

Blue W.S.

Name

Key

Date

Block

Problems 1-8 represent a variety of problems involving both the law of sines and the law of cosines. Solve each triangle. If a problem does not have a solution, write "no solution."

1. $B = 104.5^\circ$, $a = 17.2$ cm, $c = 11.7$ cm

SAS

$$b^2 = a^2 + c^2 - 2ac \cos B$$

$$b^2 = 533.5$$

$$b = 23.1$$

$$\frac{\sin 104.5}{23.1} = \frac{\sin A}{17.2}$$

$$\sin A = .72$$

$$A = 46.1^\circ$$

$$C = 29.4$$

2. $A = 40.0^\circ$, $B = 45.0^\circ$, $c = 4$ cm

ASA

$$C = 95^\circ$$

$$\frac{\sin 45}{b} = \frac{\sin 95}{4} = \frac{\sin 40}{a}$$

$$b = 2.8$$

$$a = 2.58$$

3. $A = 57.2^\circ$, $C = 112.0^\circ$, $c = 24.8$ cm

AAS

$$B = 10.8^\circ$$

$$\frac{\sin 112}{24.8} = \frac{\sin 57.2}{a} = \frac{\sin 10.8}{b}$$

$$a = 22.5$$

$$b = 5$$

4. $B = 38.4^\circ$, $a = 11.5$ cm, $b = 14.0$ cm

SSA

* Ambig

$$\frac{\sin 38.4}{14} = \frac{\sin A}{11.5} = \frac{\sin 110.92}{c}$$

$$\sin A = .51$$

$$A = 30.68^\circ$$

$$C = 110.92^\circ$$

$$c = 21.1$$

or

$$149.6$$

cant work

5. $a = 32.9 \text{ cm}, b = 42.4 \text{ cm}, c = 20.4 \text{ cm}$

SSS

*

$$c^2 = a^2 + b^2 - 2ab(\cos B)$$

$$42.4^2 = 32.9^2 + 20.4^2 - 2(32.9)(20.4)(\cos B)$$

$$\cos B = -0.22$$

$$B = 102.9^\circ$$

$$\frac{\sin A}{32.9} = \frac{\sin 102.8}{42.4} = \frac{\sin C}{20.4}$$

$$A = 49.1^\circ$$

$$C = 28.1^\circ$$

$$\sin A = 0.76$$

* see attached sheet

6. $C = 58.4^\circ, b = 72.3 \text{ cm}, c = 6.54 \text{ cm}$

SSA

$$\frac{\sin 58.4}{6.54} = \frac{\sin B}{72.3}$$

$$\sin B = 0.94$$

impossible

7. $B = 39.8^\circ, a = 12.5 \text{ cm}, b = 7.31 \text{ cm}$

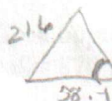
SSA

$$\frac{\sin 39.8}{7.31} = \frac{\sin A}{12.5}$$

* Ambiguous case

$$\sin A = 1.09$$

8. $B = 13.6^\circ, b = 21.6 \text{ cm}, c = 58.4 \text{ cm}$



SSA

$$\frac{\sin 13.6}{21.6} = \frac{\sin C}{58.4} = \frac{\sin A}{a}$$

$$\sin C = 0.636$$

* Ambiguous case

$$C = 39.5^\circ \text{ or } 140.5^\circ$$

$$A = 126.9^\circ \text{ or } 25.9^\circ$$

$$a = 73.5 \text{ or } 40.1$$

9.

$$A = 40^\circ, B = 40^\circ, c = 2$$

ASA

$$C = 100^\circ$$

$$\frac{\sin 100}{2} = \frac{\sin 40}{a} = \frac{\sin 40}{b}$$

$$a = b = 1.3$$

10.

Determine the largest angle's measure in $\triangle PNH$ if $p = 5.8$, $n = 37.7$, and $h = 41.3$.

$$p^2 = n^2 + h^2 - 2nh(\cos P)$$

$$33.64 = 3126.98 - 3114.02(\cos P)$$

$$-3093.34 = -3114.02 \cos P$$

$$.99336 = \cos P$$

$$P = 6.6$$

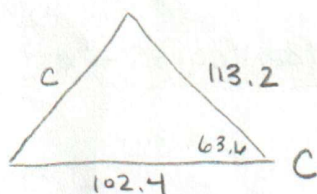
$$n^2 = p^2 + h^2 - 2ph \cos N$$

$$N = 48.4$$

$$H = 125^\circ$$

11.

