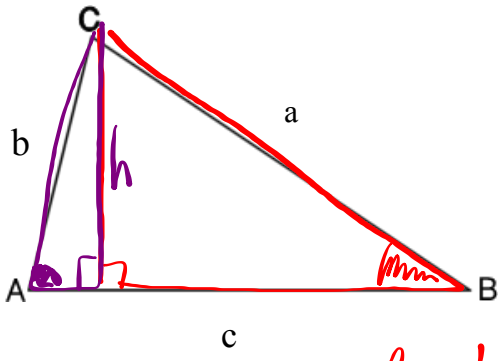
Law of Sines

** **Used when the triangle does not contain a 90° angle** (Oblique Triangle)
** In order to use you must be given 1) an angle and an opposite side
AND
2) any other side or angle
Lower case letters "a,b,c" represent side lengths
Upper case letters "A,B,C" represent angle measures

Let's derive the Law of Sines...



$\sin A = \frac{h}{b}$

$b\sin A = h$

$\sin B = \frac{h}{a}$

$a\sin B = h$

$b\sin A = a\sin B$

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

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

Law of Sines

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

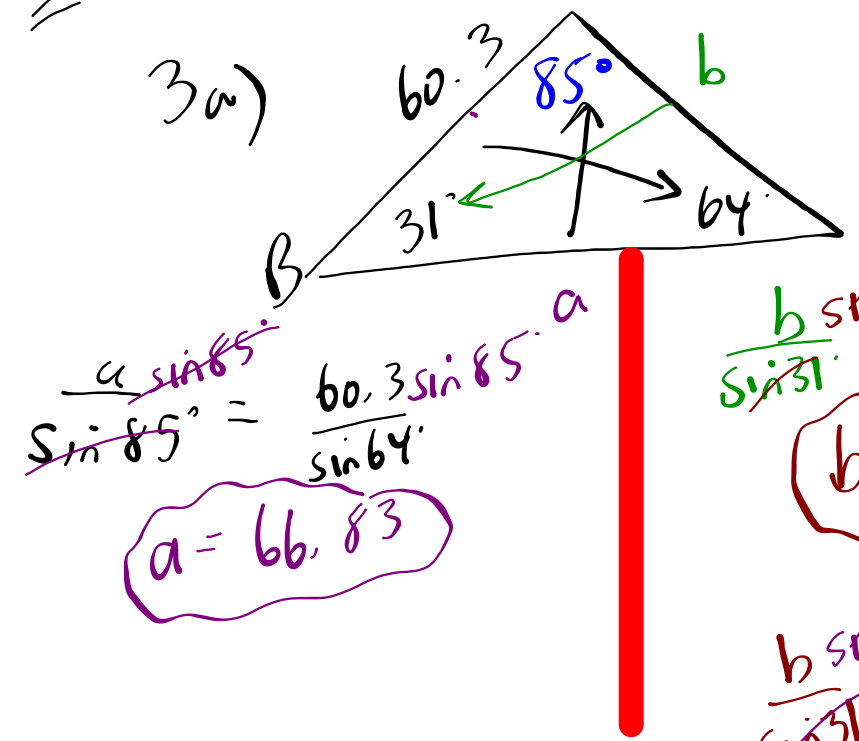
"when looking for a side"

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

"when looking for an angle"

HW: 10.9

3a)



