CASIO fx-5800P USER GUIDE

Surveying Software:

1. **AREA** (To calculate area of a closed figure using coordinates of the vertices.
2. **BM** (To calculate reduced level (RL) of occupied station by observing to known point (height).
3. **CURVE** (To calculate Chainage (curve distance) from TP
   to point on the curve intersecting with a line as drawn from the centre of the curve to side shot point.
4. **INTERSECT** (To calculate intersection point of two coordinates with angle method.
5. **RADIATION** (To calculate side shots coordinates radiate
   from one known point.
6. **ROAD SECANT** (To calculate Road Secant of same or different width.
7. **INVERSE** (To calculate bearing and distance of two known points.
8. **INV OFFSET** (To calculate Coordinates with offset & chainage provided within an alignment
9. **OFFSET** (To calculate Offset and Chainage of a point from an alignment.
10. **RESECTION** (To calculate Resection point from three known points.
11. **SPIRAL** (To calculate Spiral Curve setting-out)
12. **SOLAR** (To calculate Solar Observation.
13. **TRAVERSE** (Missing Line, Carrying Coordinates, Open Traverse, Close Traverse.

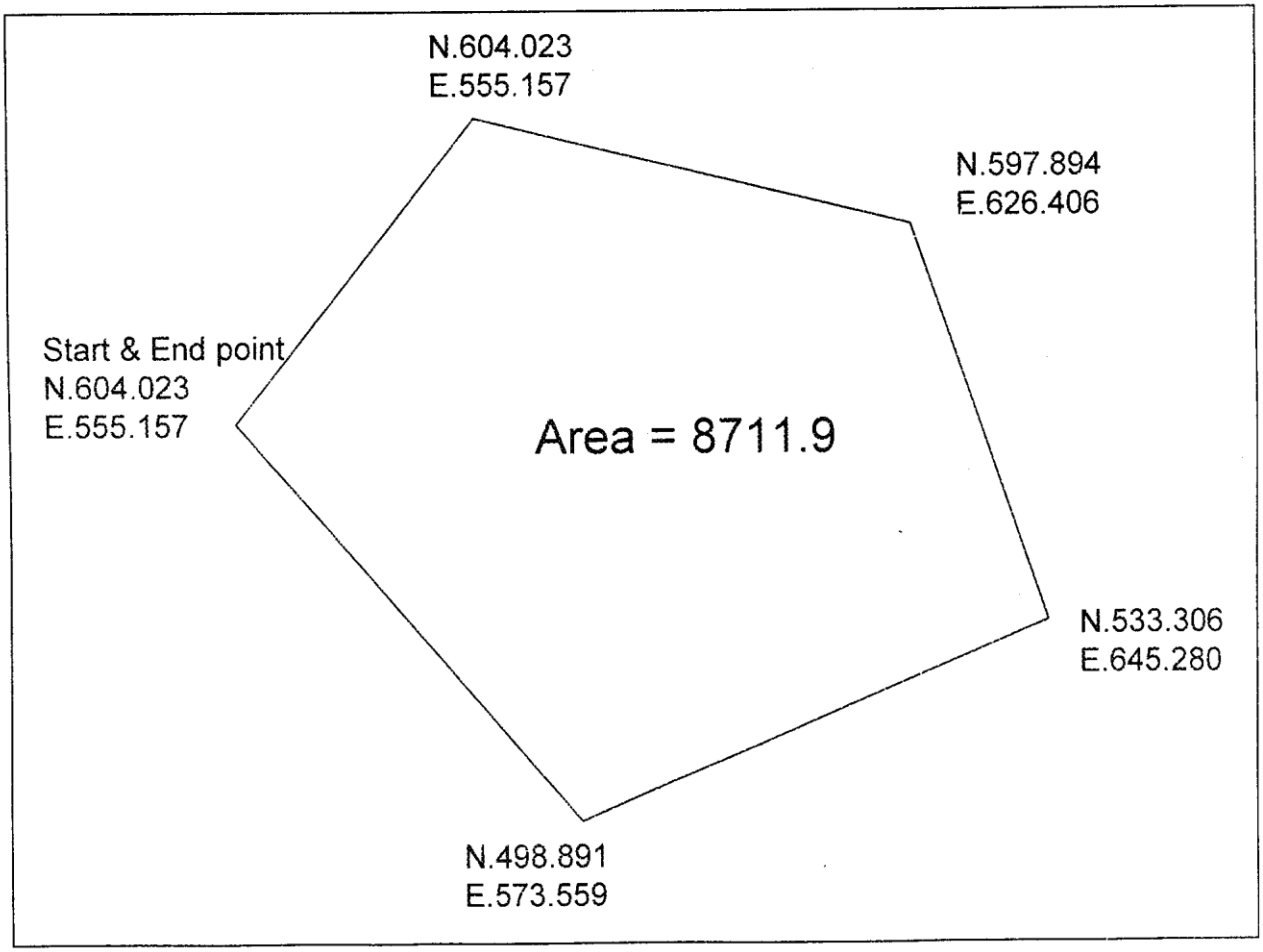
CASIO fx-5800P user guide

BASIC OPERATION

1. To switch "**ON**", press Button **(AC/ON)**, to switch **"OFF"**, press Yellow Button **(SHIFT)** once followed by Button **(AC/ON).**
2. To run programs, press the white button **"FILE"**
3. Select the program by pressing the scroll button **UP** or **DOWN** at top right-hand side of the calculator below the display.
4. Press the blue **"EXE"** button to start the program.

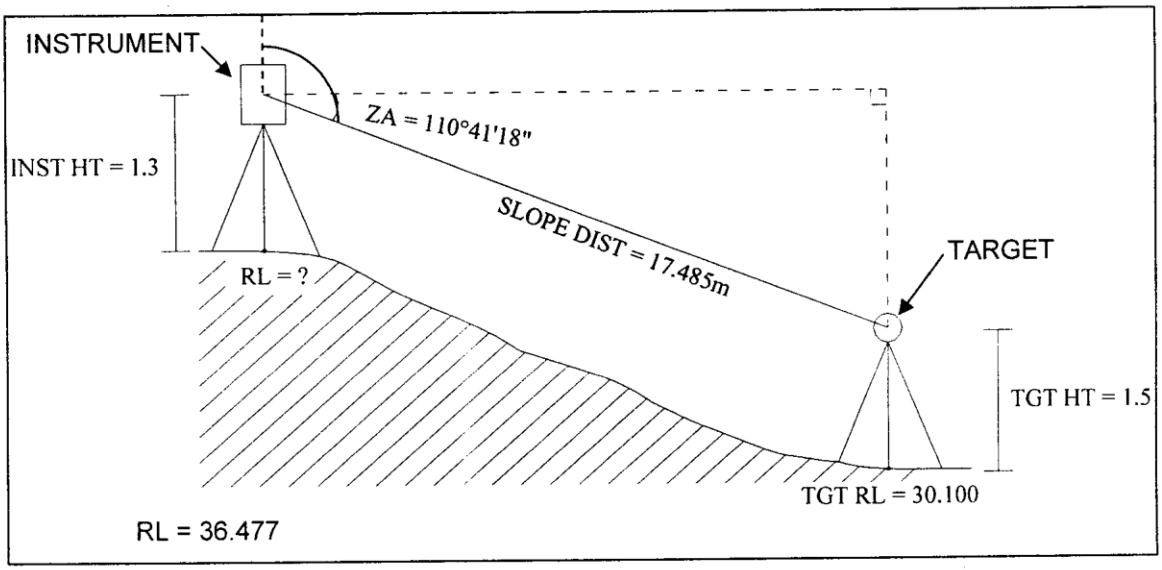
AREA (Area Computation by Coordinates)

1. Enter **Starting Point** Coordinate and Press the Blue "EXE" button.
2. Enter **Second Point** Coordinate and Press the Blue "EXE" button.
3. Enter **Third Point** Coordinate and Press the Blue "EXE" button.
4. **Enter "0" (CONT)** to continue to enter next coordinate.
5. **Continue** to key in the coordinates until the **Last Point (Note: the coordinates of the last point must be same as Starting Point).**
6. **Enter "1" (END)** is to compute the area.



