

MATHEMATICS

Level Three

Control Stations

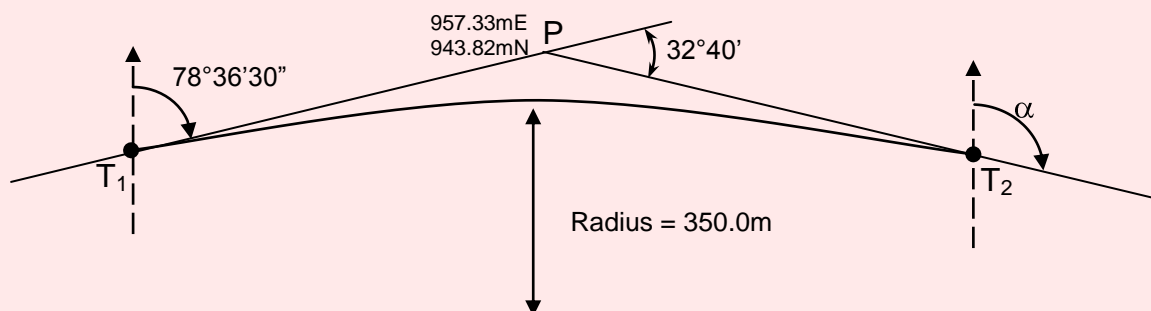
- 1) In order to fix the position and level of a point R overlooking a large construction site, observations have been conducted from two fixed stable stations T and G, with precisely known coordinates and heights. Listed below are the observations made and the known data.

Mean slope distance:	TR	1425.0241m
	GR	1406.6943m

Vertical angles	TR	6°48'25"		
(Angles taken from the horizontal)	GR	6°43'46"		Height above msl

Known data	T	958.461mE	914.580mN	91.070m
(Co-ordinates)	G	1117.797mE	782.848mN	95.131m

- a. Compute the horizontal distance from all points.
 - b. Compute the interior angles
 - c. Calculate bearings for line TR and GR, check this all works
- 2) In the same construction site a sewer is to be laid between two points having coordinates of (12,12) and (85,85). It is to be laid 1.5m under the ground.
- a. What is the length of pipe required?
 - b. If the trench for this sewer is to be 1.2 m wide what is the volume of dirt to be removed from the trench?
- 3) A new road is to be built in the middle of a housing development. A circular curve of radius 350.00m deflecting right through 32°40' is to be incorporated with its length as shown below.



- a. Work out the length of the curve T_1 to T_2
- b. If the formula for the tangent length is $= R \tan \theta / 2$, calculate the length of T_1 -P and T_2 -P. (*NB – θ in radians*).
- c. What is the direct distance between T_1 and T_2 ?
- d. Compute the coordinates for T_1 and T_2 .