

# MATHEMATICS

## Level Two

### Trig Heights #4

**Setting:** In surveying, it is common practice to use a total station – an instrument that measures slope distances and angles simultaneously. Assume that you set your total station up on tripod at a height of 1.326m above a survey mark (Station A) and measure the following:

- The slope distance between targets placed over two other survey marks.
- The horizontal angle between these two targets.

The measurement data is given below.

#### Task A

The following observations were taken from station A to stations B and C

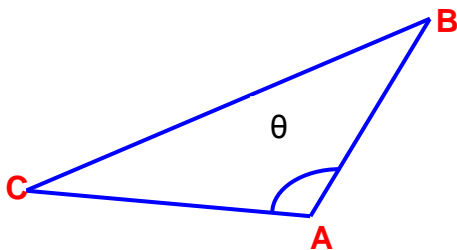
##### At station A to B

Instrument height	= 1.326m	Height of A	= 244.36m
Target Height	= 1.635m	Zenith Angle	= 89°52'44"
Slope Distance	= 2451.05m		

##### At station A to C

Instrument height	= 1.326m	Vertical Angle	= 92°16'06"
Target Height	= 0.348m	Slope Distance	= 2614.84m

- 1) Using the above information draw a diagram representing the information
- 2) Calculate the horizontal distances from A to B and A to C
- 3) Calculate the change in height between the two survey marks
- 4) Calculate the change in height between the survey marks of B and C
- 5) Calculate the elevation of B and C



- 6) Shown is a birds eye view of what the surveying set out looks like. From the information you have already calculated, and given that the measured angle ( $\theta$ ) between the two targets is  $163^{\circ}57'12''$ , calculate the horizontal distance between B and C.