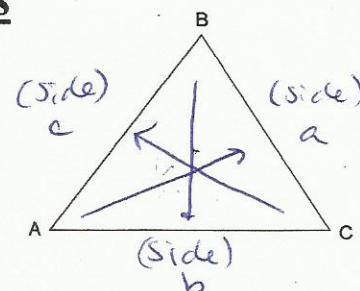


# Triangle Trigonometry – Law of Sines

Law of Sines "Formulas"/Proportions

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



- Only use the Law of Sines to solve a triangle if given the following:

Given Triangle # 1	Given Triangle # 2	Given Triangle # 3
<p>Type of Triangle: <u>ASA</u></p>	<p>Type of Triangle: <u>AAS</u></p>	<p>Type of Triangle: <u>SSA</u></p>

**Examples:** Use the Law of Sines to find missing angle, side, or solve triangle. Round to tenth place.

1.) Find side a.

$$\frac{25}{\sin 52} = \frac{a}{\sin 66}$$

$$a \sin 52 = 25 \sin 66$$

$$a = \frac{25 \sin 66}{\sin 52}$$

$a = 29$

2.) Find angle C.

$$\frac{32}{\sin 110} = \frac{19}{\sin C}$$

$$32 \sin C = 19 \sin 110$$

$$C = \sin^{-1}\left(\frac{19 \sin 110}{32}\right)$$

$C = 33.9^\circ$

3.) Find angle  $\theta$ .

① Find angle A  
② Then can find angle C ( $\theta$ )  
(interior angles of  $\Delta = 180^\circ$ )

$$\frac{33}{\sin 83} = \frac{28}{\sin A}$$

$$33 \sin A = 28 \sin 83$$

$$A = \sin^{-1}\left(\frac{28 \sin 83}{33}\right)$$

$A = 57.4^\circ$

$$\theta = 180 - 83 - 57.4$$

$\theta = 39.6^\circ$

4.) Solve triangle ABC: (3 answers)

①  $B = 180 - 36 - 110$   
 $B = 34^\circ$

$$\frac{19}{\sin 34} = \frac{a}{\sin 110}$$

$$a \sin 34 = 19 \sin 110$$

$a = 31.9$

$$\frac{19}{\sin 34} = \frac{c}{\sin 36}$$

$$c \sin 34 = 19 \sin 36$$

$C = 20$

5.) Solve triangle ABC: (3 answers)

$$\frac{15}{\sin 52} = \frac{12}{\sin C}$$

$$15 \sin C = 12 \sin 52$$

$$C = \sin^{-1}\left(\frac{12 \sin 52}{15}\right)$$

$C = 39.1^\circ$

②  $B = 180 - 52 - 39.1$   
 $B = 88.9^\circ$

$$\frac{15}{\sin 52} = \frac{b}{\sin 88.9}$$

$$b \sin 52 = 15 \sin 88.9$$

$b = 19$