

MATHEMATICS

Level One

Trigonometry

- 1) If the manufacturer of a particular total station (an instrument that measures angles and distances) stated that the accuracy of their instrument is $6\text{mm} + 5\text{ppm}$, what error can be expected if a distance of 2400m is measured? (*ppm is parts per million, so 5ppm would be 5mm per km*)

- 2) The slope distance and the angle from the zenith (the point vertically above you), were measured with a total station. Calculate the horizontal distance for each case

Slope distance	Angle from the zenith
a. 718.84m	$89^\circ 54'$
b. 498.52m	$74^\circ 36'$
c. 3562.53m	$92^\circ 24'$
d. 528.125m	$88^\circ 17''$
e. 2458.365m	$90^\circ 09'$

- 3) The slope distances shown were measured. In addition, the slope percentages were also determined. Calculate the horizontal distance.

Slope Distance	%
a. 718.84	+ 3.0
b. 4958.256	-16.3
c. 235.985	+12.9
d. 98.365	- 4.60
e. 542.167	+5.50

- 4) The slope distances shown were measured, while height differences were obtained by levelling. What are the horizontal distances?

Slope Distance	Height change
a. 718.84	+ 13.05
b. 4958.256	-26.32
c. 235.985	+16.96
d. 98.365	- 44.60
e. 542.167	+25.50

- 5) A total station was set up above point A (elevation 232.06m) and used to measure the slope distance to a reflector set up above point B (elevation 139.68m). If the height of the EDM and prism above the points are 4.75ft and 5.1ft respectively. (*NB: conversion factor from feet to meters = 0.3048*)

- Convert all height measurements to meters
- Calculate the change in height between the EDM at A and the prism at B
- If the slope is 1340.68m , calculate the horizontal distance
- What would be the angle of elevation if it were measured from the prism to the EDM?