BM (Remote Bench Mark)

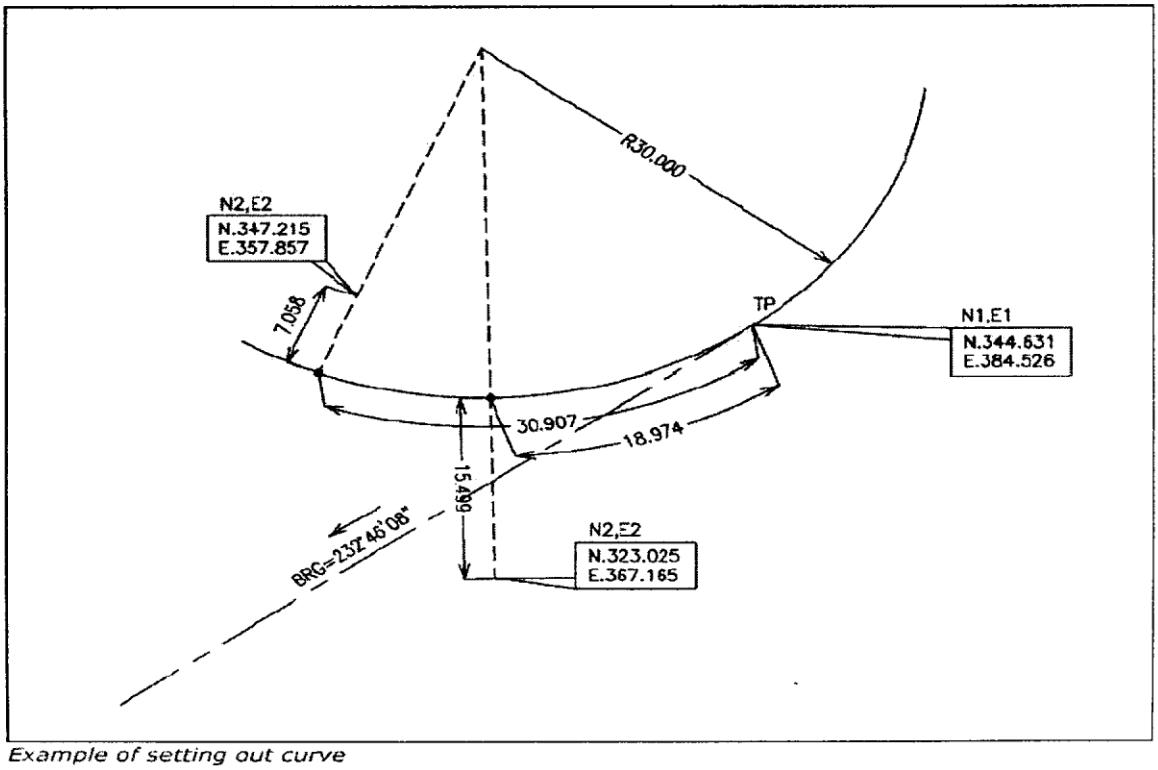
1. Enter the reduced level of the target position **(TGT RL).**
2. Enter the target hright **(TGT HT)**.
3. Enter the Zenith angle **(ZA)**.
4. Enter the measured slope distance **(SLOPE DIST)**.
5. Enter the height of instrument **(INST HT).**
6. The reduced level of the instrument position will be displayed **(RL=?)**.



Note:
To compute the RL of the instrument position given the instrument height, Target height, Zenith angle, slope distance and the target height.

CURVE (Circular curve setting-out)

1. Enter the coordinates of the **tangent point, TP (N1 / E1).**
2. Enter the **tangent bearing (BRG).**
3. Enter the **radius** of the circular curve.
4. Enter the coordinates of the **side shot point (N2 / E2).**
5. The **arc length** will be displayed **(ARC = ?)** press the **"EXE"** button to continue.
6. The distance from the side shot point to the curve will be displayed **(DIST = ?).**
7. Repeat from step 4 as many times as desired

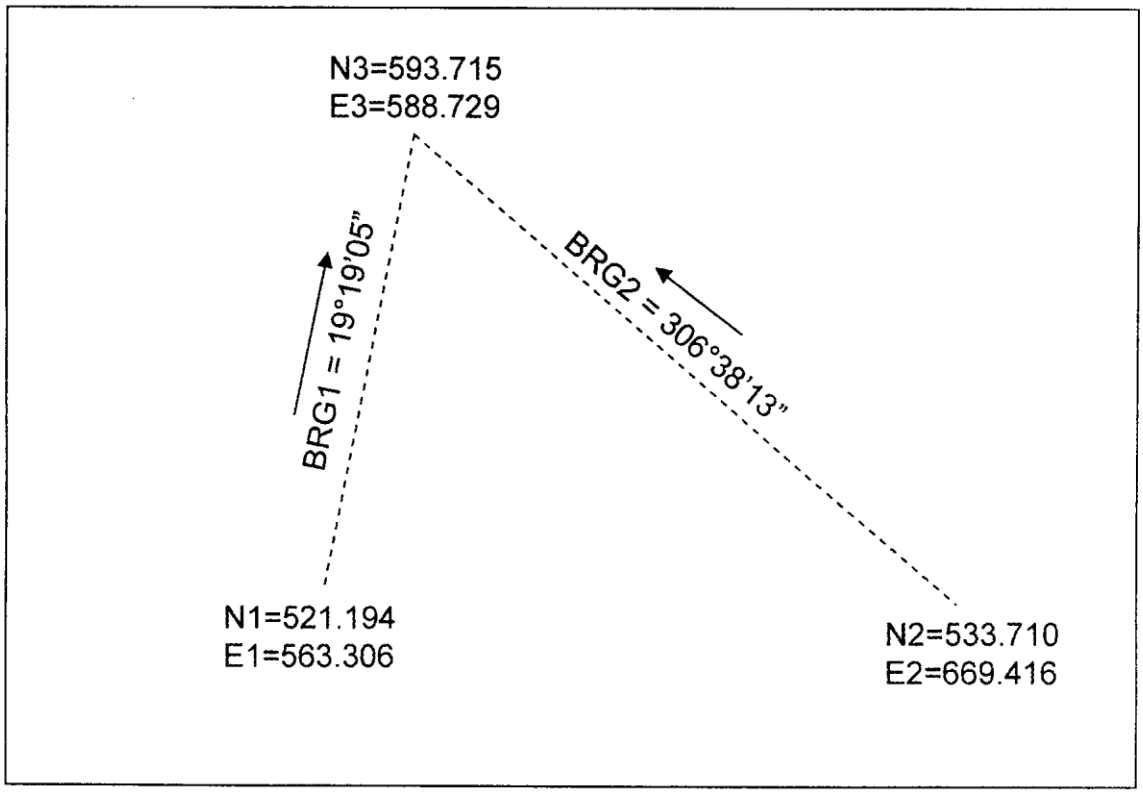


Example of setting out curve

From the example above, N2 and E2 are the northing and easting of the side shot point.

