

Accelerated Precalculus  
 Quiz Review: Laws of Sines & Cosines  
 Quiz Review WS #1

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

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

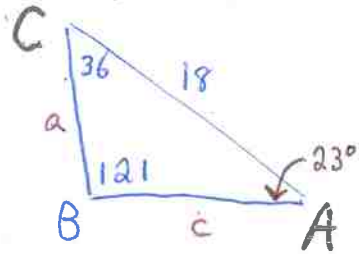
$$c^2 = a^2 + b^2 - 2ab \cos C$$

Key

For #1 - 3, solve each triangle using the given information. Put your solutions for the 1<sup>st</sup> triangle in the **top row** and for the 2<sup>nd</sup> triangle (if there is one) use the **bottom row**.

1.  $\angle C = 36^\circ$ ,  $\angle B = 121^\circ$ ,  $b = 18$

1 triangle AAS



$$\frac{c}{\sin 36} = \frac{18}{\sin 121}$$

$$c = \frac{18 \sin 36}{\sin 121}$$

$$c = 12.343$$

$$\frac{a}{\sin 23} = \frac{18}{\sin 121}$$

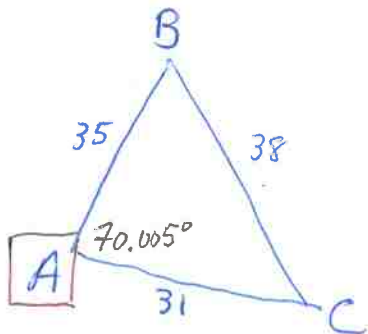
$$a = \frac{18 \sin 23}{\sin 121}$$

$$a = 8.205$$

$A_1 = 23^\circ$	$a_1 = 8.205$
$c_1 = 12.343$	
$A_2 =$	$a_2 =$
$c_2 =$	

SSS, Law of Cosine first.

2.  $a = 38$ ,  $b = 31$ ,  $c = 35$  \*start with largest angle **A**  
 \*1 triangle



$$\frac{\sin B}{31} = \frac{\sin 70.005}{38}$$

$$\sin B = \frac{31 \sin 70.005}{38}$$

$$B = \sin^{-1}(0.7666)$$

$$B = 50.051^\circ$$

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

$$38^2 = 31^2 + 35^2 - (2 \cdot 31 \cdot 35 \cos A)$$

$$-742 = -2170 \cos A$$

$$0.3419 = \cos A$$

$$A = \cos^{-1}(0.3419)$$

$$A = 70.005^\circ$$

$$\angle C = 180 - 70.005 - 50.051$$

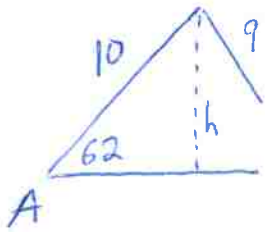
$$\angle C = 59.944^\circ$$

$A_1 = 70.005^\circ$	$B_1 = 50.051^\circ$
$C_1 = 59.944^\circ$	
$A_2 =$	$B_2 =$
$C_2 =$	

3.  $\angle A = 62^\circ, b = 10, a = 9$

\* SSA, check for ambiguous case.

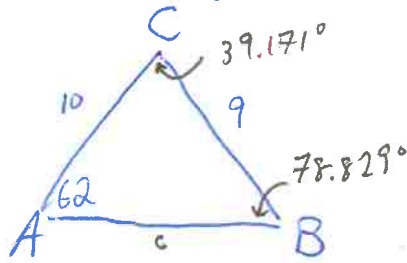
\* 2 triangles since  $h = 8.829 < 9 < 10$



$$\sin 62 = \frac{h}{10}$$

$$h = 10 \sin 62$$

$$h = 8.829$$



$$\frac{\sin B}{10} = \frac{\sin 62}{9}$$

$$\sin B = \frac{10 \sin 62}{9}$$

$$B = \sin^{-1}(0.981)$$

$$B = 78.829^\circ$$

$$B_1 = 78.829 \quad C_1 = 39.171^\circ$$

$$C_1 = 6.438$$

$$B_2 = 101.171^\circ \quad C_2 = 16.829^\circ$$

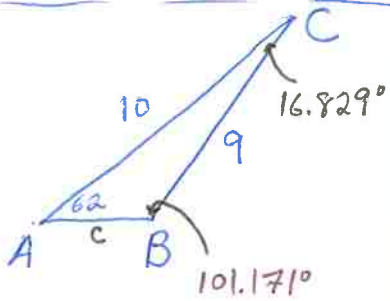
$$C_2 = 2.951$$

$$\angle C = 180 - 62 - 78.829 = 39.171^\circ$$

$$\frac{c}{\sin 39.171} = \frac{9}{\sin 62}$$

$$c = \frac{9 \sin 39.171}{\sin 62}$$

$$c = 6.438$$



$$\angle C = 180 - 62 - 101.171$$

$$\angle C = 16.829^\circ$$

$$\frac{c}{\sin 16.829} = \frac{9}{\sin 62}$$

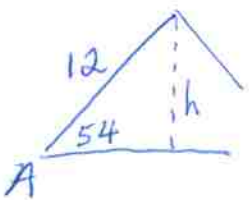
$$c = \frac{9 \sin 16.829}{\sin 62}$$

$$c = 2.951$$

$$\angle B = 180 - 78.829 = 101.171$$

4. List different values of  $a$  that will produce the given number of triangles if  $A = 54^\circ$  and  $b = 12$ .

Zero Triangles	One Triangle	Two Triangles
$a = 8$ (less than $h = 9.708$ )	$a = 13$ $a = 9.708$ ( $a = h$ , right angle) or $a > 12$	$a = 10$ $9.708 < a < 12$



$$\sin 54 = \frac{h}{12}$$

$$h = 12 \sin 54$$

$$h = 9.708$$