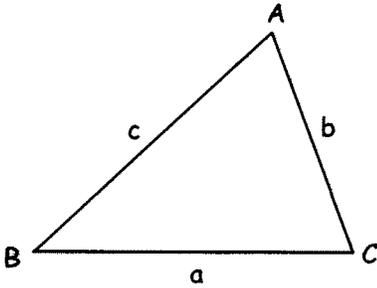# Sine Law

⬤ - SOHCAHTOA and Pythagoras are good tools for solving unknown parts of triangles but unfortunately they can only be applied to right triangles.
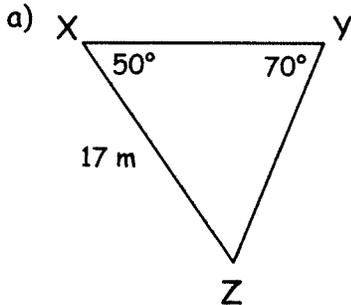
- With non-right triangles, it has been determined that there exists a relation between an angle and the side opposite to it. This leads to the Sine Law.

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

- When labelling triangles, CAPITAL LETTERS are used for the ANGLES, and the corresponding small letters for the opposite sides.

⬤

Ex/ Solve the triangle.

a)

b)
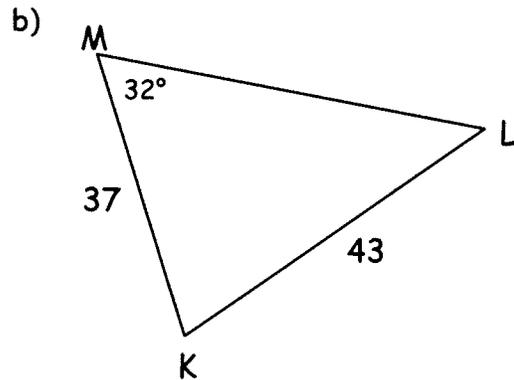

$Z = 60°$

$$\frac{\sin 70}{17} , \frac{\sin 50}{x}$$

$$\frac{\sin 70}{17} = \frac{\sin 60}{Z}$$

cross
multiply

$$\frac{x \sin 70 = 17 \sin 50}{\sin 70}$$

$$\frac{Z \sin 70 = 17 \sin 60}{\sin 70}$$

$x = 13.9$

$Z = 15.7$

$$\frac{\sin 32}{43} = \frac{\sin L}{37}$$

$$\frac{37 \sin 32}{43} = \sin L$$

$0.45597... = \sin L$
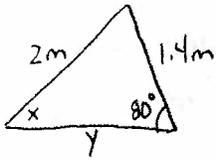
$L = \sin^{-1}(0.45597...)$

$= 27.1°$

$K = 120.9°$

$$\frac{\sin 32}{43} = \frac{\sin 120.}{K}$$

$$\frac{K \sin 32 = 43 \sin 120}{\sin 32}$$

$K = 69.6$

Ex/ A wall that is 1.4 m tall has started to lean and now makes an angle of 80° with the ground. A 2.0 m board is jammed between the top of the wall and the ground to prop the wall up. Assume that the ground is level.
a) What angle does the board make with the ground?
b) How far is the base of the board from the base of the wall?

2m / 1.4m / x / 80° / y

a) $\dfrac{\sin x}{1.4} = \dfrac{\sin 80}{2}$

$2\sin x = \dfrac{1.4 \sin 80}{2}$

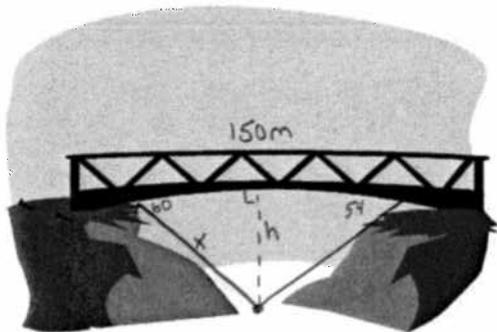$\sin x = 0.689...$

$x = \sin^{-1}(0.689...)$

$= 43.6°$

b) $y = 56.4°$

$\dfrac{\sin 56.4}{y} = \dfrac{\sin 80}{2}$

$2\sin 56.4 = \dfrac{y \sin 80}{\sin 80}$

$y = 1.69 m$

Ex/ A bridge across a valley is 150 m in length. The valley walls make angles of 60° and 54° with the bridge that spans it. How deep is the valley?

150m / 60 / x / h / 54

* Need a side so we can use SOHCAHTOA for the height.

$\dfrac{\sin 54}{x} = \dfrac{\sin 66}{150}$

$x \sin 66 = \dfrac{150 \sin 54}{\sin 66}$

$x = 132.836$

$\sin 60 = \dfrac{h}{132.836}$

$h = 115 m$

Homework: Pg. 433   #'s: 3ace,4,8,9,13