INTERSECT (Intersection by 2 known points)

1. Enter the coordinates of point 1 **(N1 / E1)**
2. Enter the coordinates of point 2 **(N2 / E2)**
3. Enter the bearing from point 1 to the unknown point 3 **(BRG1)**
4. Enter the bearing from point 2 to the unknown point 3 **(BRG2)**
5. The coordinates of point 3 will be displayed **(N3=? & E3=?)**
6. Repeat from step 1 as many times as desired



Note to be user:

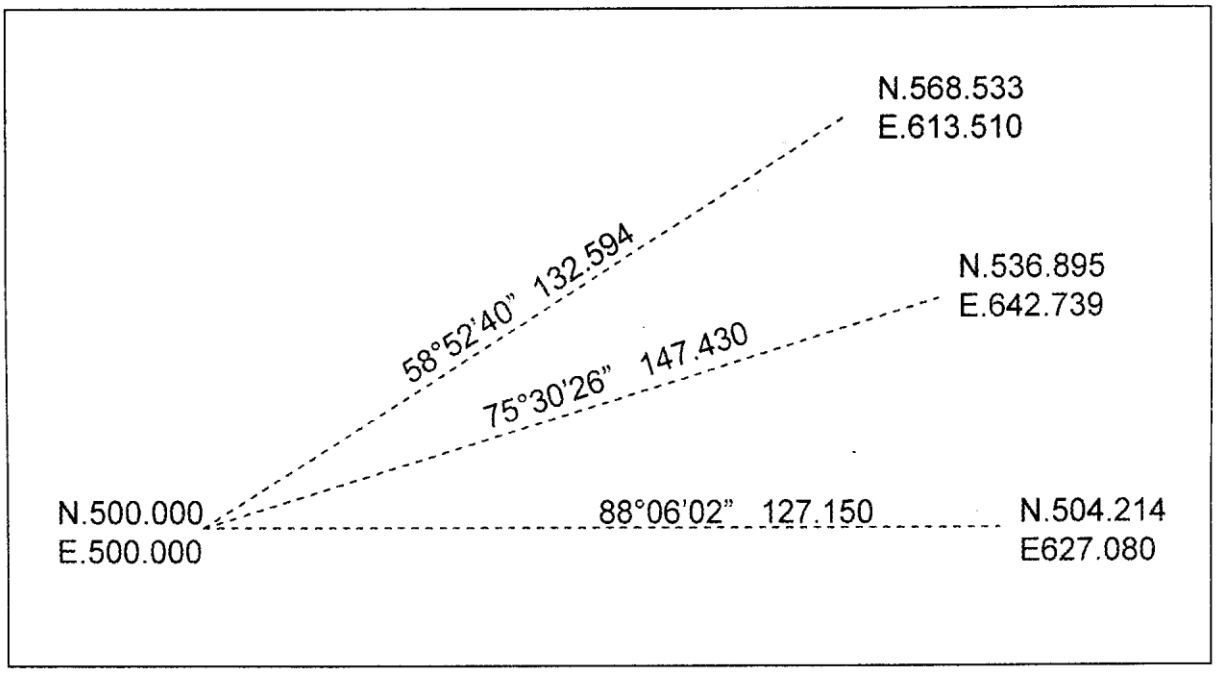
1. Coordinates of points 1 & 2 are known.
2. Bearings of 1-3 and 2-3 are known.

INVERSE (Compute Bearing & Distance using Coordinates

1. Enter Coordinate of the starting point. **(N1 – Northing / E1 – Easting)** and Press the Blue "EXE" button.
2. Enter Coordinate of the starting point. **(N2 - Northing / E2 – Easting)** and Press the Blue "EXE" button.
3. The Bearing and Distance between the two points will be displayed.
4. **Enter "0" (STAY)** to use the same starting point.
5. **Enter "1" (JUMP)** to use N2 and E2 as the starting point.
6. Repeat step 2 as many times as required.

RADIATION (To Compute Coordinates of points with 1 staring point)

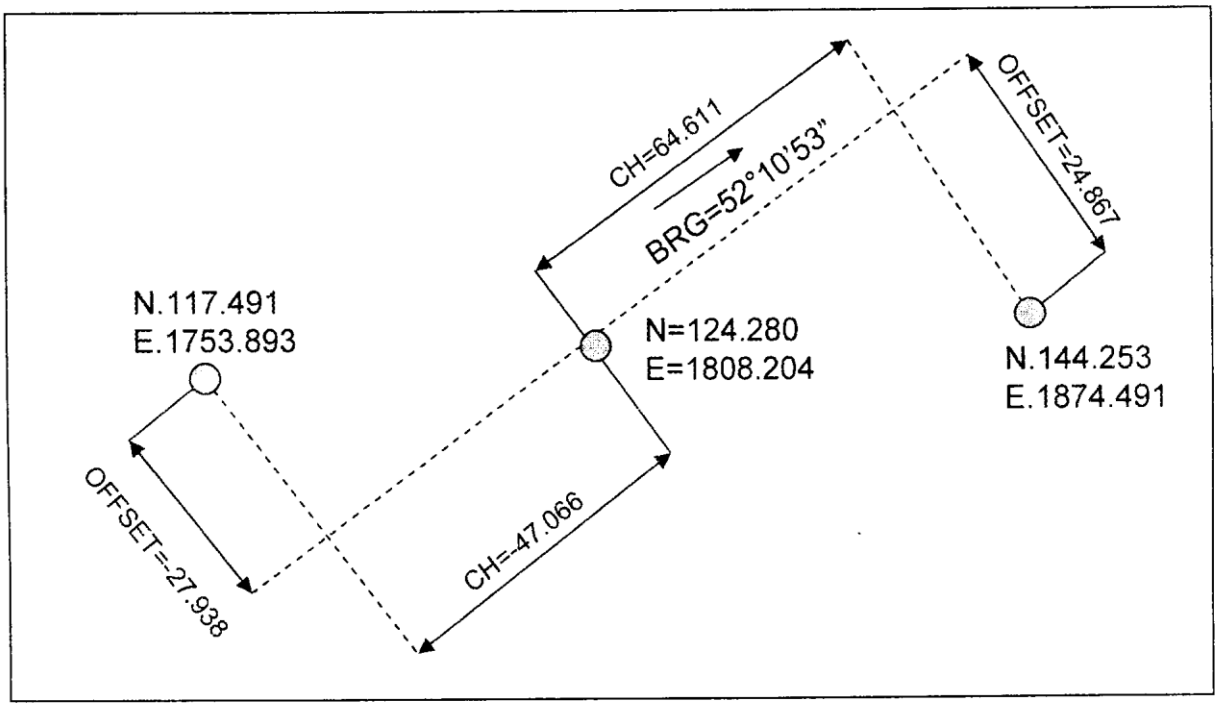
1. Enter Coordinate of the Station. **(N – Northing / E – Easting)** and Press the Blue "EXE" button.
2. Enter Bearing of the radiated point and Press the Blue "EXE" button.
3. Enter Distance of the radiated point and Press the Blue "EXE" button.
4. The coordinates of the radiated point will be displayed.
5. Repeat **Step 2** as many times as required.



