


The Prosurv cEZ Comps button contains 13 powerful routines:

- **Divide Curve**
- **Translate and Rotate**
- **Translate Elevations**
- **Polygon Area**
- **Segment (Curve) Area**
- **Pre-determined Sliding Line Area**
- **Pre-determined Hinged Area**
- **Closed Traverse Compass Rule Adjustment**
- **Connecting Traverse Compass Rule Adjustment**
- **Distribute Plat Error (Compass Rule)**
- **Compute a Radius Point based on 3 points**
- **Fit Curve to Two Tangents (Curb Returns)**
- **Divide Line 2D/3D**

Note: The first time you use a Comps function, it may take a few seconds to load.



Divide Curve

The divide curve routine lets you divide a curve several different ways. It can even create Offset points (offset from the curve). Options include:

- Every 3 degrees
- 2 degrees
- 1 degree
- 1/2 degree
- 1/3 degree
- 1/4 degree
- Split by
- Other

Prosurv cEZ Comp's
9:41
ok

Divide Curve

PC Point #	<input type="text" value="2"/>	Comp
Radius Point #	<input type="text" value="3"/>	
PT Point #	<input type="text" value="4"/>	
Offset	<input type="text" value="0"/>	
Curve Right	<input checked="" type="checkbox"/>	
	<input type="text" value="3 degrees"/>	

Status

If you select **Split by**, then you can enter a number of divisions. The example shows 5 total arcs, which creates 6 points.

Prosurv cEZ Comp's
9:42
ok

Divide Curve

PC Point #	<input type="text" value="2"/>	Comp
Radius Point #	<input type="text" value="3"/>	
PT Point #	<input type="text" value="4"/>	
Offset	<input type="text" value="0"/>	
Curve Right	<input checked="" type="checkbox"/>	
	<input type="text" value="Split by"/>	
# of Arcs (2 arcs=3 pts)	<input type="text" value="5"/>	

Status

If you select **Other**, you can enter any Degree amount in D.MMSS format. In this example, a point will be computed every 4°33'00".

Prosurv cEZ Comp's
9:43
ok

Divide Curve

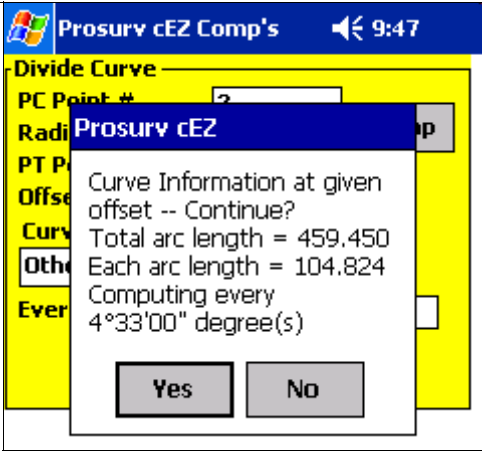
Curve Right	<input checked="" type="checkbox"/>	
	<input type="text" value="Other"/>	
Every x Deg (d.mmss)	<input type="text" value="4.3300"/>	

Status

Using the last example, pressing the **Comp** button yields the message shown here.

Tap **Yes** to store the computed points, or **No** to exit the routine.

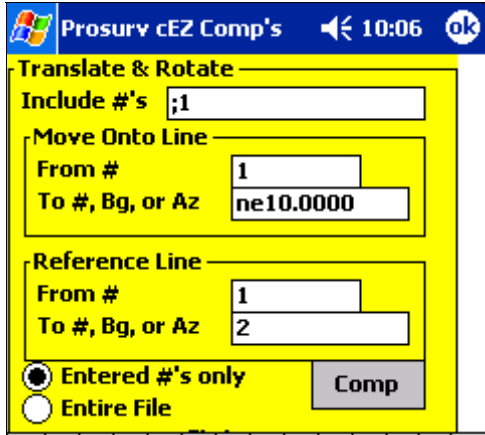
Then tap the **OK** button in the upper right corner to exit the routine.




Translate & Rotate

The powerful translate and rotate routine gives you the ability to translate points, rotate points, or do both at the same time. Options include:

- Translate/Rotate up to 200 points at one time
- Translate/Rotate the entire job
- Translate/Rotate a list of points
- Translate/Rotate a pre-defined SET of points
- Use 4 point numbers
- Use a "From point" and an Azimuth or Bearing to define each system
- Use an asterisk to define a line, such as 8*22 which uses the Azimuth between points 8 and 22



In the example above, the points contained in SET #1 are to be translated and rotated. SET #1 contains points 1.5 (1 through 5) as previously defined, and happens to represent some horizontal geometry that was defined as tangent-curve-curve.

