

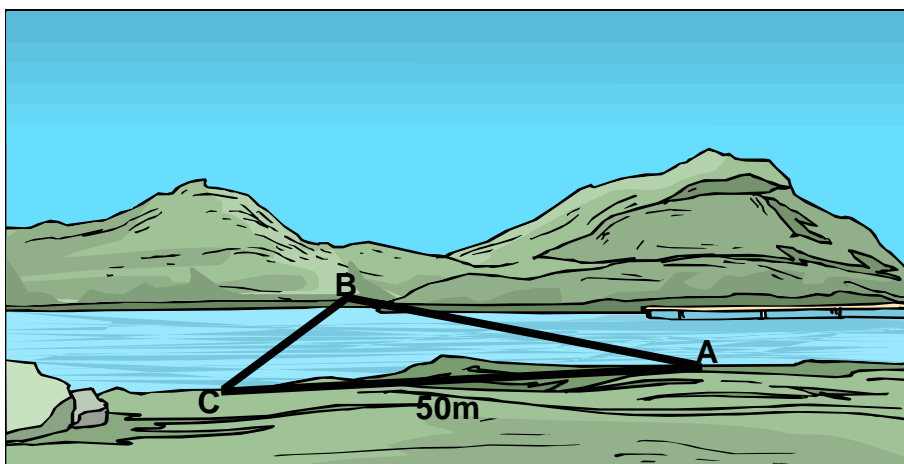
# MATHEMATICS

## Level Two

### Sine and Cosine Rule

#### Task A

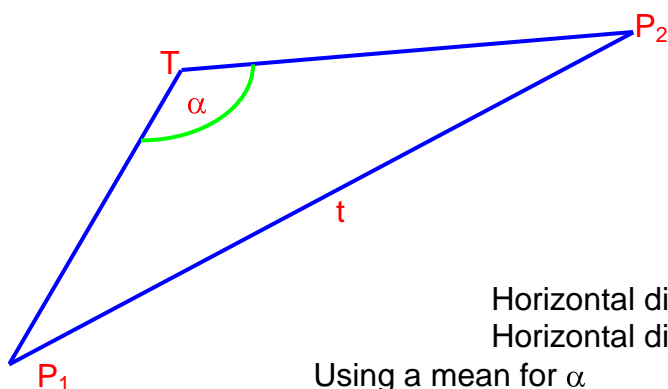
A small bridge is to be built across a river from point A to B. Victoria, the surveyor, measures from point A 50m along the riverbank to point C. She then uses her theodolite to measure angles CAB to be  $36^{\circ}30'43''$  and angle ACB to be  $46^{\circ}48'32''$ .



- 1) Find the distance across the river from point A to B
- 2) If C was moved 24m closer to A, what would be the new angle at C?

#### Task B

Below is a bird's eye view of a theodolite (T) and two points  $P_1$  and  $P_2$ .



Using the theodolite the angle was measured three times giving:

$$\alpha = 114^{\circ} 25' 19''$$

$$\alpha = 114^{\circ} 25' 20''$$

$$\alpha = 114^{\circ} 25' 21''$$

respectively

$$\text{Horizontal distance } TP_1 = 258.365\text{m}$$

$$\text{Horizontal distance } TP_2 = 364.249\text{m}$$

Using a mean for  $\alpha$

- 1) Calculate the distance from  $P_1$  to  $P_2$
- 2) Calculate the remaining two angles