INV OFFSET

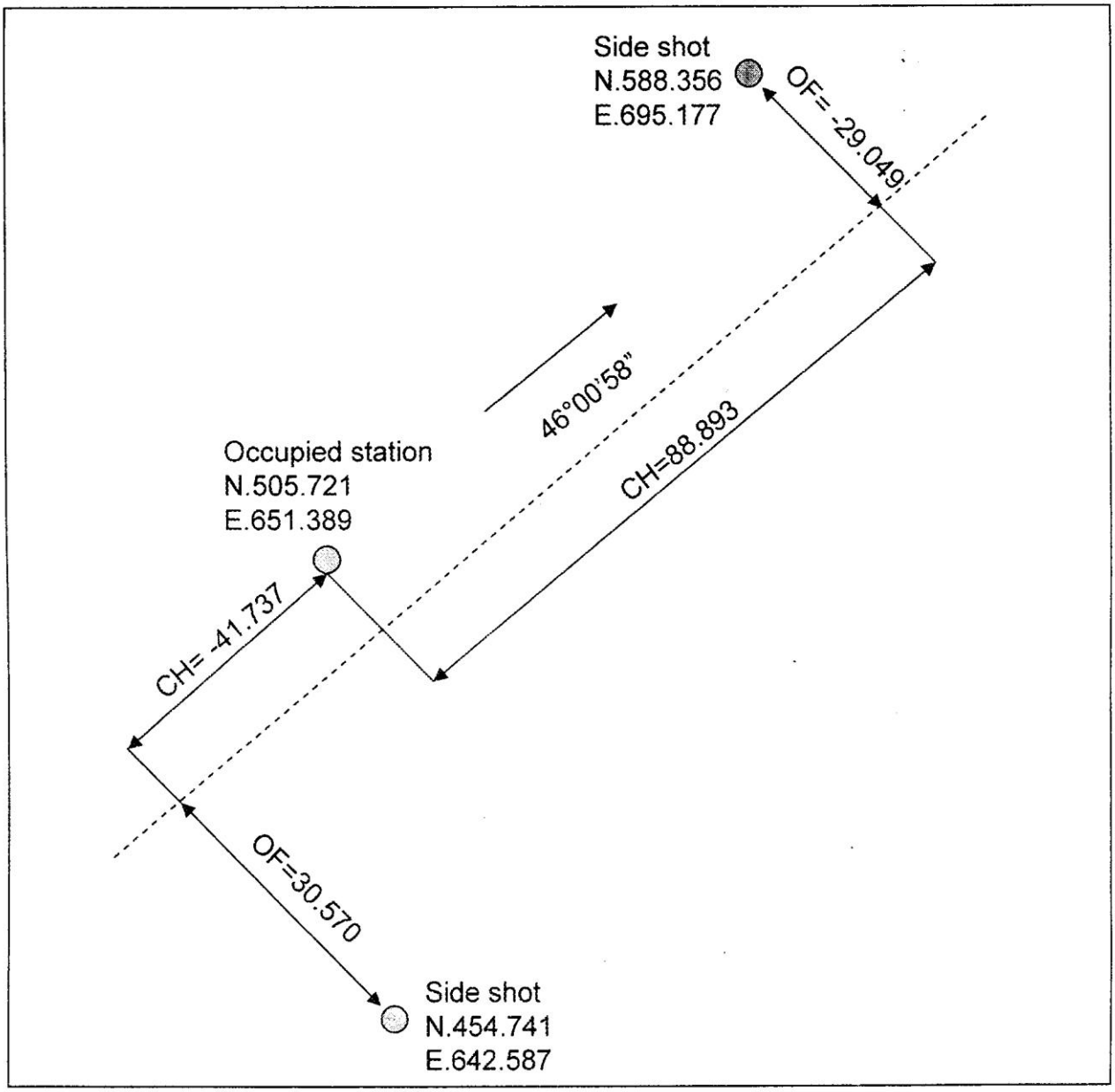
To compute the coordinates given the chainage and offset from a straight.

1. Enter the **northing of the occupied station (N).**
2. Enter the **easting of the occupied station (E).**
3. Enter **bearing of the straight (BRG).**
4. Enter the **chainage (distance along the straight) from the occupied station (CH).** Enter a negative value if the point is behind the occupied station.
5. Enter the **offset from the straight (OFFSET).** Enter a positive value for offset to the right and a negative value for offset to the left.
6. The **coordinates will be computed and displayed (OFFSET N & OFFSET E).**
7. Repeat from step 5 as required.



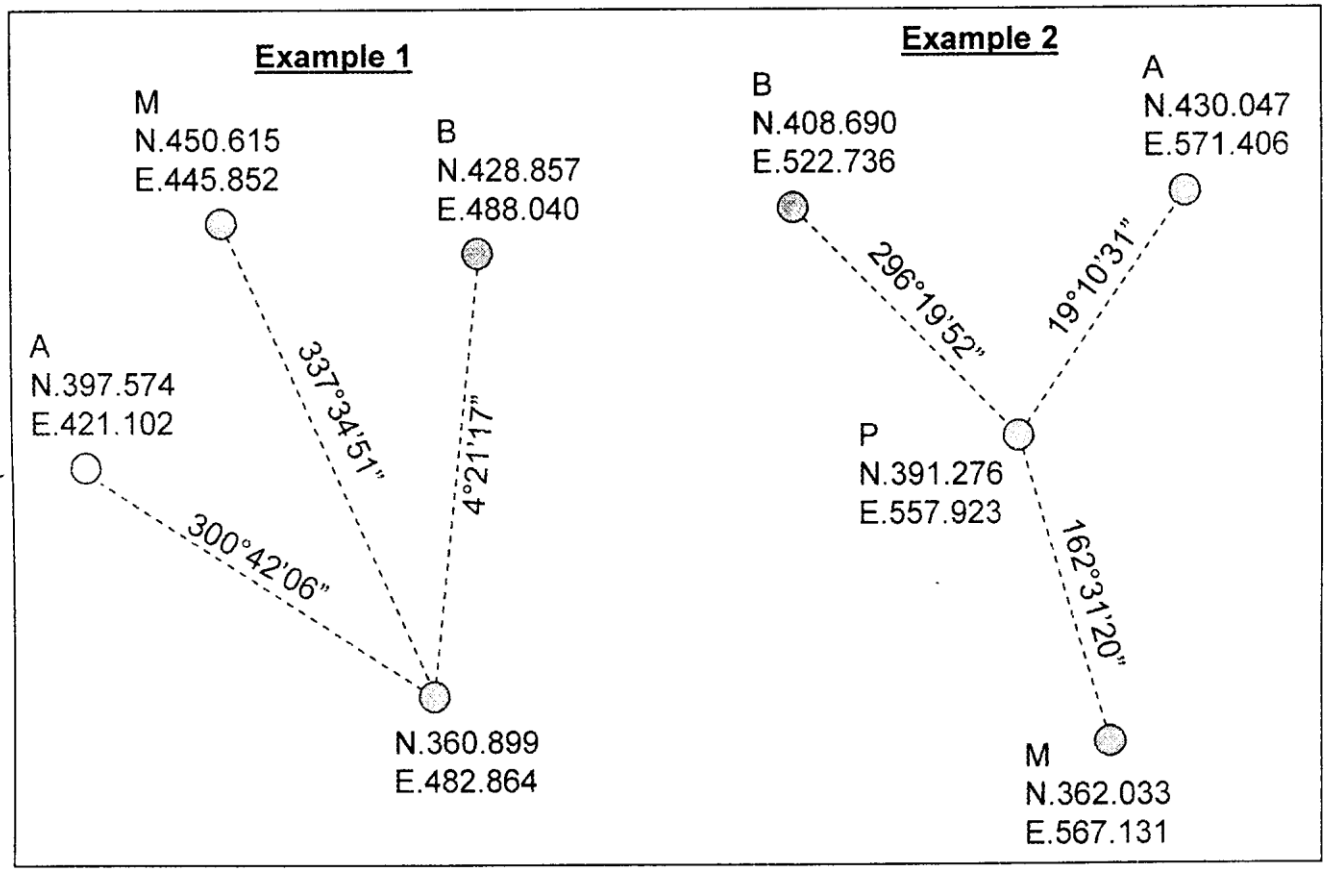
OFFSET

1. Enter the coordinates of the occupied station **(N1 & E1)** press "EXE".
2. Enter the **Grid bearing in "ddd.mmss" format.** E.g. 460058
3. Enter the coordinates of the side shot point **(N2 & E2)** press "EXE".
4. The **chainage** (distance from occupied station to the side shot point with reference to the grid bearing) aqnd the **offset distance** will be displayed.
5. Repeat from step 1 as many times as desired