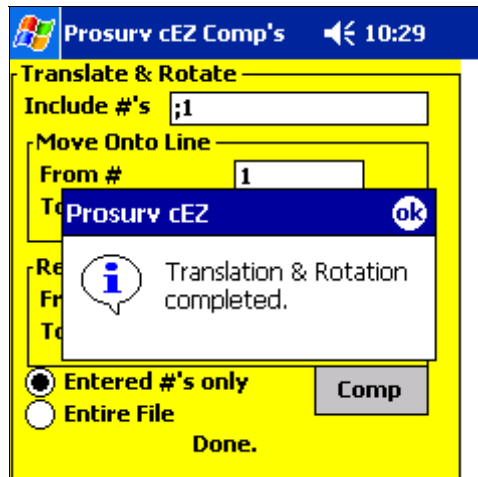
To use this routine, you define two points (or a point and a line) **to translate/rotate ONTO**. Then you define two points (or a point and a line) that represent your existing coordinate system.

In the example, there won't be any translation, since you're using the same point number "From" for each system, in this case, **Point #1**. If you entered a different "From" number for the Reference Line, such as 55, then Prosurv cEZ would "move" or translate your points based on the translation between 55 and 1.

Back to the example, the **existing bearing** from 1 to 2 is N 22°15'10" E, which you **don't need to know**, because Prosurv cEZ will compute the bearing from 1 to 2 since you entered these numbers for the reference line.

Ultimately, in the example, we will be rotating our horizontal geometry from its current position so that points 1 to 2 will be at N 10°00'00" E.

Tap the Comp button to compute and store the points. In this case, only the points 1.5 will be changed.



If you need to translate without any rotation, you could enter **NE0.0000** for each **To #**. An example would be moving from a 1000, 1000 system to 50000,50000.



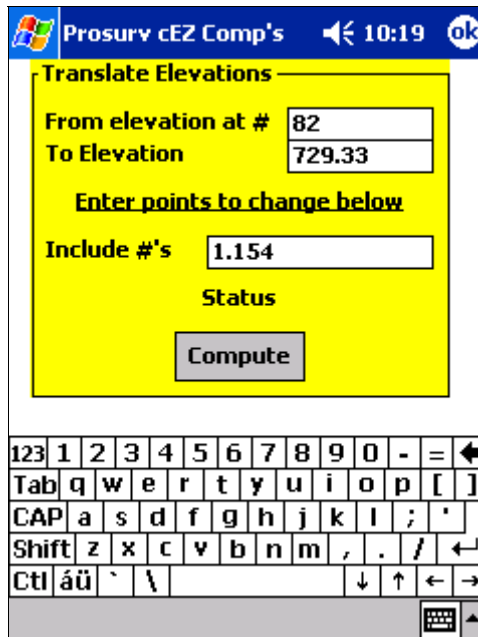
Translate Elevations

This routine lets you translate elevations from one datum to another. To translate the elevations of points in your job:

- Enter the point number whose elevation is used as the "From" elevation
1. Enter the new elevation for that point
 2. Enter the point numbers whose elevations will be changed, based on the difference between 1 and 2. The point being used for #1 does not have to be in the list of points being changed.

This routine is setup so that it works the way you do. For example, say you've shot a Fire Hydrant as a Benchmark and initially it was assumed as 100.00' in elevation. When you shot the BM, it was stored as shot #82. Now, you've run a level circuit and find that it's elevation is actually 729.33. So for the first text box you'd enter 82, and in the second text box, you'd enter 729.33. It's that EZ!

In the third text box, you've entered the point list 1.154. So every point from #1 to #154 will have it's elevation increased by $(729.33-100) = 629.33'$.

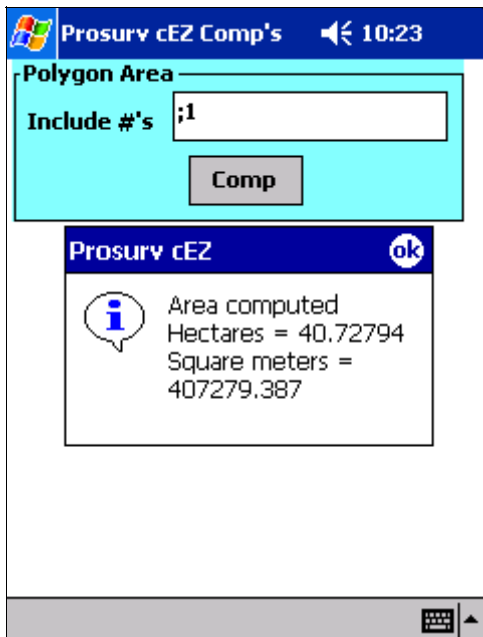


40 Polygon Area

This routine simply computes the Area within a boundary. A point list of up to 200 points can be entered, or you can enter a SET (pre-defined point list) by entering a semicolon and the SET #, such as ;5.

Note that if your Job units have been defined as metric, the area will be displayed in Hectares and Square meters.

If your Job units are US Foot, then your area will be displayed in Acres and Square feet.



