***AAT (IC/HW)-Day 1**

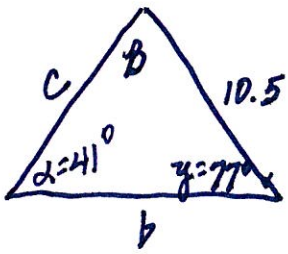
Chapter 8: 8-1 The Law of Sines

Name Key

Date: _____ Period: _____

Solve △ABC.

1. $\alpha = 41°$, $\gamma = 77°$, $a = 10.5$



$B = 180° - 41° - 77°$

$B = 62°$

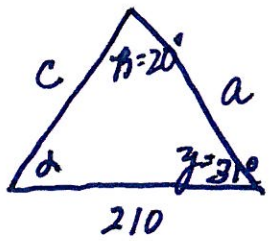
$\frac{\sin 41°}{10.5} = \frac{\sin 77°}{c}$

$C \approx 15.6$

$\frac{\sin 41°}{10.5} = \frac{\sin 62}{b}$

$b \approx 14.1$

2. $\beta = 20°$, $\gamma = 31°$, $b = 210$



$\alpha = 180° - 20° - 31° = 129°$

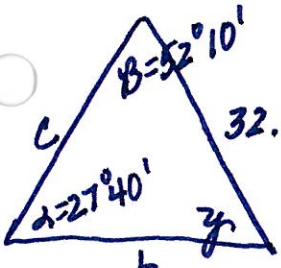
$\frac{\sin 20°}{210} = \frac{\sin 31°}{c}$

$C \approx 316.2$

$\frac{\sin 20°}{210°} = \frac{\sin 129°}{a}$

$a \approx 477.2$

3. $\alpha = 27°40'$, $\beta = 52°10'$, $a = 32.4$



$\gamma = 180° - 27°40' - 52°10'$

$\gamma = 100°10'$

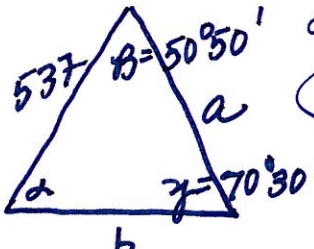
$\frac{\sin 27°40'}{32.4} = \frac{\sin 52°10'}{b}$

$b = 55.1$

$\frac{\sin 27°40'}{32.4} = \frac{\sin 100°10'}{c}$

$C \approx 68.7$

4. $\beta = 50°50'$, $\gamma = 70°30'$, $c = 537$



$\alpha = 180° - 50°50' - 70°30'$

$\alpha = 58°40'$

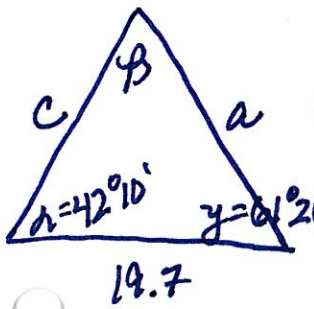
$\frac{\sin 70°30'}{537} = \frac{\sin 50°50'}{b}$

$b \approx 441.7$

$\frac{\sin 70°30'}{537} = \frac{\sin 58°40'}{a}$

$a \approx 486.6$

5. $\alpha = 42°10'$, $\gamma = 61°20'$, $b = 19.7$



$B = 180° - 42°10' - 61°20'$

$B = 76°30'$

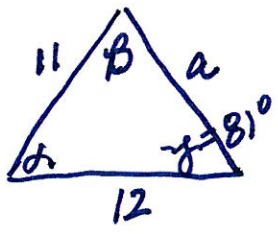
$\frac{\sin 76°30'}{19.7} = \frac{\sin 61°20'}{c}$

$C \approx 17.8$

$\frac{\sin 76°30'}{19.7} = \frac{\sin 42°10'}{a}$

$a \approx 13.6$

6. $\gamma = 81°$, $c = 11$, $b = 12$



$\frac{\sin 81}{11} = \frac{\sin B}{12}$

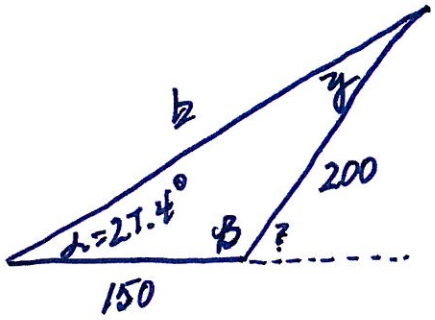
$B = \sin^{-1}\left(\frac{12 \sin 81°}{11}\right)$

$B = \sin^{-1}(1.0775)$

since not $[-1, 1]$

NO △ exists

7. A course for a skateboard race consists of a 200-meter downhill run and a 150-meter level portion. The angle of elevation of the starting point of the race from the finish line is 27.4°. What angle does the hill make with the horizontal?



$\frac{\sin y}{150} = \frac{\sin 27.4}{200}$

$y \approx 20.2°$

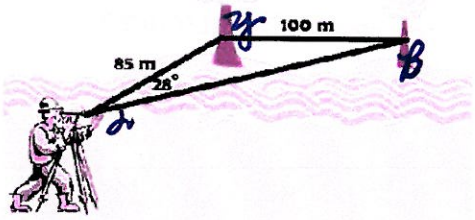
$B = 180° - 27.4° - 20.2°$

$B = 132.4°$

$? = 180° - 132.4°$

$= 47.6°$ *

8. A surveyor is trying to determine the distance from his current location to the smaller tree so that he can build a rope bridge for walking traffic. The angle from where he is at to the two trees that are 100 m apart is 28° and the distance across the river to the big tree from where he is 85 m. What is the distance from his location to the small tree (round to the nearest meter)?