RESECTION (Using 3 Known Point to compute 1 Unknown Point

1. Enter **Point 'A' Coordinate (Known Point A is always on the Left Side)** press "EXE".
2. Enter **Point 'M' Coordinate (Known Point M is always on the Middle)** press "EXE".
3. Enter **Point 'B' Coordinate (Known Point B is always on the Right Side)** press "EXE".
4. Enter **Bearing 'A' (From Unknown Point to Point 'A')** press "EXE".
5. Enter **Bearing 'M' (From Unknown Point to Point 'M')** press "EXE".
6. Enter **Bearing 'B' (From Unknown Point to Point 'B')** press "EXE".
7. The **unknown Point Coordinate (NP & EP) with be displayed.**



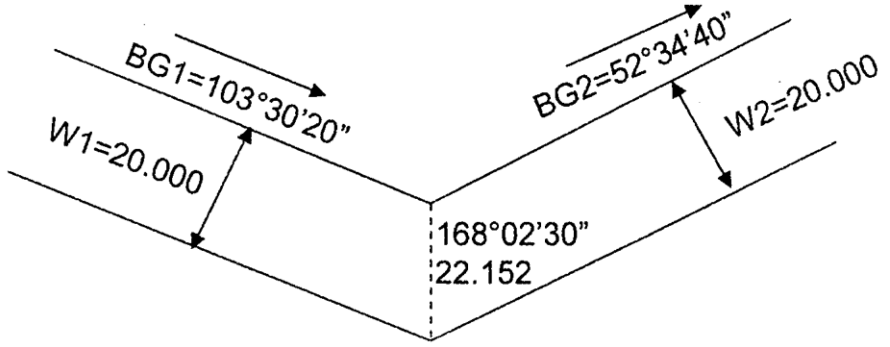
Note to user:

1. **Point P is the unknown point. Point A, B & M with known coordinates.**
2. **Point A is always on the left side and point B is on the right side. With respect to point M which is always in the middle**

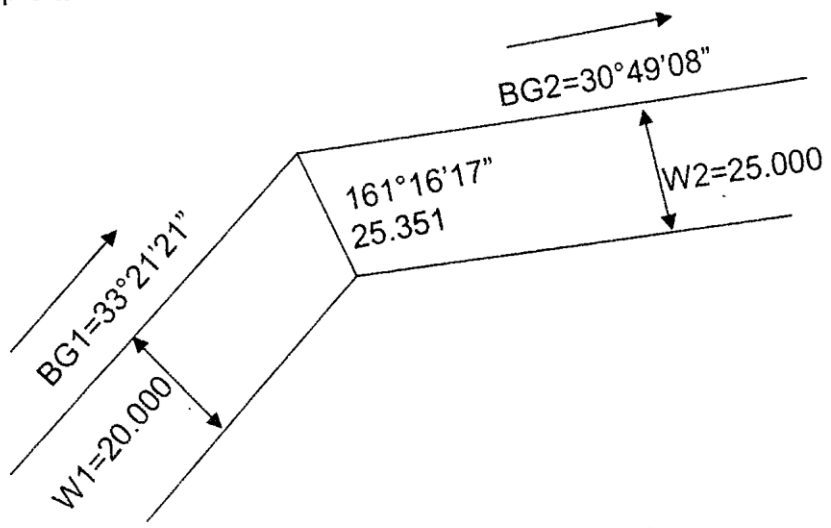
ROAD SECANT

1. Enter **(BRG 1)** and press the Blue "EXE" button.
2. Enter **(BRG 2)** and press the Blue "EXE" button.
3. Enter **(W 1)** and press the Blue "EXE" button.
4. Enter **(W 2)** and press the Blue "EXE" button.
5. It will display intersection **(BRG)** and press the Blue "EXE" button again it will display intersection **(DIST)**.

Example 1



Example 2

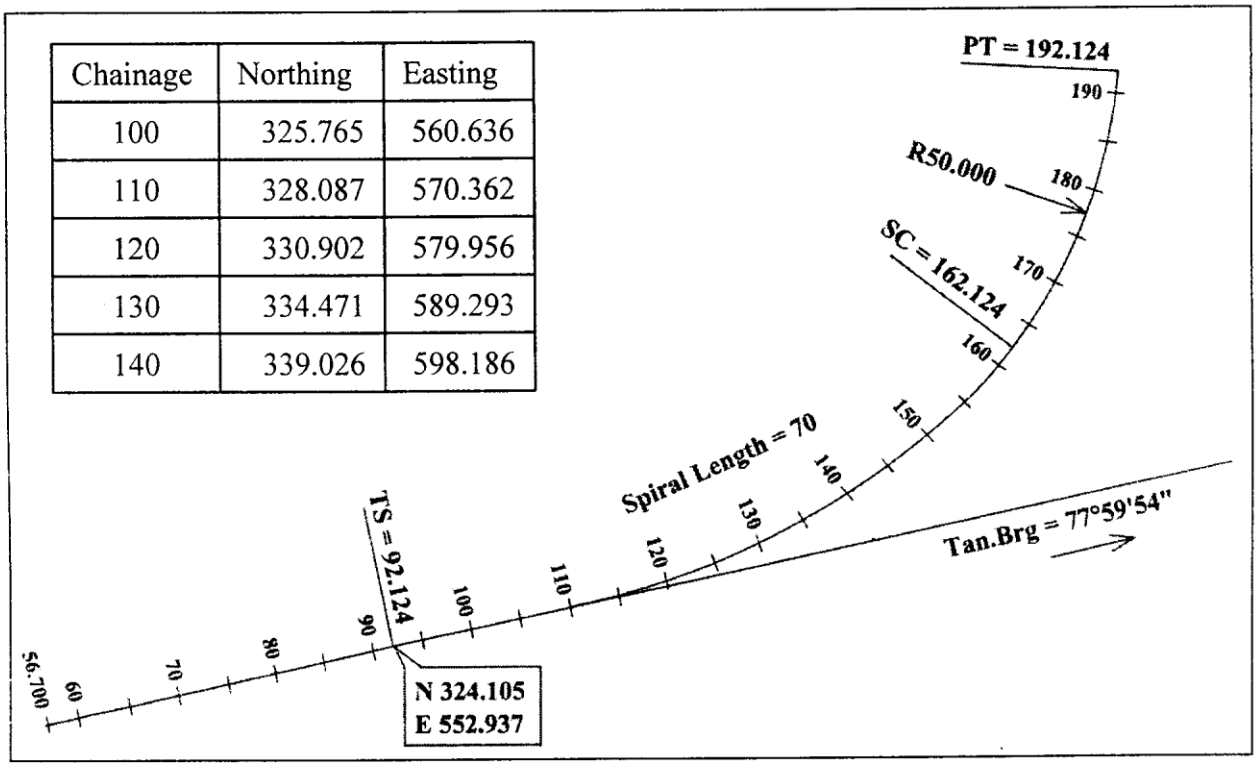


SPIRAL (SPIRAL CURVE SETTING-OUT)

1. Enter the **Tangential bearing (TAN.BRG)** of the straight that connects to the spiral.
2. Enter the **Coordinates of the tangent and spiral intersection point (TS.N & TS.E)**.
3. Enter the **chainage of the tangent and spiral intersection point (TS.CH)**.
4. Enter the **length of the spiral curve (SPIRAL LENGTH)**.
5. Enter the **radius of the connecting circular curve (RADIUS)**.
6. Enter **"1" for right-handed (clockwise) curve or "2" for left-handed (anti-clockwise) curve**.
7. Enter the **chainage** of the point to be set-out on the spiral **(SO.CH)**.
8. The **coordinates (SO.N & SO.E) will be computed and displayes**.