Curve (Segment) Area

This routine computes the curve area within the curve segment. Enter the PC, PT, and Radius Point of the curve whose area you need.

Then press the Comp button to see the results.

If your Job units are metric, then Square meters and Hectares will be displayed.

Prosurv cEZ Comp's 10:28

Curve Segment Area


PC #	2
PT#	4
RP#	3

Comp

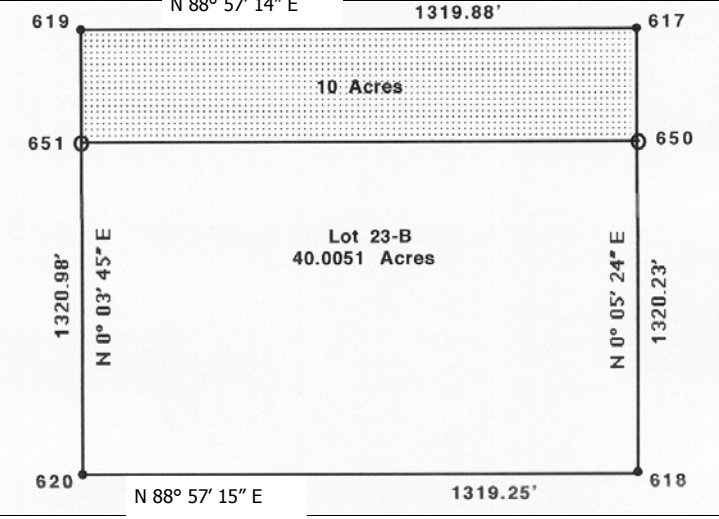
Prosurv cEZ ok

Area computed
Square Feet = 6085.951
Acreage = 0.140

▲



Pre-determined Area—Sliding Line



You may use this routine to cut up a parcel or to expand acreage. The routine will create two intersecting points and only requires you to enter four points. Each point created will be on the lines given (i.e. Line 1 and Line 2). The two points will be at the bearing that you've chosen.

The Bearing that you choose can be **any Bearing**. It is not required that this bearing be parallel to any other line. To select the bearing of the new line, you may either:

- **Enter the Bearing directly.**
- **Enter two points representing the Bearing.**

Example

You want to create a 10 acre piece of land inside of a known 40+ acre Lot whose south line is parallel with the south line of the Lot. Line 1 is represented by points 617-618 while Line 2 is represented by points 619-620. The needed acreage therefore lies to the left of points 617 and 619 (the 'From' points of each line).

This will tell Prosurv cEZ how to compute the 10 acres. If you gave Line 1 as 619-620 and Line 2 as 617-618, then the 10 acres would be created

above the 40 acre Lot rather than inside of it. This is how you would *expand* acreage (simply by the way that you enter the four points).

PDA Sliding Line

618 To # 620 To # Comp

617 From # 619 From # Hint

Area to Create 10

Bg to Hold 620*618

Total Area

123 [] { } 7 8 9 # % = ◀

^ , . < > 4 5 6 + - * /

± ° : \ | 1 2 3 ↓ ↑ ← →

\$ ¢ € £ ¥ (0) Tab space ←

Tap the **Hint** button to view the screen shown here.

Hints

Note: Creation of area is to the LEFT of the From points

For Bg to Hold, enter: Bearing (NW25.1215), Az (125.1312), or Point*Point

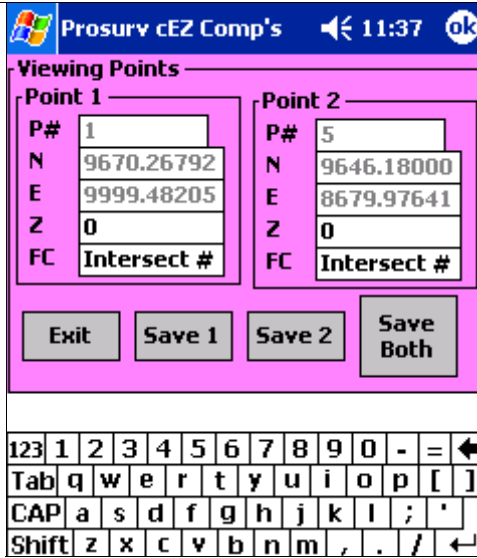
4 15

53 22

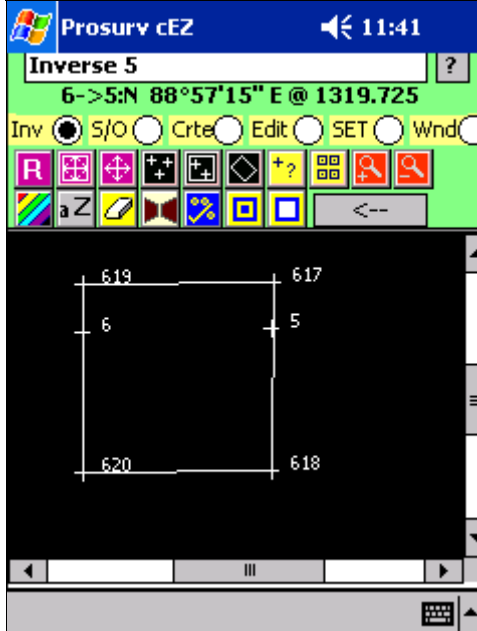
New Acreage

OK

The results of the computation are shown here. You can save either point, or both points.