$\frac{\sin 28}{100} = \frac{\sin B}{85}$

$m\angle B = 23.52°$

$y = 180° - 28° - 23.52°$

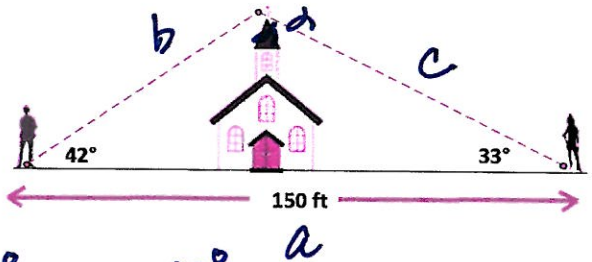
$y = 128.48°$

$\frac{\sin 28°}{100} = \frac{\sin 128.48°}{c}$

$c = 166.75$

$c \approx 167$ m. *

9. Two ft people are 150 apart and are on either sides of the church. Jeff sees the top of the steeple at 42° and Samantha sees it at 33°. How much closer is Jeff than Samantha to the steeple (round to the nearest foot)?



$\angle = 180° - 42° - 33° = 105°$

$\frac{\sin 105°}{150} = \frac{\sin 42°}{c}$

$c = 103.91$ ft

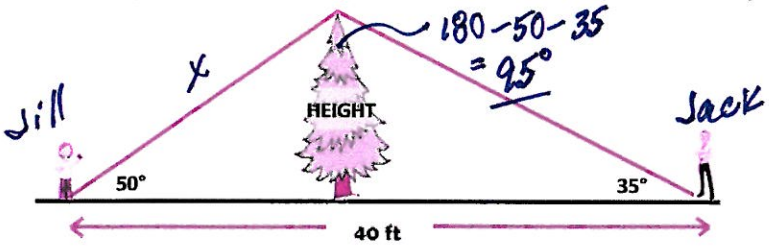
$\frac{\sin 105°}{150} = \frac{\sin 33°}{b}$

$b = 84.58$ ft.

$103.91 - 84.58 = 19.33$

≈ 19 ft. closer *

10. **Jack and Jill are tying decorative string from the top of the Christmas Tree to the ground. They will do this many times in many different colors creating a very unique celebration of color and pattern. What is the length of Jill's string based on the measurements provided? (round to the nearest foot)**

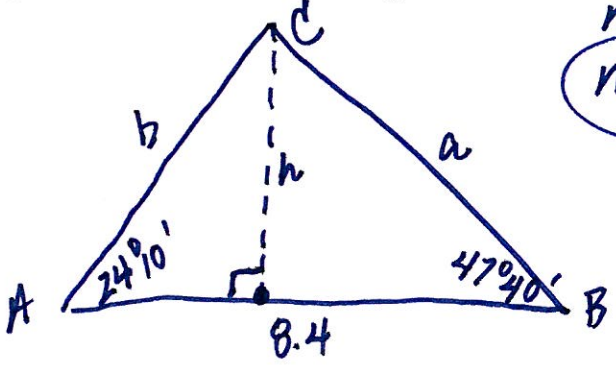


$$\frac{\sin 95^\circ}{40} = \frac{\sin 35^\circ}{x}$$

$x = 23.03$

$x = 23$ ft. *

11. The angles of elevation of a balloon from two points A and B on level ground are 24°10' and 47°40', respectively. Points A and B are 8.4 miles apart and the balloon is between the points. Approximate the height of the balloon above the ground.



$m\angle C = 180 - 24^\circ 10' - 47^\circ 40'$

$m\angle C = 108^\circ 10'$

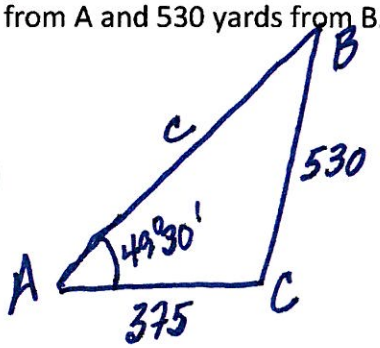
$$\frac{\sin 47^\circ 40'}{b} = \frac{\sin 108^\circ 10'}{8.4}$$

$b = 6.5$ mi

$$\sin 24^\circ 10' = \frac{h}{6.5}$$

$h \approx 2.7$ mi *

12. To determine the distance between two points A and B, a surveyor chooses a point C that is 375 yards from A and 530 yards from B. If $\angle BAC$ has a measure of 49°30', approximate the distance between A and B.



$$\frac{\sin B}{375} = \frac{\sin 49^\circ 30'}{530}$$

$m\angle B \approx 32^\circ 30'$

$m\angle C \approx 180^\circ - 49^\circ 30' - 32^\circ 30'$

$(m\angle C = 98^\circ)$

$$\frac{\sin 98}{c} = \frac{\sin 49^\circ 30'}{530}$$

$c \approx 690$ yards *