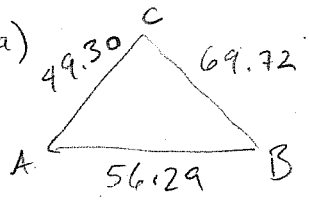
Name: SOLUTIONS

Student ID: _____

Quiz 4

Question 1. *(10 marks)* Solve the triangle with:
(a) sides $a = 69.72$, $b = 49.30$, $c = 56.29$
(b) sides $a = 5.240$, $b = 4.446$, and angle $\angle C = 48.13°$.

a)



$\therefore a^2 = b^2 + c^2 - 2bc\cos A$

$\Rightarrow \cos A = \dfrac{b^2 + c^2 - a^2}{2bc}$

$= \dfrac{(49.30)^2 + (56.29)^2 - (69.72)^2}{2(49.30)(56.29)}$

$= 0.13299998$

$\therefore A = \cos^{-1}(0.13299998) = \underline{82.36°}$

$\dfrac{a}{\sin A} = \dfrac{b}{\sin B}$

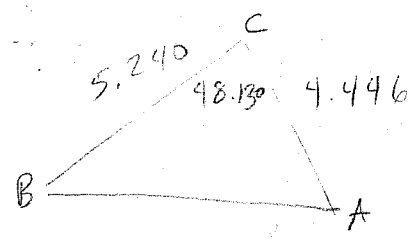
$\sin B = \dfrac{b\sin A}{a}$

$\therefore B = \sin^{-1}\left(\dfrac{49.30\sin 82.36}{69.72}\right)$

$= \underline{44.49°}$

$\therefore C = 180 - 82.36 - 44.49$

$= \underline{53.15°}$



$\therefore c^2 = a^2 + b^2 - 2ab\cos C$

$\Rightarrow c = \sqrt{(5.240)^2 + (4.446)^2 - 2(5.240)(4.446)\cdot\cos 48.13}$

$= \underline{4.016}$

$\dfrac{a}{\sin A} = \dfrac{c}{\sin C} \Rightarrow \sin A = \dfrac{a\sin C}{c}$

$\Rightarrow A = \sin^{-1}\left(\dfrac{a\sin C}{c}\right)$

$= \sin^{-1}\left(\dfrac{5.240\cdot\sin 48.13}{4.031}\right)$

$= \underline{76.32}$

$\therefore B = 180° - 76.32° - 48.13°$

$= \underline{55.55°}$

(OTHER POSSIBLE SOLUTION $\angle A = 103.68° \Rightarrow \angle B = 28.19°$
DOESN'T WORK SINCE $\angle B < \angle C$ BUT $b > c$)