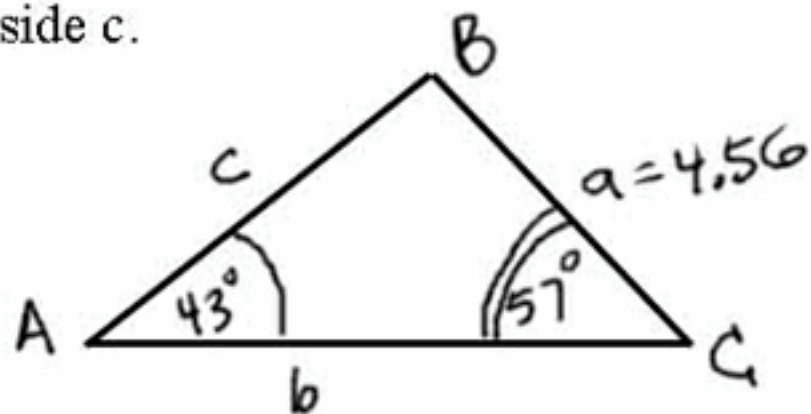


$$\frac{\sin A}{a} = \frac{\sin B}{b} = \frac{\sin C}{c}$$

The law of Sines is useful for triangles that are not right triangles. Choose any two of the above ratios to set up a proportion. You will need to know any 3 of the 4 pieces of information, then solve for the missing item (angle or side).

Ex 1) In  $\triangle ABC$  (not a right triangle)  $a = 4.56$ ,  $\angle A = 43^\circ$ , and  $\angle C = 57^\circ$ , find side  $c$ .



$$\frac{\sin 43^\circ}{4.56} = \frac{\sin 57^\circ}{c}$$

$$\frac{0.6820}{4.56} = \frac{0.8387}{c}$$

$$0.6820c = (4.56)(0.8387)$$

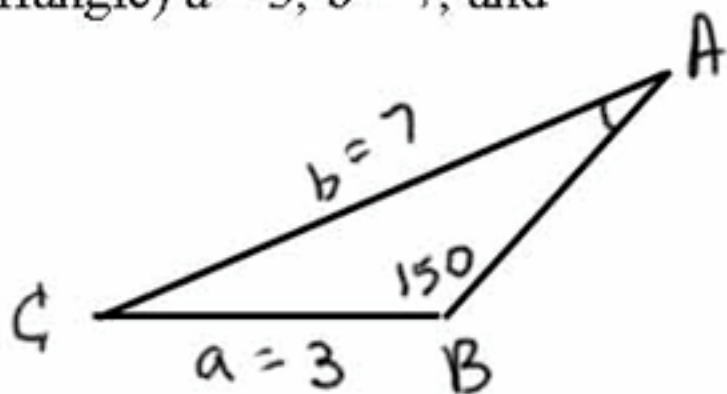
$$\frac{0.6820c}{0.6820} = \frac{3.8245}{0.6820}$$

$$c = 5.6078$$

$$c = 5.6$$

Ex 2) In  $\triangle ABC$  (not a right triangle)  $a = 3$ ,  $b = 7$ , and  $\angle B = 150^\circ$ , find  $\angle A$ .

$$\frac{\sin A}{3} = \frac{\sin 150}{7}$$



$$\frac{\sin A}{3} = \frac{0.5}{7}$$

$$\frac{7 \sin A}{7} = \frac{(3)(0.5)}{7}$$

$$\sin A = 0.2143$$

$$A = \sin^{-1} 0.2143$$

$$A = 12.3745^\circ$$

$$A = 12.4^\circ$$

Ex 3) A 123 foot support wire for a transmitting tower makes an angle of  $61^\circ$  with the ground. This wire is to be replaced by a new wire whose angle with the ground is  $46^\circ$ . How long does the new wire have to be?

$$\textcircled{I} \angle ACB = 180^\circ - 61^\circ = 119^\circ$$

$$\textcircled{II} \frac{\sin 119^\circ}{x} = \frac{\sin 46^\circ}{123}$$

$$\frac{0.8746}{x} = \frac{0.7193}{123}$$

$$\frac{0.7193x}{0.7193} = \frac{123(0.8746)}{0.7193}$$

$$x = 149.5562$$

$$x \doteq 149.6$$