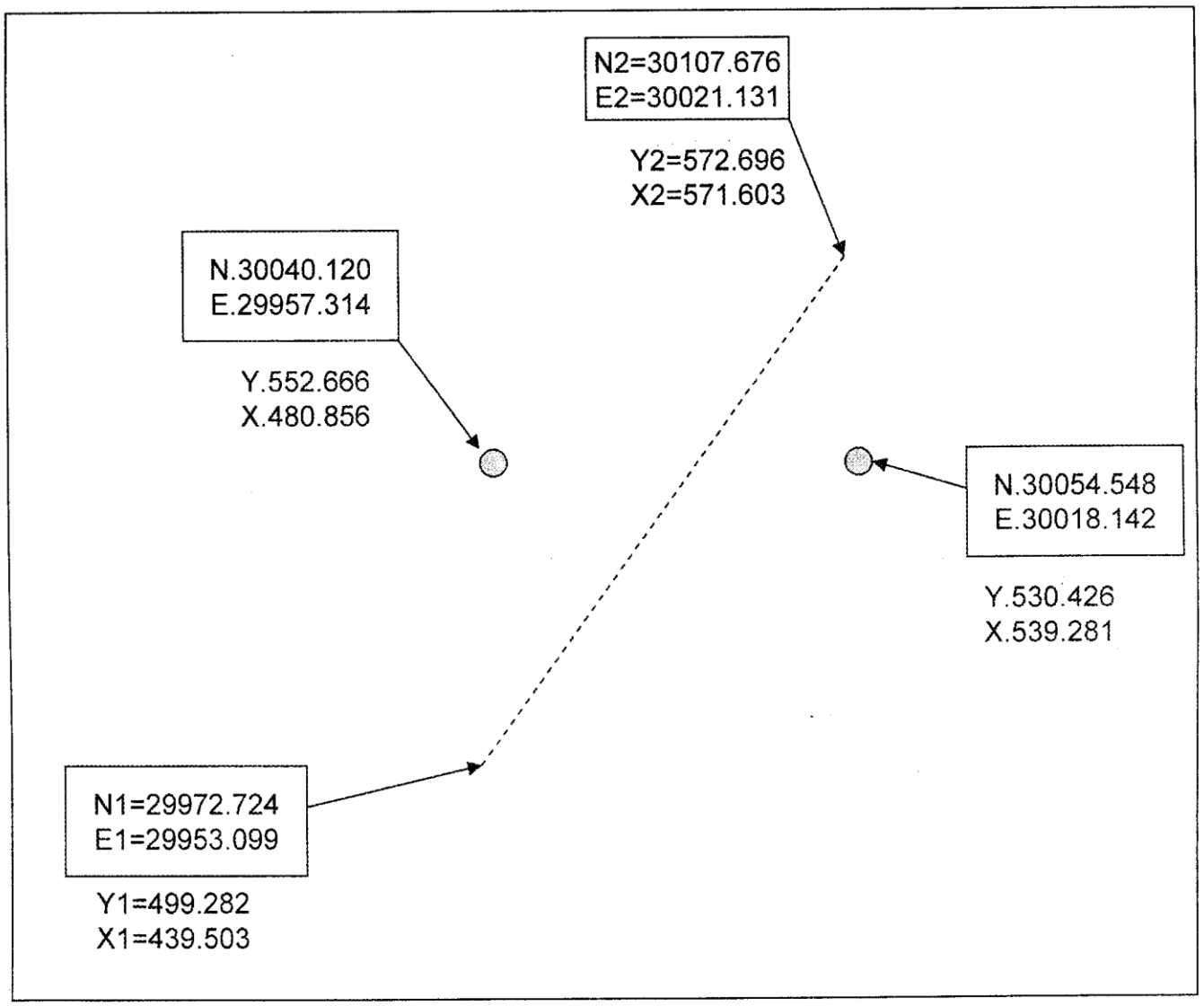
Repeat step 7 until all the required chainages are computed.

Chainage	Northing	Easting
100	325.765	560.636
110	328.087	570.362
120	330.902	579.956
130	334.471	589.293
140	339.026	598.186



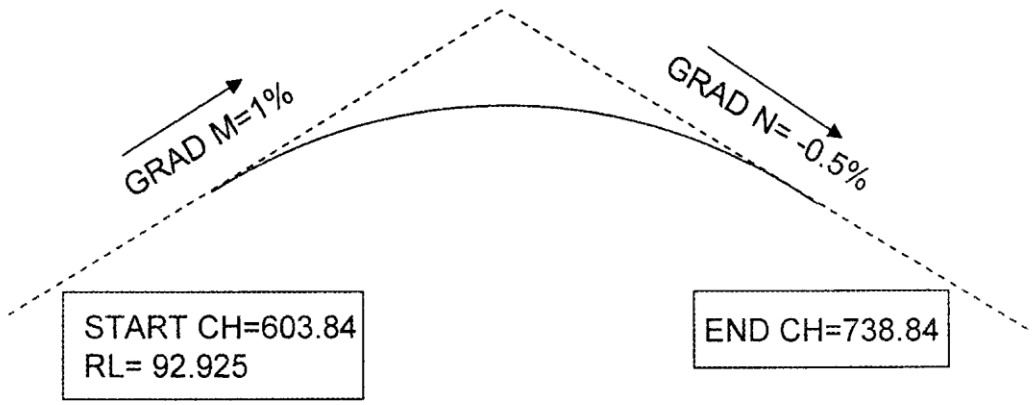
TRANSFORM (Coordinate transfromation)

1. Enter **true** coordinates of point 1 **(N1 / E1)**.
2. Enter **project** coordinates of point 1 **(Y1 / X1).**
3. Enter **true** coordinates of point 2 **(N2 / E2)**.
4. Enter **project** coordinates of point 2 **(Y2 / X2)**.
5. Enter the **true** coordinates of any point **(N? / E?)**.
6. The **project** coordinates **(Y=? / X=?)** will be displayed.
7. Repeat from step 5 as many times as desired.



V-CURVE (Vertical Curve Setting-out)

1. Enter the **gradient of the 1st straight in % (GRAD M)**.
2. Enter the **gradient of the 2nd straight (GRAD N)**. Note, enter positive gradient for up slope and negative for down slope.
3. Enter the **starting chainage (START CH)**.
4. Enter the **level at the starting chainage (RL AT START)**.
5. Enter the **ending chainage (END CH)**.
6. Enter the **chainage that is required for setting-out (CH)**.
7. The **reduced level at that chainage is computed and displayed (RL)**.
8. Repeat from step 6 as required.