The resulting points (5 and 6) are plotted and displayed. Note the Inverse between the points is parallel to the south line of the Lot, which is what we wanted.



Computed points are shown to the right.

Points: Pg #1 of 1 11:45 ok

<- -> PNEZF PA

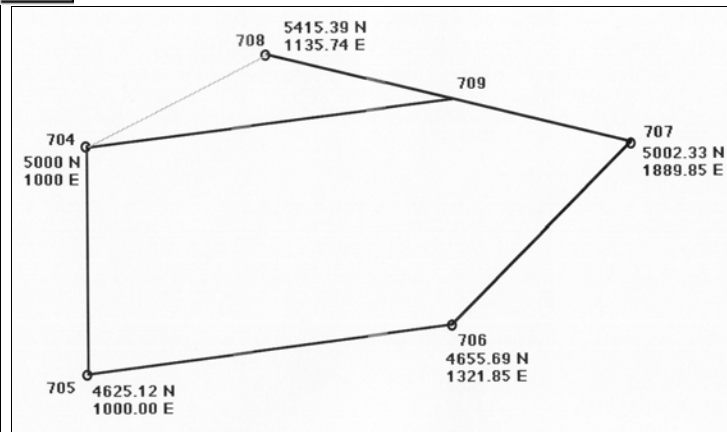
Jump to Page Find # List Set

Go Go

Pt #	North	East	Elev	FCode
2	3586.688	3142.990		
3	3516.823	3539.215		3
4	3717.644	3190.580		3
5	9670.268	9999.482		
6	9646.180	8679.976		
617	10000.000	10000.000		
618	8679.772	9997.926		
619	9976.672	8680.337		
620	8655.692	8678.896		



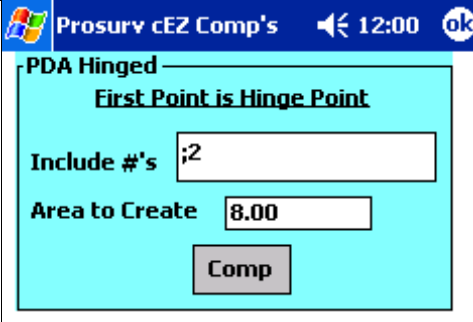
Pre-determined Area—Hinged



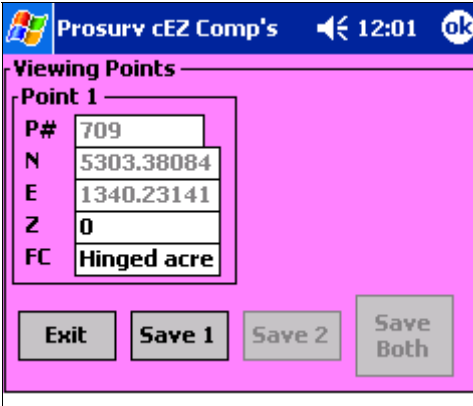
This routine can create acreages using up to 100 points to define the polygon. The first point entered will be the point used as the hinge point. The points of the polygon can be entered on the first line, or you may use a set number representing the points of the polygon simply by pressing a semi-colon ; followed by the set number.

In this example, points 704.708 have been stored as SET #2, and we'd like to create 8 acres.

View the computed point and tap **Save 1** to store it.



The screenshot shows the 'PDA Hinged' screen with a cyan background. It features a title bar with the Windows logo, 'Prosurv cEZ Comp's', a back arrow, '12:00', and an 'ok' button. The main content area has the title 'PDA Hinged' and the subtitle 'First Point is Hinge Point'. Below this, there are two input fields: 'Include #'s' containing ';2' and 'Area to Create' containing '8.00'. A 'Comp' button is located at the bottom center.

