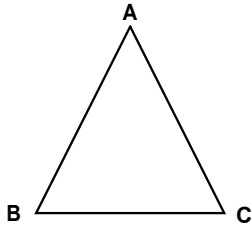


8.1 Sine Law Day 1

Chapter 8: Trigonometry of Acute Triangles

8.1 - The Sine Law



The relationship between the sides and their opposite angles in any acute $\triangle ABC$ is:

Sine Law

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

DO IT NOW!!

Solve for 'x':

1) $\frac{1}{3} = \frac{x}{9}$

2) $\frac{2}{6} = \frac{9}{x}$

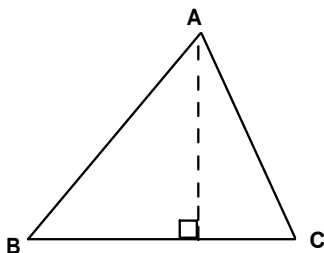
How can we use what we know about the trig ratios for right angle triangles to help us solve for unknown sides and angles of acute triangles?

Sine Law

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

The sine law is derived by breaking up an acute triangle into 2 right angle triangles and then using trig ratios (SOHCAHTOA).

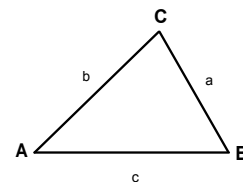
See the handout of the proof for the full explanation.



Sine Law: The ratio of each side to its opposite angle is equal!

Sine Law

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



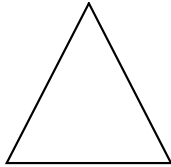
Note: Even though there are three parts to this equation, you only use two parts at a time. The choice of which two to use depends on what information is given.

8.1 Sine Law Day 1

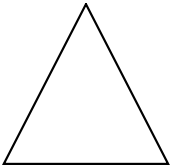
$$\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$$

The Sine Law can be used to find:

1. An unknown side when two angles and a side are known

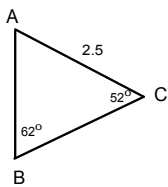


2. An unknown angle if two sides and the angle opposite one of the known sides are known



Find Side Lengths Using the Sine Law

1

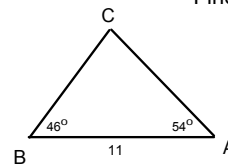


Find the length of side 'c'

Remember: We can use the sine law to find an unknown side when we know two angles and a side.

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

2



Find the length of side 'a'

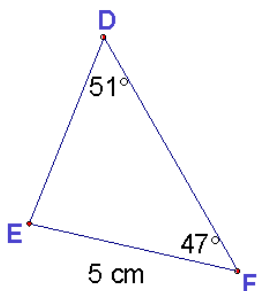
Remember: We can use the sine law to find an unknown side when we know two angles and a side.

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

8.1 Sine Law Day 1

3

Find the length of side 'f'



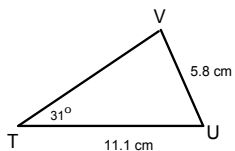
Remember: We can use the sine law to find an unknown side when we know two angles and a side.

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

Find an Angle Using the Sine Law

4

Find $\angle V$

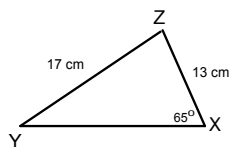


Remember: We can use the sine law to find an unknown angle if two sides and the angle opposite one of the known sides are known

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

5

Find $\angle Y$

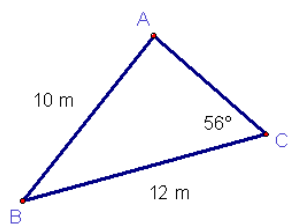


Remember: We can use the sine law to find an unknown angle if two sides and the angle opposite one of the known sides are known

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

8.1 Sine Law Day 1

6



Find $\angle B$

Remember: We can use the sine law to find an unknown angle if two sides and the angle opposite one of the known sides are known

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

Key Concepts

- In an acute $\triangle ABC$, the sine law states that

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

- The sine law can be used to find
 - an unknown side if two angles and a side are known
 - an unknown angle if two sides and the angle opposite one of the known sides are known

- The sine law can also be written in the form

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