CHAINAGE (D)	REDUCED LEVEL (Z)
620	93.072
640	93.214
660	93.311
680	93.364
693.84	93.375
700	93.373
720	93.337
738.84	93.263

TRAVERSE MISCLOSE (with Transit adjustment)

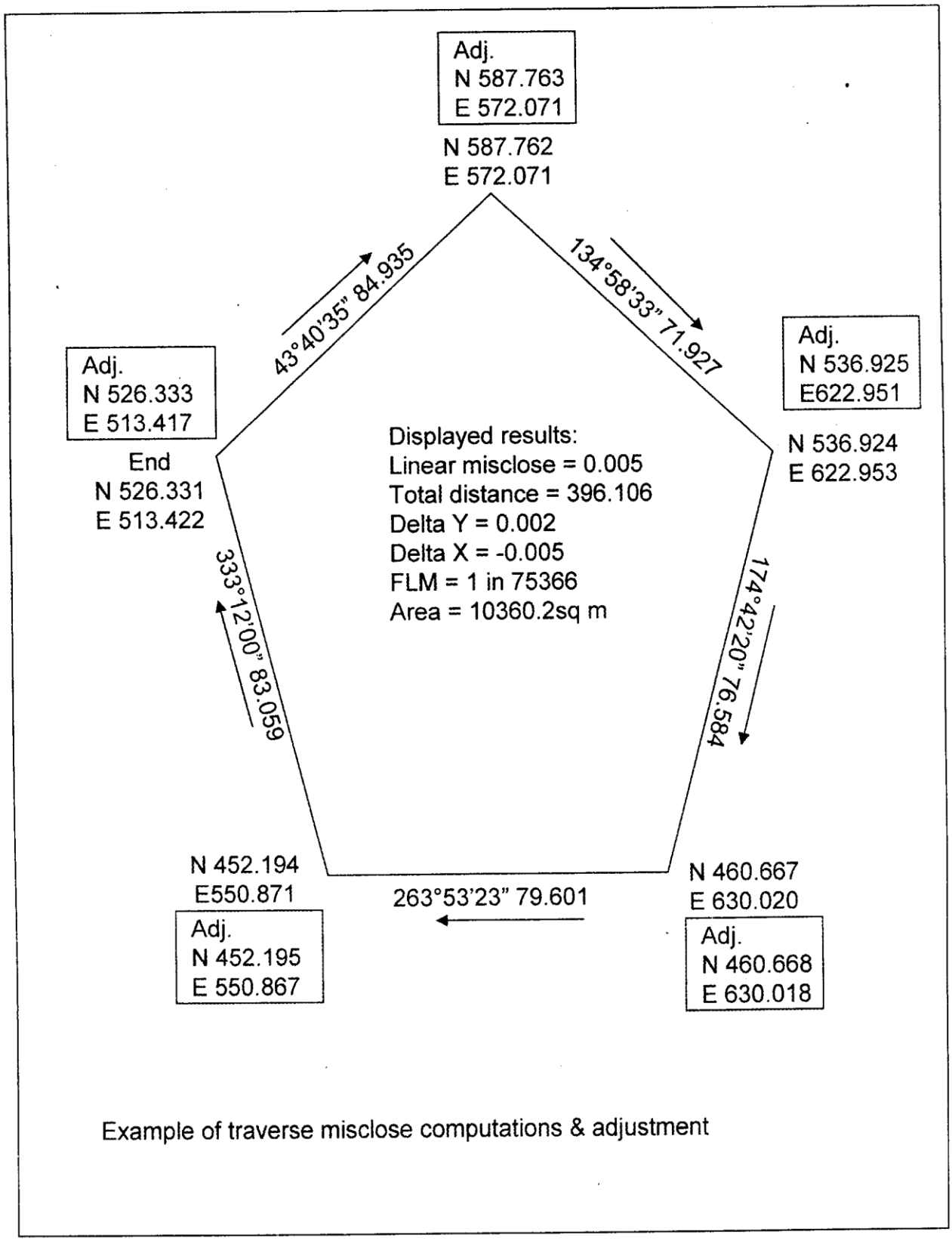
1. Enter coordinate of the starting point **(N1 – Northing, E1 – Easting).** If the coordinate are not needed, then enter "**0**" for the northing and the program will not prompt for any more coordinates.
2. Press the "**EXE**" button.
3. If "**Open loop**" is requied, enter the ending coordinates as well **(N2 & E2)**. If "**Closed loop**" is requied, enter "**0**" for the northing and easting will not be prompted.
4. Enter the bearing for the foresight reading and press the "**EXE**" button.
5. Enter the distance of the foresight reading and press the "**EXE**" button.
6. The foresight coordinates will be displayed, press the "**EXE**" button to continue. If the starting coordinates are keyed in as 0 (zero) for the northing and the easting, no coordinate will be displayed after every bearing and distance entry.
7. Repeat **Step 2** above until the **Last Bearing and Distance** have been entered.
8. Enter "**0**" for both the bearing and distance to end the traverse.
9. The misclose statistics and the area will be displayed.
10. Press the "**EXE**" button to avance to the next displayed statistic.
11. When "**0=DISPLAY 1=CONT 2=ADJUST 3=2ML**" is displayed enter the option by pressing the numeric keys as required.

    "0" - to repeat the display
    "1" - to continue with the next entry
    "2" - to do transit adjustment
    "3" - to compute 2 missing lines

12. Enter "**2**" to begin transit adjustment.
13. The program will prompt for the bearing and distance. You will need to re-enter the bearing and distance as prompted.
14. The adjusted coordinates (if entered) will be displayed after every entry.
15. Enter "**0**" for the bearing and distance to end data entry.
16. The **final area** will be displayed.

MISSING LINE (Using the Traverse Program)

