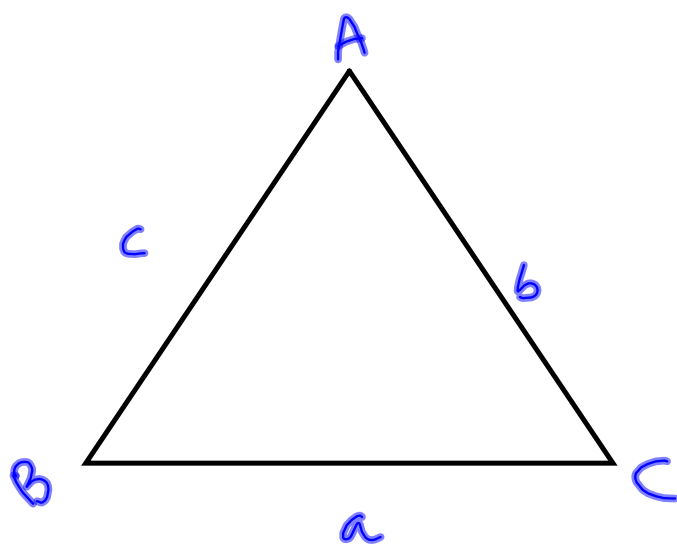


8.1 and 8.2

Law of sine and cosine

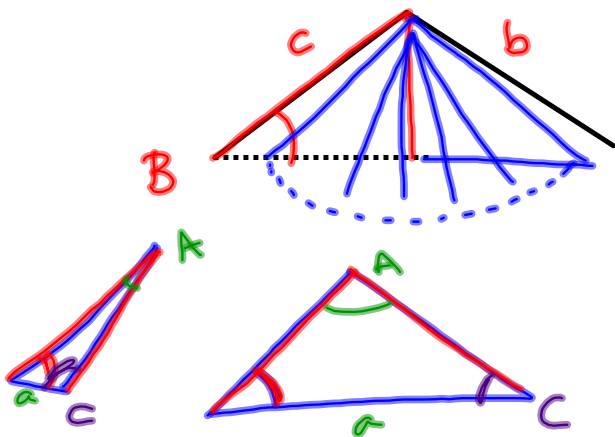


## Law of sines

$$\frac{\sin A}{a} = \frac{\sin B}{b} = \frac{\sin C}{c}$$

Only use when you have:  
ASA, AAS, or SSA

SSA:



Ambiguous case  
 $\sin^{-1}$

b

too short =  $\emptyset \Delta$ ,  $\sin^{-1}(1.6)$

just right =  $1 \Delta$ , 2nd  $\angle$  is too big

too long =  $2 \Delta$ , 2nd  $\angle$  isn't too big

Solve the triangle:

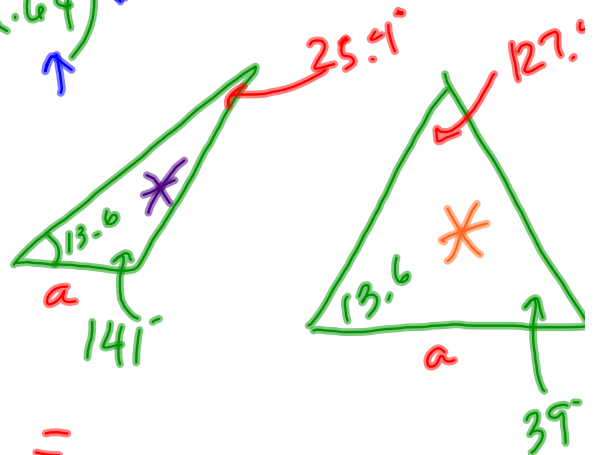
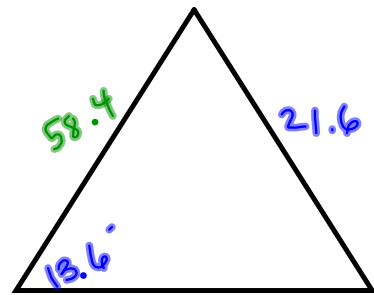
$B = 13.6^\circ$ ,  $b = 21.6\text{cm}$ ,  $c = 58.4\text{cm}$

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

$$\sin C = .64$$

$$C = \sin^{-1}(.64)$$

$A = 127.4^\circ$  or  $25.4^\circ$   
 $B = 13.6^\circ$  or  $13.6^\circ$   
 $C = 39^\circ$  or  $141^\circ$   
 $a = 73$  or  $39$   
 $b = 21.6$   
 $c = 58.4$



$$\textcircled{1} \frac{\sin 13.6}{21.6} = \frac{\sin 127.4}{a} =$$

$$\textcircled{2} \frac{\sin 13.6}{21.6} = \frac{\sin 25.4}{a} =$$

## Law of cosines

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

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

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

watch your C's and c's!

Use when you have:

SAS or SSS\*

Solve the triangle:

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

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

$$32^2 = 42^2 + 20^2 - 2(42)(20) \cos A$$

$$-1140 = -1680 \cos A$$

$$.68 = \cos A$$

$$A = 47^\circ$$

$$C = 56^\circ$$

$$\frac{\sin 47^\circ}{32} = \frac{\sin B}{42} = \frac{\sin C}{20}$$

Law of Sine:

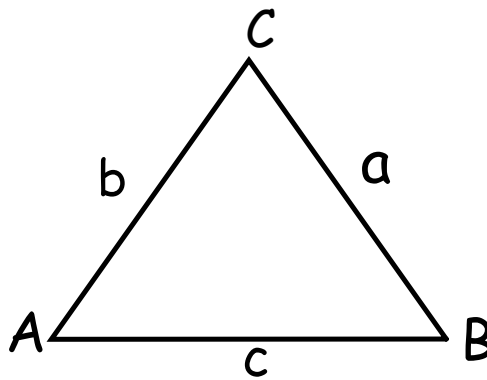
-ASA, AAS, SSA

Law of Cosine:

-SSS, SAS



Area of an Oblique Triangle:



$$K = \frac{1}{2} ab \sin C$$

$$K = \frac{1}{2} ac \sin B$$

$$K = \frac{1}{2} bc \sin A$$