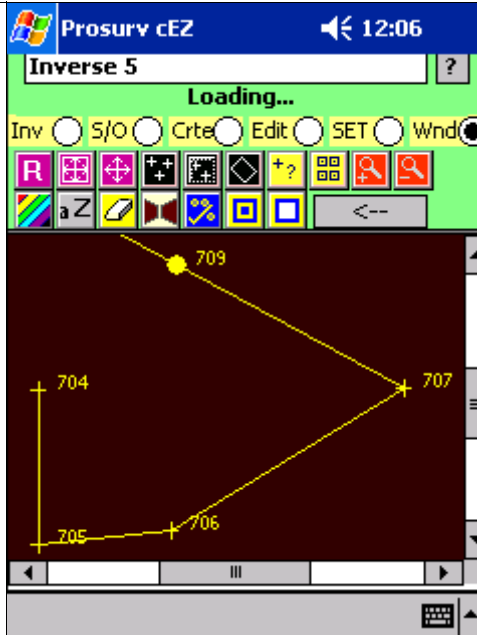


The screenshot shows the 'Viewing Points' screen with a pink background. It features a title bar with the Windows logo, 'Prosurv cEZ Comp's', a back arrow, '12:01', and an 'ok' button. The main content area has the title 'Viewing Points' and the subtitle 'Point 1'. Below this, there is a table of data:

P#	709
N	5303.38084
E	1340.23141
Z	0
FC	Hinged acre

At the bottom of the screen, there are four buttons: 'Exit', 'Save 1', 'Save 2', and 'Save Both'.

Plotted points are shown to the right.



CRA

Compass Rule Adjustment—Closed Traverse

This routine will solve a correctly closed traverse, and requires the point numbers of the actual traverse points, along with the "extra" points shot when closing your traverse.

The illustration demonstrates the use of the "extra points".

Note that #5 is the point that you shot while occupying #4, backsighting #3 and "closing" to #2, which already existed since it was your original backsight when you started the traverse.

Point #6 is the shot you took while occupying #5, backsighting #4 and turning to #1 (the original POB).

Finally, you set up on #6, backsighted #5, and turned a closing angle to #3. This is the 78.1812 (D.MMSS) angle shown above.

Prosurv cEZ Comp's
◀ 12:14
ok

Compass Rule Adj (Closed)

Include #'s (Traverse Points)

1,3,4,2

Point # of 'extra' point at original Backsight (5)

of 'extra' pt at POB (6)

'Closing' Angle at POB

Counter - Clockwise

1,3,4,2

5

6

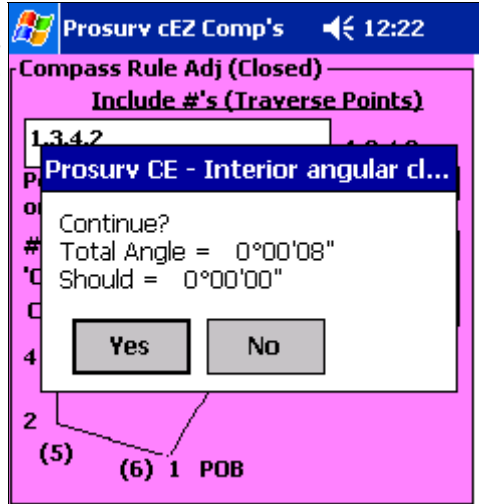
78.1812

Comp

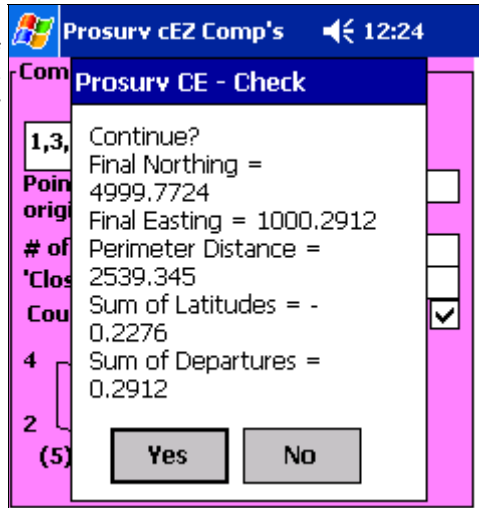
1	5000.0000	1000.0000
2	5438.2487	561.7513
3	5350.9003	1230.4849
4	6031.4494	639.9355
5	5438.3502	561.6466
6	4999.7825	1000.0827

Coordinates for the traverse points are shown here.

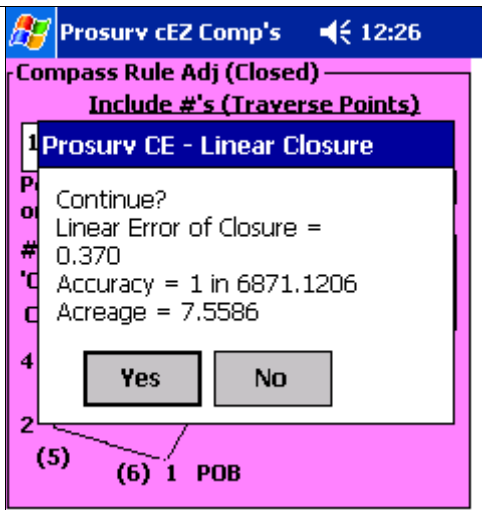
First, Prosurv cEZ shows you the Angular Error (in this case, the total should be exactly 360° which = 0°).



