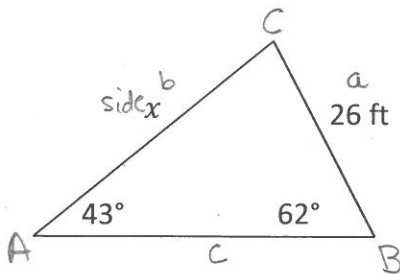


Using the Law of Sines to find an Unknown Side Length

Example 1: Finding the length of an unknown side using the Law of Sines

Find the length of side x in this triangle.



① Label the angles and sides

② Given
 $\angle A = 43^\circ$,
 $a = 26$
 $\angle B = 62^\circ$

Find
 side b or x

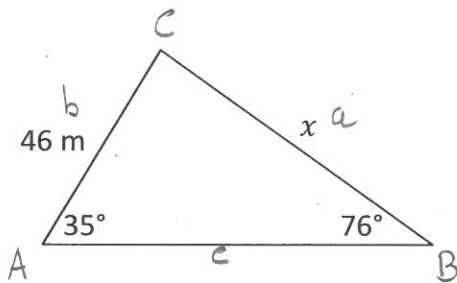
③ using law of sines: $\frac{\text{side } a}{\sin \angle A} = \frac{\text{side } b}{\sin \angle B}$

$$\frac{26}{\sin 43^\circ} = \frac{b}{\sin 62^\circ}$$

$$\frac{\sin 62^\circ \cdot 26}{\sin 43} = b \Rightarrow \underline{\underline{b = 33.66 \text{ ft}}}$$

Example 2

Solve for x .



① Given
 $\angle A = 35^\circ$
 $\angle B = 76^\circ$

Find
 x or side b

$$b = 46 \text{ m}$$

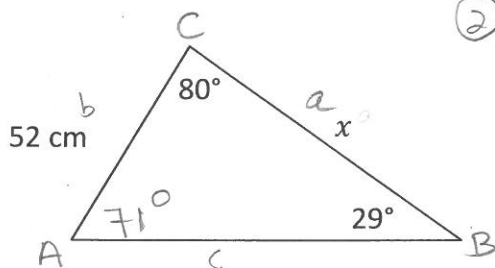
② Using Law of sines: $\frac{a}{\sin \angle A} = \frac{b}{\sin \angle B}$

$$\frac{a}{\sin 35} = \frac{46}{\sin 76} \Rightarrow a = \frac{46 \sin 35}{\sin 76}$$

$$a = \underline{\underline{27.19 \text{ m}}}$$

Example 3

Solve for x .



① NOTE: Using the 180° rule, find $\angle A$.

$$\angle A = 180^\circ - 29^\circ - 80^\circ \Rightarrow \underline{\underline{71^\circ}}$$

② Given
 $\angle A = 71^\circ$
 $\angle B = 29^\circ$
 $b = 52 \text{ cm}$

Find
 x or side a

③ Using laws of sines: $\frac{a}{\sin \angle A} = \frac{b}{\sin \angle B}$

$$\frac{a}{\sin 71^\circ} = \frac{52}{\sin 29^\circ}$$

$$a = \frac{52 \sin 71}{\sin 29}$$

$$a = \underline{\underline{101.42 \text{ cm}}}$$