

# Ambiguous Case - Law of Sines (SSA)

Could have 1 triangle, 2 triangles, or no  $\Delta$ s

\* Solving for an angle using Law of Sines.

Ex.  $A = 30^\circ$ ,  $a = 7$ ,  $c = 16$

$$\frac{\sin 30^\circ}{7} \rightarrow \frac{\sin C}{16}$$

$$16 \sin 30^\circ = 7 \sin C$$

$$\sin C = \frac{16 \sin 30^\circ}{7}$$

$$\sin C = 1.1428$$

$$C = \sin^{-1}(1.1428) \text{ ERROR!}$$

No Triangle

Ex.  $A = 30^\circ$ ,  $a = 10$ ,  $c = 16$

$$\frac{\sin 30}{10} = \frac{\sin C}{16}$$

2  $\Delta$ s!

$$10 \sin C = 16 \sin 30$$

$$\sin C = .8$$

$$C = 53.13^\circ$$

$$B = 96.87^\circ$$

$$180 - (30 + 53.13)$$

$$\frac{\sin 30}{10} = \frac{\sin 96.87}{b}$$

$$b = 19.86$$

$$180 - 53.13 =$$

$$C = 126.87^\circ$$

$$B = 180 - (126.87 + 30)$$

$$B = 23.13^\circ$$

$$\frac{\sin 30}{10} = \frac{\sin 23.13}{b}$$

$$b = 7.86$$

Check w/ given angle  $30^\circ$  + still  $< 180$

Ex.  $A = 30^\circ$ ,  $a = 20$ ,  $c = 16$  One  $\Delta$ ! 2  $\Delta$ s?

$$\frac{\sin 30}{20} = \frac{\sin C}{16}$$

$$C = 23.58^\circ$$

$$B = 180 - (23.58 + 30)$$

$$B = 126.42$$

$$b = 32.19$$

$$180 - 23.58$$

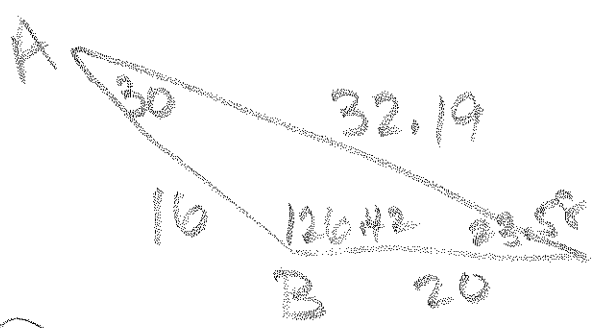
$$= 156.42^\circ$$

$$30 + 156 = 186$$

Too BIG!!

Not 2  $\Delta$ s

$$\frac{\sin 30}{20} = \frac{\sin 126.42}{b}$$



$a = 7$   $b = 15$   $A = 26$  Find # of triangles

$$\frac{\sin 26}{7} = \frac{\sin B}{15}$$

$$B = 69.95^\circ$$

$$* 180 - 69.95$$

$$B = 110.05^\circ$$

2  $\Delta$ 's!

$a = 6$   $b = 24$   $B = 38^\circ$

$$\frac{\sin A}{6} = \frac{\sin 38}{24}$$

$$A = 8.85^\circ$$

One  $\Delta$ !

$$180 - 8.85 = 171.15^\circ$$

~~$+ 38$~~   
more than 180