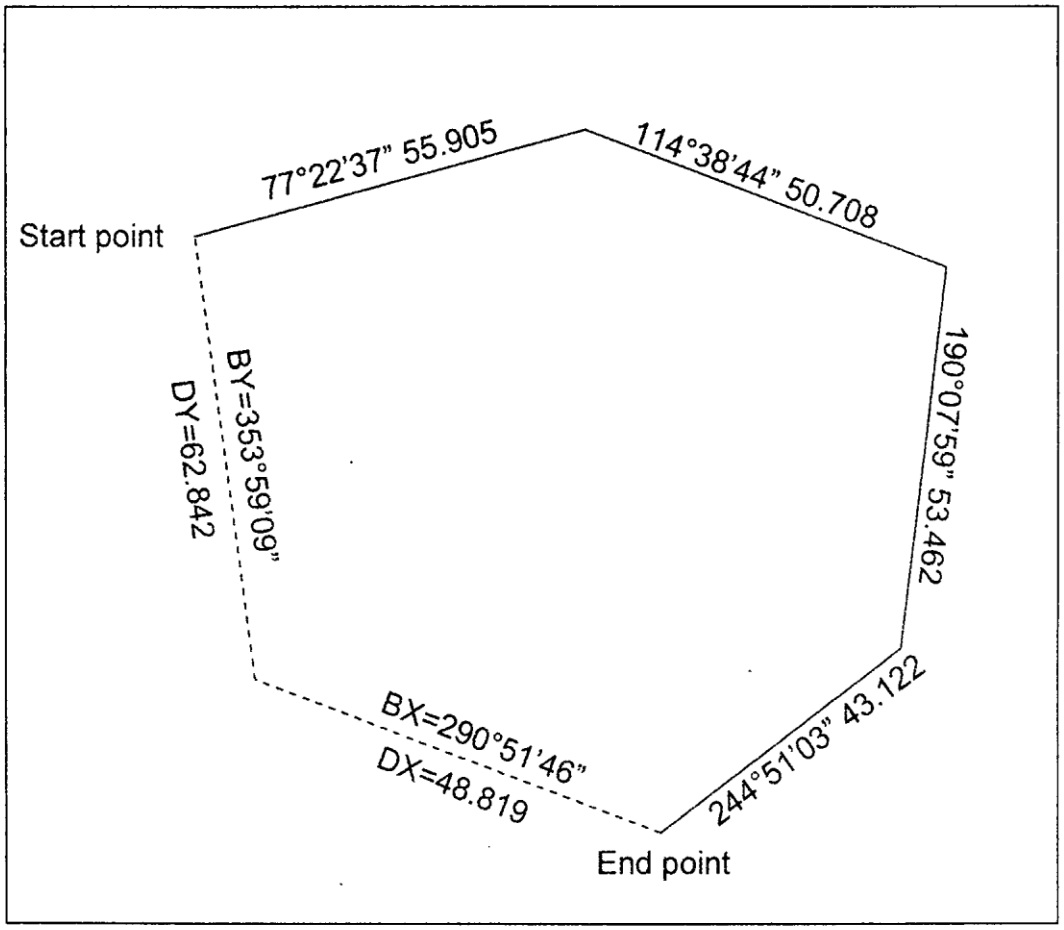
1. Enter "**0**" for the both northing and easting of the starting point. Press the "**EXE**" button.
2. Enter the bearing for the foresight reading and press the "**EXE**" button.
3. Enter the distance of the foresight reading and press the "**EXE**" button.
4. Repeat **Step 2** above until the **Last Bearing and Distance** have been entered.
5. Enter "**0**" for both the bearing and distance to end the data entry.
6. The missing line information will be displayed.
7. **All other information displayed should be ignored if using this function.**



Example of traverse misclose computations & adjustment

TWO MISSING LINE (Using the Traverse Program)

1. Enter the **coordinates for the both northing and easting** of the starting point or enter "**0**" if coordinates are not required the press the "**EXE**" button.
2. Enter the bearing for the foresight reading and press the "**EXE**" button.
3. Enter the distance for the foresight reading and press the "**EXE**" button.
4. Repeat **Step 2** above until the last bearing and distance have been entered.
5. Enter "**0**" for both the bearing and distance to end the data entry.
6. The missing line information will be displayed.
7. Enter the 1st bearing (**BX**)
8. Enter the 2nd bearing (**BY**)
9. The two missing distances (**DX** and **DY**) will be displayed.



SOLAR

1. Zone 1 – Data entry of observed values

1.1 Enter Circle Left (CL) horizontal reading to Reference Object (R.O.).
1.2 Enter 1st CL horizontal reading to Sun.
1.3 Enter 2nd CL horizontal reading to Sun.
1.4 Enter 1st CR horizontal reading to Sun.
1.5 Enter 2nd CR horizontal to Sun.
1.6 Enter Circle Right (CR) horizontal reading to R.O.
1.7 Results of "Mean on Sun" and "Mean of R.O." will be displayed.
1.8 Enter 1st CL vertical reading to Sun.
1.9 Enter 2nd CL vertical reading to Sun.
1.10 Enter 1st CR vertical reading to Sun.
1.11 Enter 2nd CR vertical reading to Sun.
1.12 "Mean Alt" will be displayed.
1.13 From the Star Alamanc, enter the Reflection and Parax correction value.
1.14 "True Alt" will be displayed.

2. Zone 2 – Compute the Latitude & Convergence

2.1 Enter the North co-ordinates of the station.
2.2 Enter the North co-ordinates of the Origin.
2.3 Enter the Latitude (Lat) of the Origin.
2.4 The "Last of Station" will be displayed.
2.5 Enter the East co-ordinates of the station.
2.6 Enter the East co-ordinates of the Origin.
2.7 The "Convergence" will be displayed.

3. Zone 3- Computes the Grid Beading

3.1 Enter Declination (DEC) at 0 hour U.T.
3.2 Enter DEC at 12 hour U.T.
3.3 Enter the U.T. at time of observation.
3.4 "DEC at observation" will be displayed.
3.5 Enter the true altitude (ALT) computed from "Zone 1".
3.6 Enter the Latitude of station as computed from "Zone 2".
3.7 The "Azimuth" (AZ) to the Sun will be displayed.
3.8 Enter the observed AZ (mean on Sun) as computed from "Zone 1".
3.9 Enter the observed R.O. (mean on R.O.) as computed from "Zone 1".
3.10 Enter the convergence (CON) as computed from "Zone 2".
3.11 The "Grid bearing" will be displayed.

TYPICAL SOLAR OBSERVATION FORM

Zone 1 — Zone 3

SOLAR OBSERVATION FOR AZIMUTH

STATION ..... R.O. ..... F.B. & PAGE ..... DATE OF OBSN .....

TYPE OF THEODOLITE ..... 1 DIV. OF HORIZONTAL LEVEL ..... OBSERVER .....

Time h.	m.			Horizontal	L. R.	Vertical	Dec. at ( ) hr. U.T.	Y
h.	m.	C.L.	R.O.	180 00 00	Level = (R−L)ten. Alt.		Diff. ±	
16	46			291 46 41		57 52 51	Dec. at Observation	−23 09 06
16	46			291 20 34		58 09 46	Cos. Azimuth = Sin. Dec.−(Sin. Alt. x Sin Lat.) / Cos. Alt. x Cos. Lat.	
16	47	C.R.		111 37 03		301 43 13	Azimuth	240 48 02
16	48			111 57 54		301 37 30	Obsd. Azimuth	291 33 05
			R.O.	0 00 00			Difference	
					Level		Obsd. R.O.	180 07 00
Mean Time		Moon on Sun		291 33 03	Mean Alt.	31 51 52	True. R.O.	
8	47	Moon on R.O.		180 00 00	Refn. & Parx.	0 01 17	Con. & Lev.	+0 22 28
U.	T.				True Alt.	31 50 35	Grid Bearing	129 17 24
		C.L.	R.O.	180 00 00			Dec. at ( ) hr. U.T.	
16	49			282 21 23		58 29 45	Diff. ±	
16	49			291 15 20		58 37 30	Dec. at Observation	−23 09 06
16	50	C.R.		111 29 54		301 11 11	Azimuth	241 01 39
16	50			111 10 25		301 03 08	Obsd. Azimuth	291 46 45
			R.O.	0 00 00			Difference	
					Level		Obsd. R.O.	180 00 00
Mean Time		Moon on Sun		291 46 43	Mean Alt.	31 16 44	True. R.O.	
8	50	Moon on R.O.		180 00 00	Refn. & Parx.	0 01 18	Con & Lev.	
U.	T.				True Alt.	31 15 26	Grid Bearing	129 17 19

Co-ord. of Station N.	2,99/0.6	Mean Grid Bearing
Co-ord. of Origin N.	0 000	Computed by :
Sum / Difference + / −		
Sum / Difference x 0.0325695 ±		
Lat. of Origin N.	2 67 37	
Lat. of Station N.	2 16 27	Date :
Co-ord. of Station E.	-113:54.7	Checked by :
Co-ord. of Origin E.	0.000	
Sum / Difference +/−		
Diff.Long.=Sum / Diff. x 0.0322517		Zone 2
Diff. Long. x Sin. Lat.		
Convergence	+0 02 25	Date :