

Sine Law

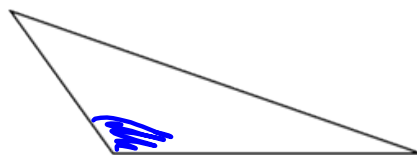
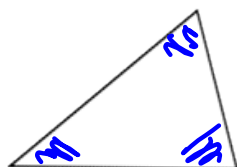
Learning Goals

- review formula for sine law
- review when to use sine law
- use sine law to find sides and angles of triangles

Terminology review:

An **acute** triangle has 3 acute angles.

An **obtuse** triangle has 1 obtuse angle.



Sine Law

no right angle

The sine law can be used to solve for unknown angles and sides in oblique triangles. Using this method involves ratios.

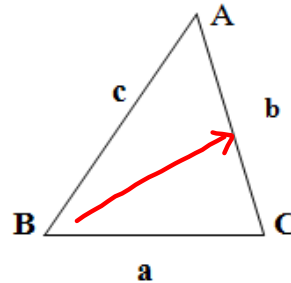
fractions

Notice that the side opposite the angle is labeled with a lower case letter (ie. a) and the angle is labeled with an upper case letter (ie. A).

Two ways to write sine law:

Solve for angles

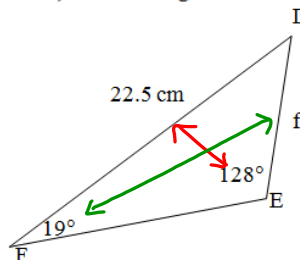
$$\frac{\sin A}{a} = \frac{\sin B}{b} = \frac{\sin C}{c}$$



Solve for sides

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

Ex 1) Find the length of the side f, to 1 decimal place.



$$\frac{f}{\sin F} = \frac{e}{\sin E}$$

$$\frac{f}{\sin 19^\circ} = \frac{22.5}{\sin 128^\circ}$$

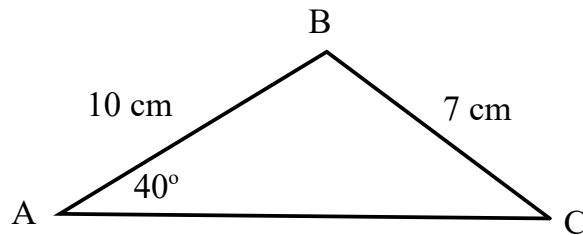
Lx →

$$f = \frac{22.5}{\sin 128^\circ} (\sin 19^\circ)$$

$$f = 9.3$$

On the Boards...

Find the measurement of angle C.



$$\frac{\sin C}{10} = \frac{\sin 40^\circ}{7}$$

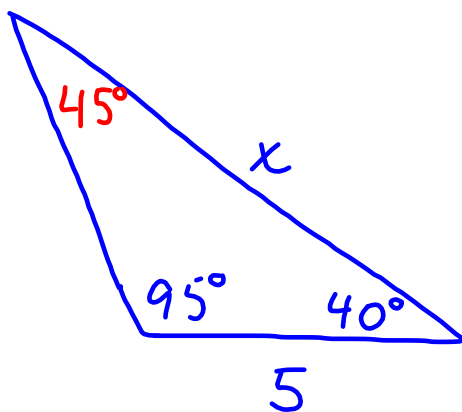
$$\sin C = \frac{\sin 40^\circ}{7} (10)$$

$$\sin C = 0.92$$

$$C = 67^\circ$$

Sketch $\triangle XYZ$, then solve for side x.

In $\triangle XYZ$, $\angle X = 95^\circ$, $y = 5$ cm, and $\angle Z = 40^\circ$.

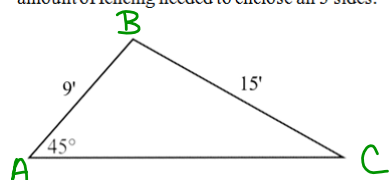


$$\frac{x}{\sin 95^\circ} = \frac{5}{\sin 45^\circ}$$

$$x = \frac{5}{\sin 45^\circ} (\sin 95^\circ)$$

$$x = 7.01$$

Ex 3) Two sides of a triangular lot measure 9 ft and 15 ft, as shown. Determine the total amount of fencing needed to enclose all 3 sides.



① Find C

$$\frac{\sin C}{9} = \frac{\sin 45^\circ}{15}$$

$$\sin C = \frac{\sin 45^\circ}{15} (9)$$

$$\sin C = 0.43$$

$$C = 25^\circ$$

② Find B

$$45^\circ + 25^\circ + B = 180^\circ$$

$$B = 110^\circ$$

③ Find b

$$\frac{b}{\sin 110^\circ} = \frac{15}{\sin 45^\circ}$$

$$b = 19.86$$

$$\therefore \text{total } 9 + 15 + 20 = 44$$

$$\therefore 44 \text{ ft}$$

Seatwork

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