$\angle A = 85°$

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

$\frac{a \sin 85°}{\sin 85°} = \frac{60.3 \sin 85°}{\sin 64°}$

$a = 66.83$

$\frac{b \sin 31°}{\sin 31°} = \frac{60.3 \sin 31°}{\sin 64°}$

$b = 34.55$

OR

$\frac{b \sin 31}{\sin 31} = \frac{66.83 \sin 31}{\sin 85}$

$b =$

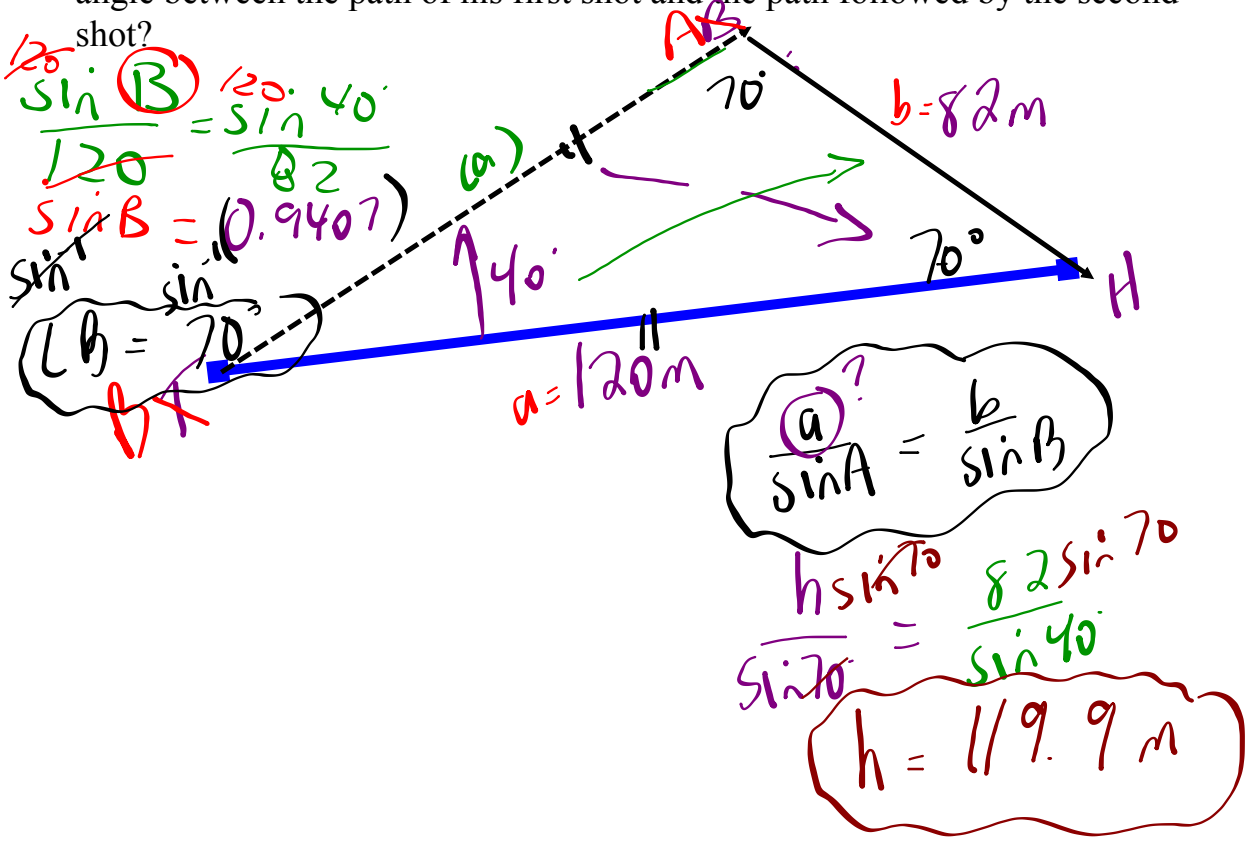
EXAMPLE #4 - Application

$\frac{\sin\theta}{a} = \frac{\sin B}{b}$

Suppose that Mr. Watters was playing a straight par 3 golf hole that was 120 m long. He hits one of his regular old slices that ends up 40 ° off line and is still 82 m from the hole.

(a) How far did his tee shot travel?

(b) If he somehow miraculously hits his next shot onto the green, what was the angle between the path of his first shot and the path followed by the second shot?



$\frac{\sin B}{120} = \frac{\sin 40^\circ}{82}$

$\sin B = (0.9407)$

$\sin^{-1}$ $\sin$

$\angle B = 70^\circ$

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

$\frac{h \sin 70}{\sin 70} = \frac{82 \sin 70}{\sin 40}$

$h = 119.9\ m$

HW: 10.9 -> #5 & #6

10.10 -> #1, 2, 3