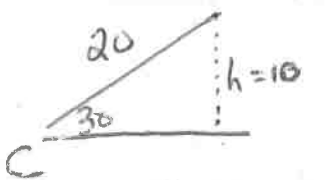


3.03 Ambiguous Case Worksheet

Date: \_\_\_\_\_

Determine the number of possible solutions. If a solution exists, solve the triangle(s).

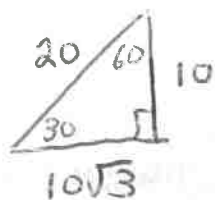
1.  $C = 30^\circ, b = 20, c = 10$



$$\sin 30 = \frac{h}{20}$$

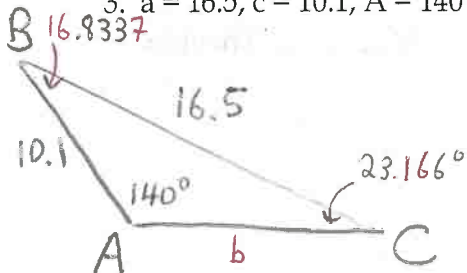
$$h = 20 \sin 30 = 10$$

**1 Right triangle**



**1 triangle**

3.  $a = 16.5, c = 10.1, A = 140^\circ$



$$\frac{10.1}{\sin C} = \frac{16.5}{\sin 140}$$

$$\sin C = \frac{10.1 \sin 140}{16.5}$$

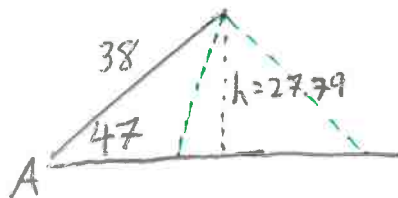
$$\sin C = 0.3934$$

$$C = \sin^{-1}(0.3934)$$

$$C = 23.166^\circ$$

**2 triangles**

2.  $a = 32, b = 38, A = 47^\circ$



$$\sin 47 = \frac{h}{38}$$

$$h = 38 \sin 47$$

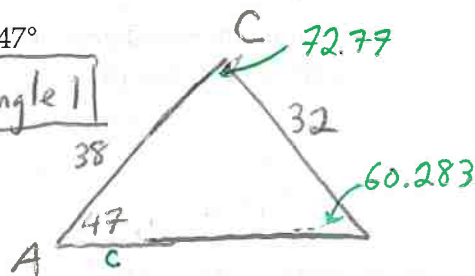
$$h = 27.79$$

$$\frac{c}{\sin 72.77} = \frac{32}{\sin 47}$$

$$c = \frac{32 \sin 72.77}{\sin 47}$$

$$c = 41.791$$

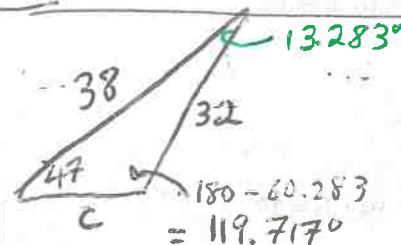
**Triangle 1**



$$\frac{38}{\sin B} = \frac{32}{\sin 47} \rightarrow 32 \sin B = 38 \sin 47$$

$$\sin B = \frac{38 \sin 47}{32} \quad \sin B = 0.868$$

$$B = 60.283^\circ$$

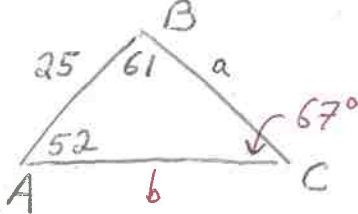


**Triangle 2**

$$\frac{c}{\sin 13.283} = \frac{32}{\sin 47} \rightarrow c = \frac{32 \sin 13.283}{\sin 47}$$