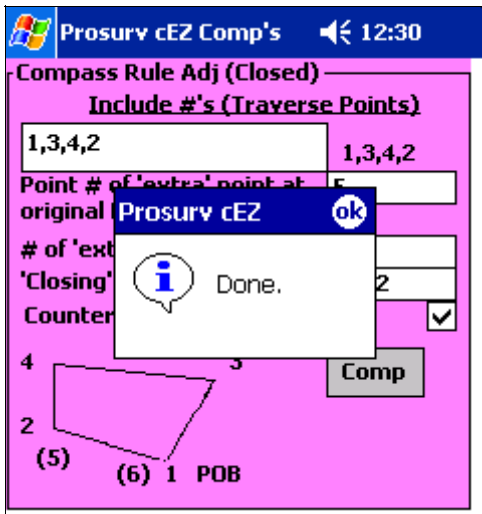
The next screen shows you the Sum of Latitudes and Departures, along with other necessary closure information.



Finally, the Linear Error of Closure, Accuracy, and total Area is shown.



When you have completed viewing the closure information, Prosurv cEZ allows you to *Overwrite* the current traverse point's coordinates with the adjusted coordinates. If you wish to save the original coordinates, you should **export your points as an asc file** before computing the closure and overwriting the points. This way, you could bring them back into the job (and overwrite the adjusted points, or offset the point numbers) if needed.

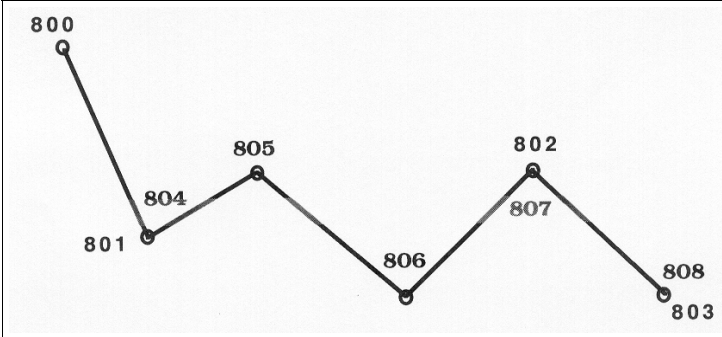


The adjusted coordinates are shown here.

1	5000.0000	1000.0000
2	5438.4133	561.5362
3	5350.9379	1230.4368
4	6031.5620	639.7773
5	5438.3502	561.6466
6	4999.7825	1000.0827



Compass Rule Adjustment—Connecting Traverse



800 and 803 are concrete monuments. The coordinates shown below are from data given to you by your client (820-823 are the results of this routine).

Your traverse points between the monuments were shot as shown above. Also, as shown above, the coordinate of your first traverse point should be the same as the monument's coordinate.

Prosurv cEZ Comp's 12:40 OK

Compass Rule Adj (Connect)

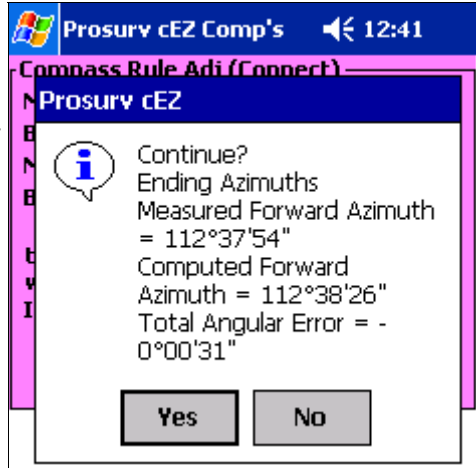
Monument #1 (Record)	801
Back-Az Pt for mon #1	800
Monument #2 (Record)	802
Back-Az Pt for mon #2	803

Below enter the points of your traverse starting at mon. #1, ending with the forward azimuth of mon. #2

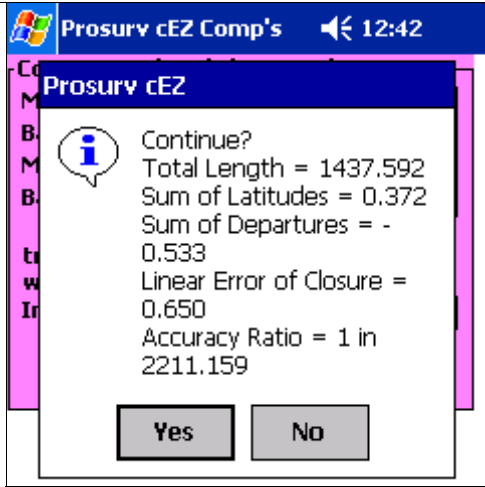
Include #'s

<u>Point #</u>	<u>Northing</u>	<u>Easting</u>
800	6002.85	800.77
801	5053.77	1029.55
802	5218.65	2129.33
803	4897.22	2899.98
804	5053.77	1029.55
805	5100.35	1492.87
806	4795.04	1819.33
807	5219.10	2128.77
808	4897.52	2900.11
820	5053.77	1029.55
821	5100.21	1493.04
822	4794.76	1819.65
823	5218.65	2129.33

