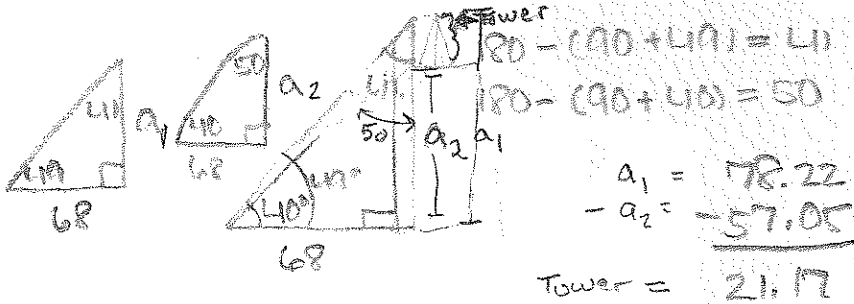


Math 143
Quiz 11 - Section 8.1

Show your work for full credit. Calculators allowed, but no notes.

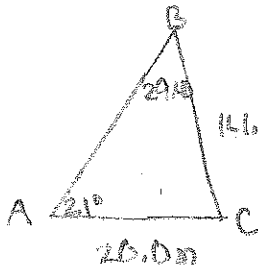
I. Solve

1. A surveyor standing 68 meters from the base of a building measures the angle to the top of the building and finds it to be 40° . The surveyor then measures the angle to the top of the radio tower on the building and finds that it is 49° . How tall is the radio tower? (3 pts)



$\frac{68}{\sin 41} = \frac{a_1}{\sin 50}$
 $\frac{68}{\sin 49} = \frac{a_2}{\sin 40}$
 $a_1 \sin 41 = 68 \sin 50$
 $a_1 = \frac{68 \sin 50}{\sin 41}$
 $a_1 = 78.22$
 $a_2 \sin 40 = 68 \sin 49$
 $a_2 = \frac{68 \sin 49}{\sin 40}$
 $a_2 = 57.05$
 $78.22 - 57.05 = 21.17$

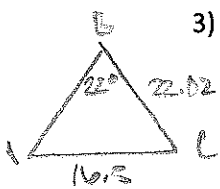
- 2) Find the area of the triangle having the following measurements: $A = 21^\circ$, $b = 20.0$ m, $c = 14.6$ m. Round to the nearest tenth of a square unit. (3 pts)



$A = \frac{1}{2} ab \sin C$
 $C = 180 - (21 + 29.40) = 129.6^\circ$
 $A = \frac{1}{2} (14.6)(20) \sin 129.6$
 112.419 m^2
 $\frac{14.6}{\sin 21} = \frac{20}{\sin B}$
 $14.6 \sin B = 20 \sin 21$
 $\frac{14.6 \sin B}{14.6} = \frac{7.17}{14.6}$
 $\sin^{-1}(\sin B) = (\sin^{-1} 0.49)$
 $29.40 = B$
 2. 112.419 m²

II. Multiple Choice. (2 pts/problem)

Two sides and an angle (SSA) of a triangle are given. Determine whether the given measurements produce one triangle, two triangles, or no triangle at all. Solve each triangle that results. Round lengths to the nearest tenth and angle measures to the nearest degree.



- 3) $B = 22^\circ$, $b = 16.5$, $a = 22.02$
- A) $A = 150^\circ$, $C = 8^\circ$, $c = 6.1$
 B) $A_1 = 30^\circ$, $C_1 = 128^\circ$, $c_1 = 34.7$;
 $A_2 = 150^\circ$, $C_2 = 8^\circ$, $c_2 = 6.1$
 C) $A = 30^\circ$, $C = 128^\circ$, $c = 34.7$
 D) no triangle

$180 - 30 = 150$
 $150 + 22 = 172$

$\frac{16.5}{\sin 22} = \frac{22.02}{\sin A}$
 $16.5 \sin A = 22.02 \sin 22$
 $\frac{16.5 \sin A}{16.5} = \frac{8.25}{16.5}$
 $\sin^{-1}(\sin A) = (\sin^{-1} 0.5)$
 $29.9 \approx 30$

3. B

- 4) $B = 75^\circ$, $b = 4$, $c = 5$
- A) $C = 37^\circ$, $A = 68^\circ$, $a = 11$
 B) $C = 39^\circ$, $A = 66^\circ$, $a = 13$
 C) $B = 38^\circ$, $A = 67^\circ$, $a = 9$
 D) no triangle

$\frac{4}{\sin 75} = \frac{5}{\sin C}$
 $\sin 75 \cdot 5 = 4 \cdot \sin C$
 $\frac{4.89}{4} = \frac{4 \cdot \sin C}{4}$
 $1.22 = \sin C$

4. D