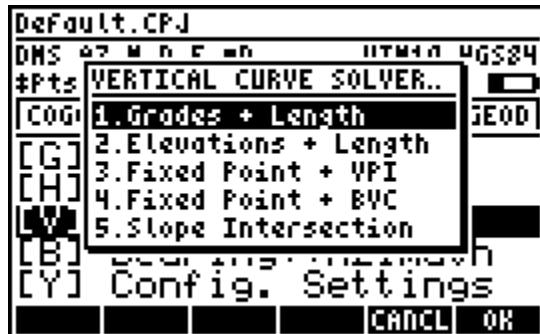


# Vertical Curve Solver

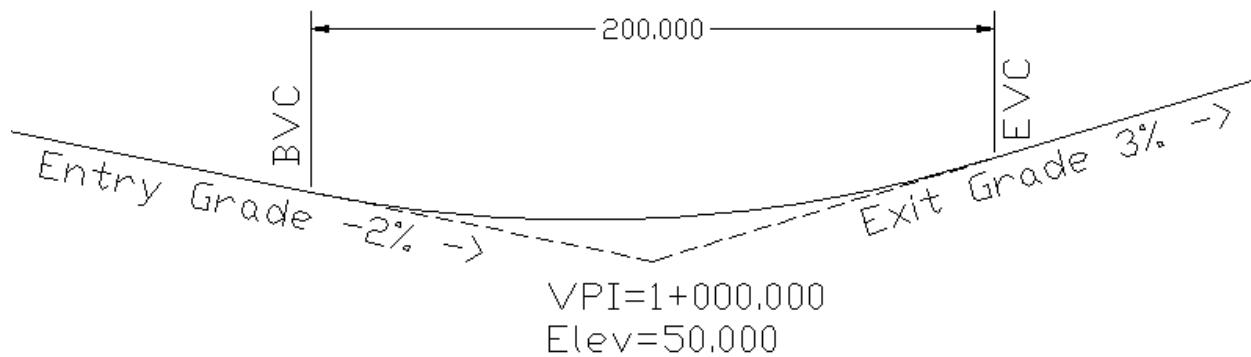
## Using COGO+ Pro by Simple Geospatial Solutions

The Vertical Curve Solver program in COGO+ Pro is found in the TOOLS menu. The solver can be used with 5 possible solving scenarios, depending on the type of information known. When the curve is solved it is also possible to calculate elevations for any station on the curve, as well as on tangents outside the curve.

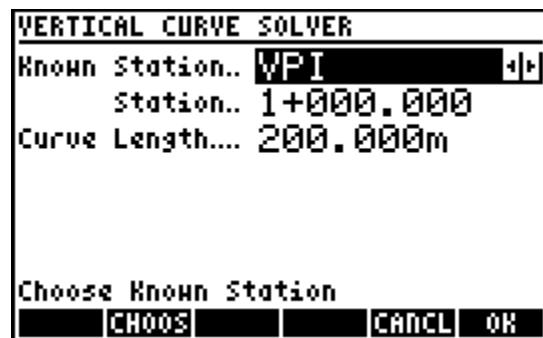


### Example 1

A vertical curve is given with a length of 200m and a known station at the VPI of 1+000 and a known elevation of 50.000, also at the VPI. The entry grade is -2%, exit grade is 3%. Solve the stations and elevations of the BVC and EVC.



Step 1: Start the Vertical Curve Solver and choose “1.Grades + Length”, then enter the known station and length information.



Step 2: Next enter the grade and elevation information.

VERTICAL CURVE SOLVER			
Entry Grade..	-2.000 %		
Exit Grade....	3.000 %		
Known Elev....	VPI	↓↑	
Elev.... 50.000m			
Entry Grade			
EDIT		CANCL	OK

Step 3: The curve solution is displayed, with stations and elevations solved at BVC, VPI, EVC and the High/Low point. Note the softmenu.

VERTICAL CURVE SOLUTION			
BVC Sta....	0+900.000		
Elev.. 52.000m			
VPI Sta....	1+000.000		
Elev.. 50.000m			
EVC Sta....	1+100.000		
Elev.. 53.000m			
LOW Sta....	0+980.000		
Elev.. 51.200m			
Elev?	Sta?	INT	EXPRT
OK			

Option 1: Press [Elev?] to solve the elevation at any station.