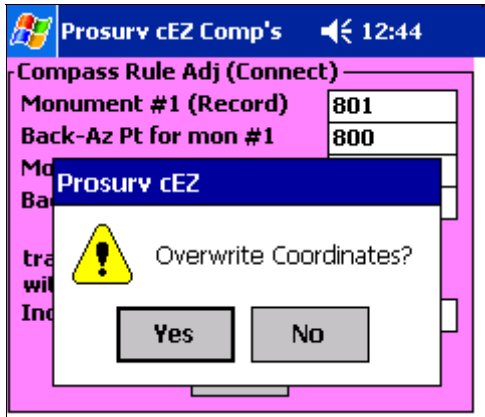
The forward azimuth to the final monument is displayed and compared to the computed forward azimuth. This angular error will then be applied to each bearing along your traverse.



The closure information is shown here. If the closure is acceptable to you, press **Yes**. You will now be able to store the fully adjusted coordinates.

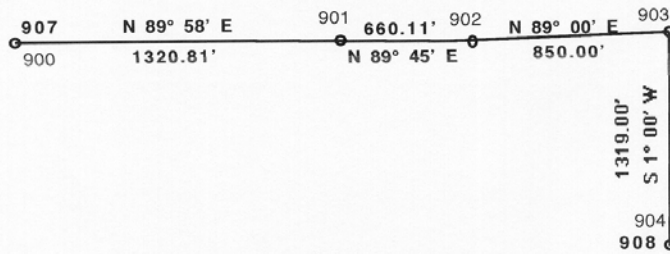


This routine overwrites the given points with the adjusted coordinates. Because of this, you should export your points as a backup prior to using this routine (in case of any mistakes).



CRA
Plat
Error

Compass Rule Adjustment—Distribute Plat Error



This routine allows you to adjust pre-computed plat coordinates to better fit what you've located in the field.

Points 900.904 are pre-computed coordinates based on a General Land Office Plat of 1917. A traverse was run during which monuments were found at points 907 and 904. These monuments were shot as points **907 and 908** respectively. The coordinates of these points are shown below. When using this routine, the coordinate of the first monument **must** be the same coordinate as the first point of your pre-computed traverse.

Prosurv cEZ Comp's
⏪ 1:06
ok

Compass Rule Adj (Dist. Plat Error)

Monument #1 (Found)

Monument #2 (Found)

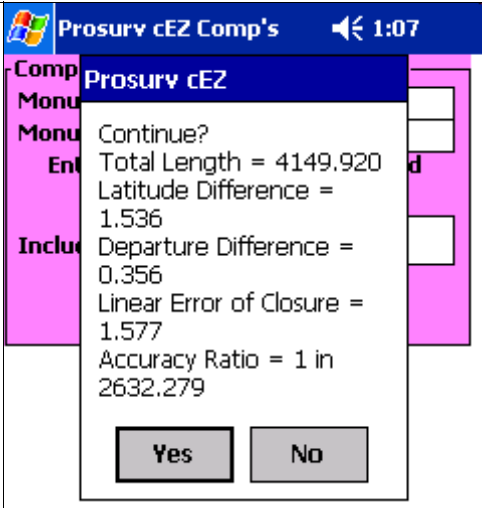
Enter the points of the computed plat below

Include #'s

Page 30

Comps

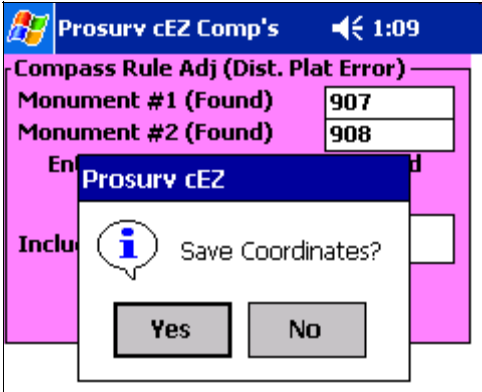
The closure information is shown here. If the closure is acceptable to you, tap **Yes**. You will now be able to store the fully adjusted **plat** coordinates.



The screenshot shows the 'Prosurv cEZ Comp's' app interface. A dialog box titled 'Prosurv cEZ' is displayed, asking 'Continue?'. The dialog lists the following statistics: Total Length = 4149.920, Latitude Difference = 1.536, Departure Difference = 0.356, Linear Error of Closure = 1.577, and Accuracy Ratio = 1 in 2632.279. There are 'Yes' and 'No' buttons at the bottom of the dialog.

You may enter a new point number to begin storing your corrected coordinates (of the traverse).

The adjusted coordinates are stored automatically, using the Auto #.