A triangular field is 102.4 yards on one side and 113.2 yards on another. The measure of the angle between them is 63.6° . Determine the length of the third side.

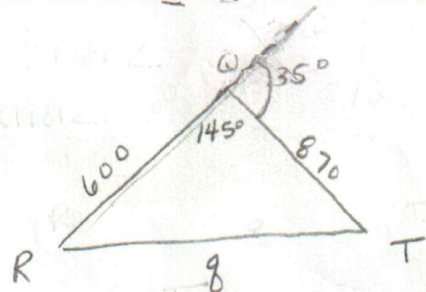


$$c^2 = 113.2^2 + 102.4^2 - 2(113.2)(102.4)\cos 63.6$$

$$c = 113.98 \text{ yd}$$

12.

To approximate the distance from two points R and T on opposite sides of a small lake, a person walks 600 feet from R to Q and then turns 35° and walks 870 feet to T. Find RT.



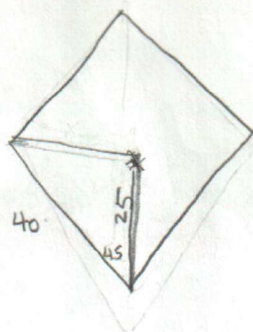
$$g^2 = 600^2 + 870^2 - 2(600)(870)\cos 145^\circ$$

$$g = 1404.3 \text{ ft}$$

13. In T-Ball, the field is a square diamond with each side measuring 40 feet. The "pitcher's mound" is positioned 25 feet from home base. Determine the distance from the pitcher's mound to third base.

$$x^2 = 40^2 + 25^2 - 2(40)(25)\cos 45^\circ$$

$$x = 28.47$$

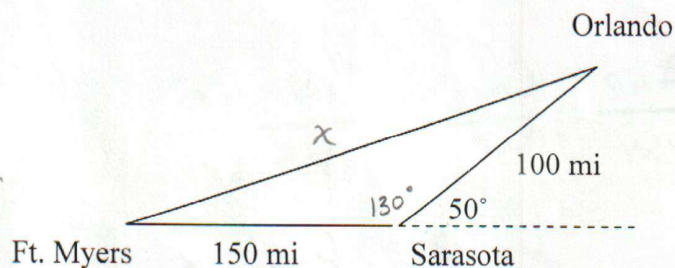


14. An airplane flies from Ft. Myers to Sarasota, a distance of 150 miles and then turns through an angle of 50° and flies to Orlando, a distance of 100 miles. How far is it from Ft. Myers to Orlando if you took a direct flight?

SAS

$$x^2 = 150^2 + 100^2 - 2(100)(150)\cos 130^\circ$$

$$x = 227.56 \text{ mi}$$



#5)

$$32.9^2 = 42.4^2 + 20.4^2 - 2(42.4)(20.4) \cos A$$

$$\cos A = .65$$

$$A = 49^\circ$$

$$B = 77^\circ \text{ or } 102.9^\circ$$

$$C = 54^\circ \text{ or } 28.1^\circ$$

$$\frac{\sin 49^\circ}{32.9} = \frac{\sin B}{42.4} = \frac{\sin C}{20.4}$$

$$\rightarrow \sin B = .47$$

$$B =$$

 angles
do not
match sides

$$20.4^2 = 32.9^2 + 42.4^2 - 2(32.9)(42.4) \cos C$$

$$\cos C = .88$$

$$C = 28^\circ$$

$$A = 49^\circ \text{ or } 130^\circ$$

$$B = 103^\circ \text{ or } 22^\circ$$

$$\frac{\sin 28^\circ}{20.4} = \frac{\sin A}{32.9} = \frac{\sin B}{42.4}$$

$$\rightarrow \sin A = .76$$

↑
sides
do not
match