SOLVE ELEVATION			
Station.....	1+019.500		
.....			
Elevation..	51.395m		
Enter Station to Solve			
EDIT		CANCL	

Option 2: Press **F2** **[Sta?]** to solve the station with a certain elevation.

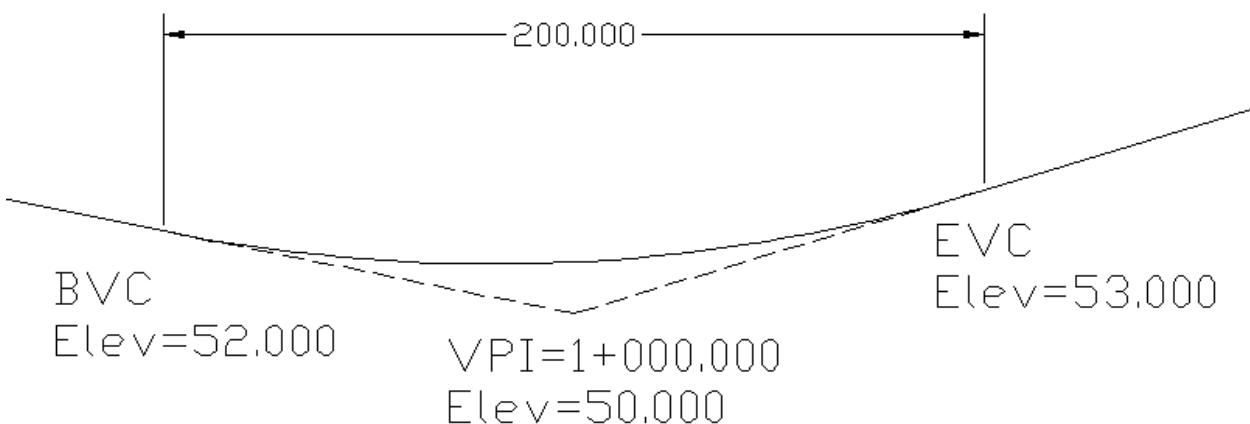
<b>SOLVE STATION(S)</b>		
Elevation.. <b>51.500m</b>		
.....		
Station 1.. 0+931.010		
Station 2.. 1+028.990		
Enter Elevation to Solve		
<b>EDIT</b>		<b>CANCL</b>

Option 3: Press **F3** **[INT]** to enter a station interval and solve the elevations at each station.

<b>VERTICAL CURVE</b>	<b>Station Interval Elevations</b>
.....	BVC: 52.000
Station Interval:	0+910.000: 51.813
100	0+920.000: 51.650
	0+930.000: 51.513
	0+940.000: 51.400
	0+950.000: 51.313
	0+960.000: 51.250
	0+970.000: 51.213
	0+980.000: 51.200
	0+990.000: 51.213
<b>CANCL</b>	<b>GRAPH</b>
	<b>OK</b>

## Example 2

A vertical curve is given with a length of 200m and a known station at the VPI of 1+000 and known elevations at BVC of 52.000, at VPI of 50.000 and at EVC of 53.000. Solve the entry and exit grades.



Step 1: Start the Vertical Curve Solver and choose “2.Elevations + Length”, then enter the known station and length information.

<b>VERTICAL CURVE SOLVER</b>		
Known Station..	VPI	••
Station..	1+000.000	
Curve Length....	200.000m	
Choose Known Station		
CH00S	CANCL	OK

Step 2: Enter the known elevation values.

<b>VERTICAL CURVE SOLVER</b>		
BVC Elevation..	52.000m	
VPI Elevation..	50.000m	
EVC Elevation..	53.000m	
Enter BVC Elevation		
EDIT	CANCL	OK

Step 3: The curve solution is displayed, with values solved for the entry and exit grades, the stations at the BVC, VPI, EVC and High/Low point, and the elevation at the High/Low point. Again note the softmenu, the same options are available as shown in Example 1.

<b>VERTICAL CURVE SOLUTION</b>		
Entry Gd..	-2.000 %	
Exit Gd....	3.000 %	
BVC Sta..	0+900.000	
VPI Sta....	1+000.000	
EVC Sta....	1+100.000	
LOW Sta....	0+980.000	
Elev..	51.200m	
Elev? Sta? INT EXPRT		OK