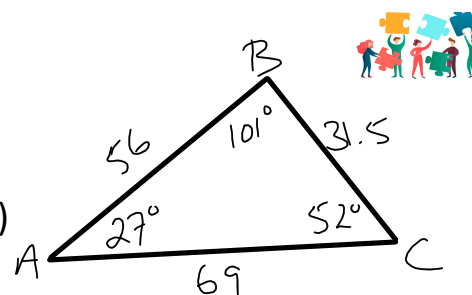


## 1.6 The Sine Law

Draw an oblique triangle,  $\triangle ABC$  (no  $90^\circ$  angle).  
Measure and label all angles and sides (carefully!)



Then calculate:

$$\frac{\sin A}{a} = \frac{\sin 27^\circ}{31.5}$$

$$= 0.014$$

$$\frac{\sin B}{b} = \frac{\sin 101^\circ}{69}$$

$$= 0.014$$

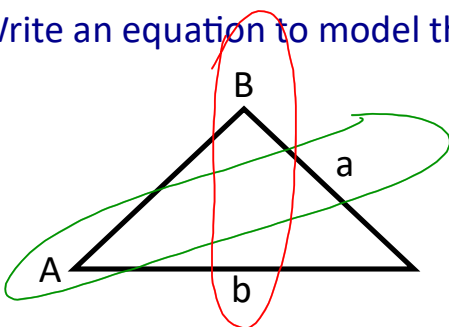
$$\frac{\sin C}{c} = \frac{\sin 52^\circ}{56}$$

$$= 0.014$$

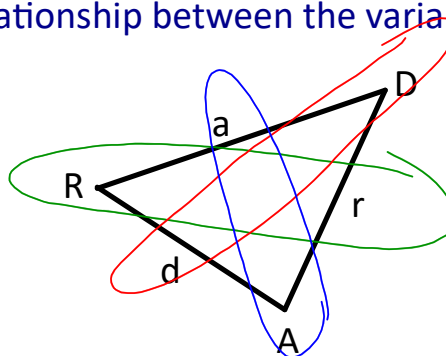
Compare your results with neighbouring group(s). What can you conclude?

They seem to be the same!

Write an equation to model the relationship between the variables shown.



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



$$\frac{\sin R}{r} = \frac{\sin D}{d} = \frac{\sin A}{a}$$



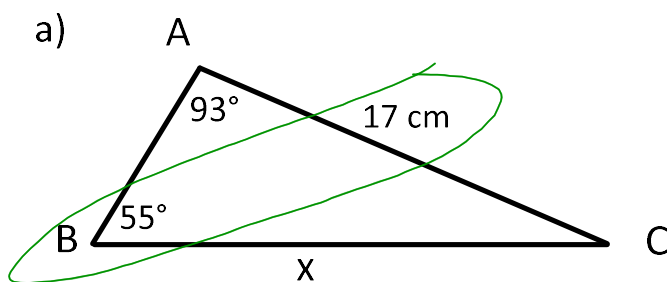
## The Sine Law

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

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

\*\*These ratios can be used to find unknown sides or angles in oblique triangles.\*\*

1) Solve for the unknown.

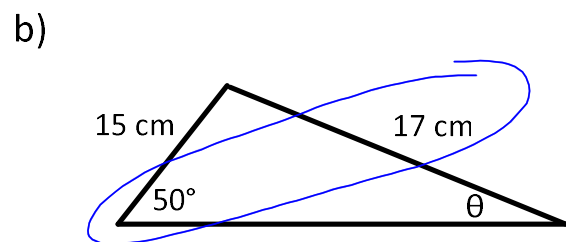


$$\frac{b}{\sin B} = \frac{a}{\sin A}$$

$$\frac{17}{\sin 55^\circ} = \frac{x}{\sin 93^\circ}$$

$$\sin 93^\circ \cdot \frac{17}{\sin 55^\circ} = x$$

$$x \doteq 20.7$$



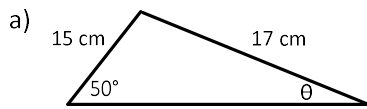
$$\frac{\sin \theta}{15} = \frac{\sin 50}{17}$$

$$\sin \theta = 15 \cdot \frac{\sin 50}{17}$$

$$\sin \theta = 0.6759$$

$$\theta = 42.5^\circ$$

Solve for the unknown.



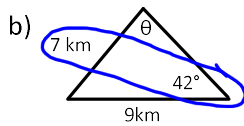
$$\frac{\sin \theta}{15} = \frac{\sin 50}{17}$$

$$\sin \theta = \frac{15 \cdot \sin 50}{17}$$

$$\sin \theta = \frac{11.49}{17}$$

$$\sin \theta = 0.67$$

$$\theta = 42.5^\circ$$



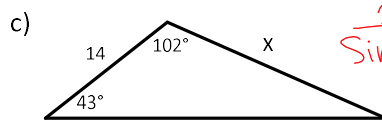
$$\frac{\sin \theta}{9} = \frac{\sin 42}{7}$$

$$\sin \theta = 9 \cdot \frac{\sin 42}{7}$$

$$= 0.8603$$

$$\theta = \sin^{-1}(0.8603)$$

$$= 59^\circ$$

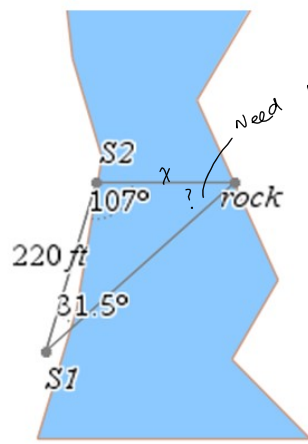


$$\frac{x}{\sin 102} = \frac{14}{\sin 43}$$

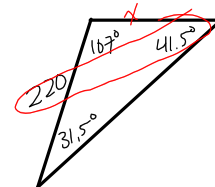
$$x = \sin 102 \cdot \frac{14}{\sin 43}$$

$$= 20$$

How wide is the river?



need to use sum = 180°  
 $\theta = 180 - 107^\circ - 31.5^\circ$   
 $= 41.5^\circ$



$$\frac{x}{\sin 31.5^\circ} = \frac{220}{\sin 41.5^\circ}$$

$$x = \sin 31.5^\circ \cdot \frac{220}{\sin 41.5^\circ}$$

$$= 173.5$$

∴ The river is approx 173.5 ft wide

*Practice*

Set 1: p. 401 #C2,C3,2ab,3ab,4a,6b,10

Set 2: p. 401#C2,C3,2b,4a,6b,9,12,15,20