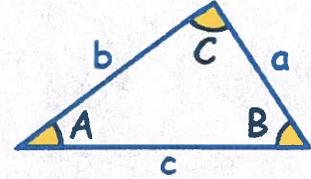


**53 - Word Problems**

**Key Ideas**

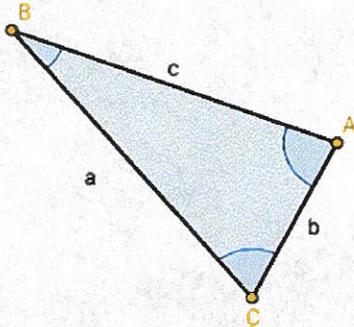
**Sine Law:**

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



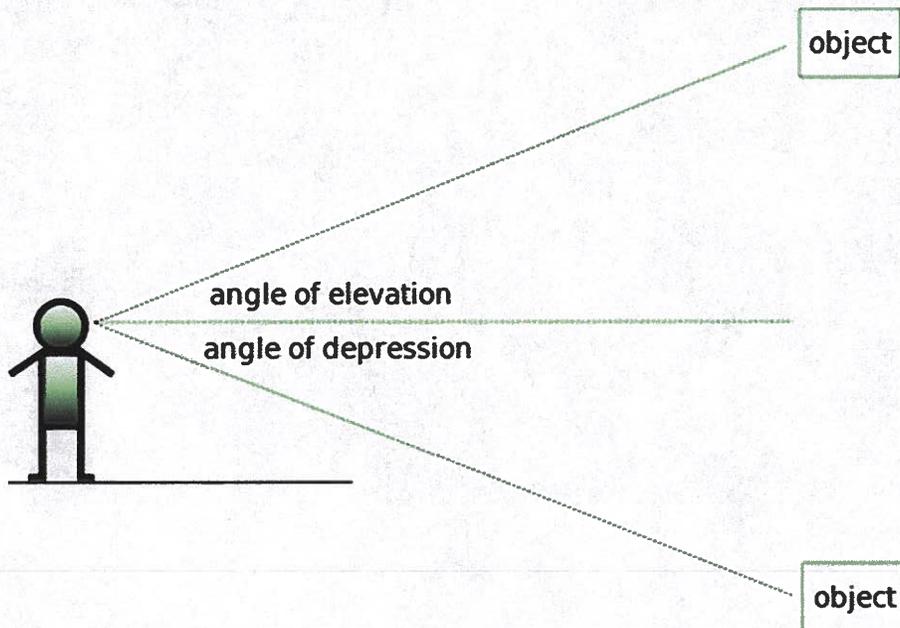
**Cosine Law:**

**Law of Cosines**



$$\begin{aligned} a^2 &= b^2 + c^2 - 2bc \cos A \\ b^2 &= a^2 + c^2 - 2ac \cos B \\ c^2 &= a^2 + b^2 - 2ab \cos C \end{aligned}$$

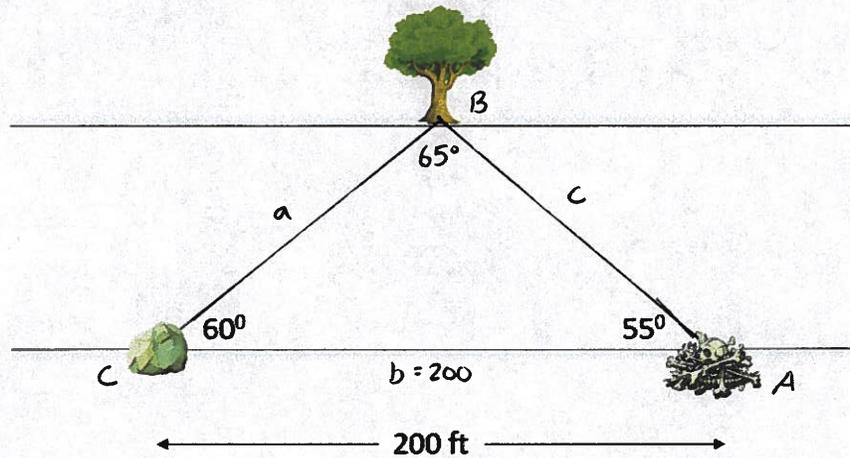
**Part 1 - Angle of Inclination, Angle of Declination**



### Part 2 – Angle of Inclination, Angle of Declination

Use the following information to answer Q1:

An explorer is trying to determine how far apart two parallel banks of a river are. He walks to a rock and turns  $60^\circ$  from the shore to spot a tree. He then walks 200ft to a bone pile and turns  $55^\circ$  from the shore to spot the same tree.

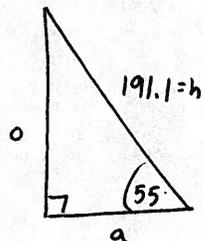


Q1: How far across is the river?

$$\frac{\sin B}{b} = \frac{\sin 60}{c}$$

$$\frac{\sin 65}{200} = \frac{\sin 60}{c}$$

$$c = 191.1$$



$$\sin \theta = \frac{o}{h}$$

$$\sin 55 = \frac{o}{191.1}$$

$$\text{opp} = 156.5 \text{ ft}$$