Co-ordinate 'Inverse' Program 2
or Bearing and Distance from Co-ordinates

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This program allows you to enter two co-ordinate pairs and calculate the bearing and distance between them. The far point (or To point, or point 2, with co-ordinates (E2, N2)) is entered first, followed by the near point (or From point, or point 1, with co-ordinates E1, N1)). The result will give the bearing from the From point to the To point.

Because of the limitation in the HP-33S displaying letters, these are displayed separately, one at a time. You will need to note these and write the final bearing using the two letters and the angle.

Line	Instruction	Display	User Programming Instructions
V0001	LBL V		
V0002	SF 10		⮕ FLAGS SF .0
V0003	CLΣ		⮐ CLEAR Σ (4)
V0004	Σ+		
V0005	STOP		R/S
V0006	Σ–		⮐ Σ–
V0007	Σx		⮕ SUMS Σx
V0008	x > 0 ?		⮕ x ? 0
V0009	N		⮕ EQN RCL N
V0010	x ≤ 0 ?		⮕ x ? 0
V0011	S		⮕ EQN RCL S
V0012	Σy		⮕ SUMS Σy
V0013	x > 0 ?		⮕ x ? 0
V0014	E		⮕ EQN RCL E
V0015	x ≤ 0 ?		⮕ x ? 0
V0016	W		⮕ EQN RCL W
V0017	Σy		⮕ SUMS Σy
V0018	ABS		⮐ ABS
V0019	Σx		⮕ SUMS Σx
V0020	ABS		⮐ ABS
V0021	y, x → θ, r		⮐ → θ, r
V0022	x < > y		
V0023	→HMS		⮕ →HMS
V0024	x < > y		
V0025	CF 10		⮕ FLAGS CF .0
V0026	STOP		R/S

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Notes

To run the program, enter the co-ordinates of the far (To) point, (E2, N2). Key in E2, press the ENTER key, key in N2 and press XEQ V.

Enter the co-ordinates of the near (From) point (E1, N1). Key in E1, press the ENTER key, key in N1, then press the R/S key.

The calculator will stop and display a single letter. This will be 'N' or 'S,' as the meridian from which to turn the bearing angle. Press the R/S key and the calculator will continue with the calculation.

The calculator will then stop and display a second single letter. This will be 'E' or 'W,' as the direction in which the bearing is to be turned. Press the R/S key and the calculator will continue with the calculation.

When the calculator stops, the lower part of the stack will contain the following values.

Stack Register	Contents
Y	Bearing angle of the line in degrees, minutes and seconds (HP notation), but without any letters
X	Distance of the line

Sample Computation

Enter far point's co-ordinates: E2   205 123.456   Press Enter

N2   123 456.789   Press XEQ V

The calculator will stop and display 1.000000

Enter near point's co-ordinates: E1   206 654.321   Press Enter

E1   132 654.987   Press R/S

The calculator will stop and display 'S.'

Press R/S to continue.

The calculator will stop and display 'W.'

Press R/S to continue.

The calculator will stop with the final values displayed.

Stack will now contain: 9.265706   in the Y register (bearing angle, DMS)

9,324.719518   in the X register (distance)

The length of the line is 9324.720. The bearing of the line is S 9° 26' 57".056 W (if you need it to that level of precision!)

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Storage Registers Used

None.

Statistical Registers: Σx = Y or N co-ordinates, or ΔY or ΔN

          Σy = X or E co-ordinates, or ΔX or ΔE

Labels Used

Label V   Length = 82   Checksum = AA16.