$$c = 10.053$$

4.  $A = 52^\circ, B = 61^\circ, c = 25$



**1 triangle**

$$\frac{b}{\sin 61} = \frac{25}{\sin 52}$$

$$b = \frac{25 \sin 61}{\sin 52}$$

$$b = 23.754$$

$$\frac{a}{\sin 52} = \frac{25}{\sin 67}$$

$$a = \frac{25 \sin 52}{\sin 67}$$

$$a = 21.402$$

$$\frac{b}{\sin 61} = \frac{25}{\sin 67}$$

$$b = \frac{25 \sin 61}{\sin 67}$$

$$b = 23.754$$

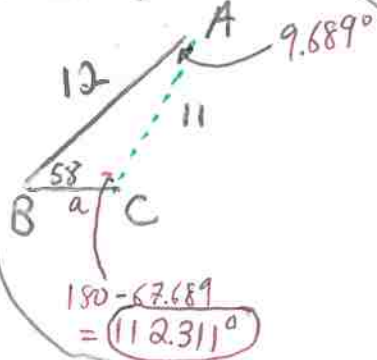
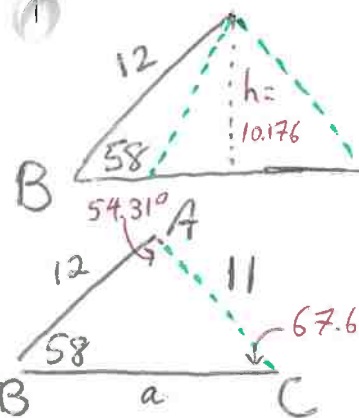
2 triangles

5.  $B = 58^\circ, b = 11, c = 12$

$$\sin 58 = \frac{h}{12}$$

$$h = 12 \sin 58$$

$$h = 10.176$$



$$\frac{12}{\sin C} = \frac{11}{\sin 58}$$

$$\sin C = \frac{(\sin 58 \times 12)}{11}$$

$$\sin C = 0.925$$

$$C = 67.689^\circ$$

$$\frac{a}{\sin 54.31} = \frac{11}{\sin 58}$$

$$a = \frac{11 \sin 54.31}{\sin 58}$$

$$a = 10.535$$

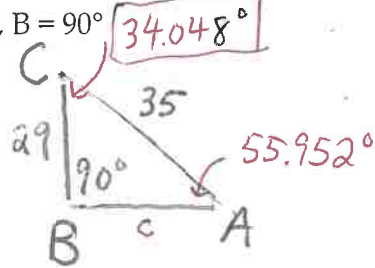
$$\frac{a}{\sin 9.689} = \frac{11}{\sin 58}$$

$$a = \frac{11 \sin 9.689}{\sin 58}$$

$$a = 2.183$$

11

6.  $a = 29, b = 35, B = 90^\circ$



$$\frac{29}{\sin A} = \frac{35}{\sin 90}$$

$$\sin A = \frac{29 \sin 90}{35} = \frac{29}{35}$$

$$A = \sin^{-1}\left(\frac{29}{35}\right) = 55.952^\circ$$

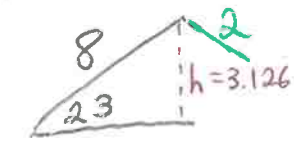
$$c^2 + 29^2 = 35^2$$

$$c^2 = 384$$

$$c = 8\sqrt{6} \approx 19.596$$

Explain why the set of measurements given in #7 & #8 do not create any triangles.

7.  $C = 23^\circ, a = 8, c = 2$

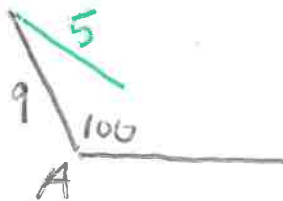


$c = 2$  is too short since  $h = 3.126$

$$\sin 23 = \frac{h}{8} \quad | \quad h = 8 \sin 23$$

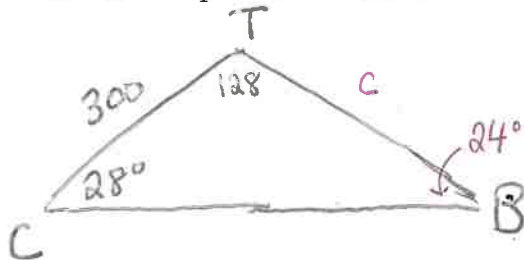
$$h = 3.126$$

8.  $a = 5, b = 9, A = 100^\circ$



With an obtuse triangle, the opposite side need to be longer than the side helping to create obtuse angle.

9. Charlie is standing near a river and wants to calculate the distance across the river. He measures the angle made between his line of sight to a tree on the edge of his side of the river (further downriver from where he is) and to a boat ramp directly on the other side of the river to be  $28^\circ$ . The distance between him and the tree can be measured and is 300 feet. The angle formed by him, the tree, and the boat ramp is  $128^\circ$ . What is the distance across the river from the tree to the boat ramp?



$$\frac{c}{\sin 28} = \frac{300}{\sin 24}$$

$$c = \frac{300 \sin 28}{\sin 24}$$

$$c = 346.272 \text{ feet}$$