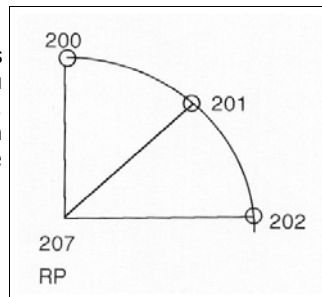
The screenshot shows the 'Prosurv cEZ Comp's' app interface. The main screen is titled 'Compass Rule Adj (Dist. Plat Error)'. It has two input fields: 'Monument #1 (Found)' with the value '907' and 'Monument #2 (Found)' with the value '908'. A dialog box titled 'Prosurv cEZ' is overlaid on the screen, asking 'Save Coordinates?' with 'Yes' and 'No' buttons.

The entered, computed, and adjusted coordinates are shown here.

Points: Pg #1 of 4			
		<input checked="" type="radio"/> PNEZF	<input type="radio"/> PA
Jump to Page		<input checked="" type="checkbox"/> List Set	
<input type="text"/>	Go	Find #	<input type="text" value="3"/> Go
Pt #...North...East...Elev...FCode			
900	5000.0000	1000.0000	
901	5000.7684	2320.8098	
902	5003.6487	2980.9135	
903	5018.4832	3830.7840	
904	3699.6841	3807.7643	
907	5000.0000	1000.0000	
908	3701.2200	3808.1200	
909	5001.2572	2320.9230	
910	5004.3818	2981.0833	
911	5019.5309	3831.0266	

Comp RP **3-Point Radius Point**

This routine will compute a radius point given 3 points on a curve. You must enter the points from left to right. The resulting coordinate will have an equal radius to all three points on the curve.



Prosurv cEZ lets you see the results of the computed point before you store the point. This lets you analyze several different points that you might want to use (for example, if you shot 10 points of a CL of a curve).

The coordinates of the computed RP are also displayed.

Tap the **Store** button to store the point.

Prosurv cEZ Comp's 1:20 ok

3 Point RP

Left Point #	200
Center Point #	201
Right Point #	202
Radius	392.840
Deg of Curve (Arc)	14°35'06"
Deg of Curve (Chord)	14°37'29"

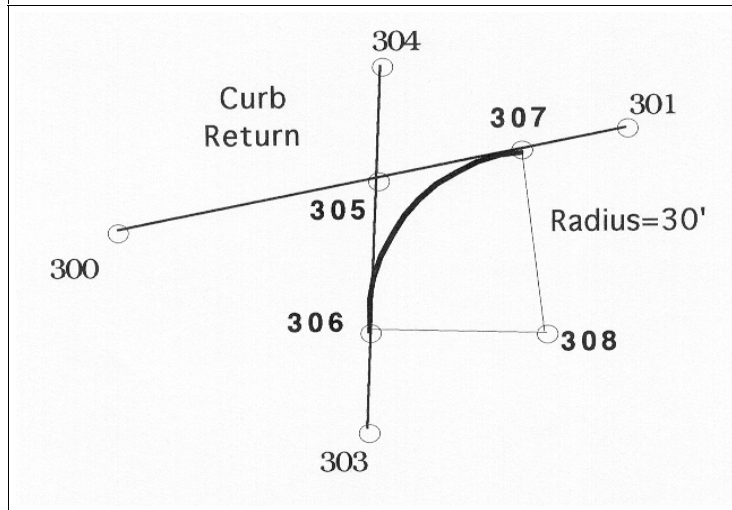
4607.160008937
5000.083799850

Comp
Store



Fit a Curve to Two Tangents (Curb Returns)

The **Fit Curve** routine computes the Point of Intersection (PI), Point of Curvature (PC), Point of Tangency (PT), and Radius Point (RP) of a simple curve when given two points on each line and a radius amount. The PC and PT are computed so that they are at 90° angles to/from the Radius



point. This routine is great for computing the following:

- **Curb returns where a new road intersects an existing one**
- **Curb returns where two new roads will intersect**
- **Determining the PC, PT, RP, and PI when designing a new road in the field (Fit a Curve to Two Tangents)**

The PC, PI, PT, and Radius Point will be computed. You will have to know 2 points representing the existing curb (as shot in the field) and 2 points on the future curb line which will meet the existing. **Or, if you know the PI, you can enter the PI and one point from each line.**

If you don't know the PI, then the four points will have to intersect coordi-

nately-i.e. a 'cross' is created if the points are connected. If, however, (as often happens) the points do not cross, simply create a point 500' up each line for example, and use these coordinates instead.

In the following example, point #304 was created at 500' from point #302 and 180 degrees from line 302-303 in order that the two lines would cross. The reason for this is that a total of four radius points could be computed from the two lines.

You will have to determine which is your PC and PT by inverting or plotting etc... The points are given the descriptors PC, PI, PT, and RP automatically.

Prosurv cEZ Comp's 1:28 ok

Fit Curve to Two Tangents

Tangent 1

From # or PI 300

To # 301

RP is Right of Line

Radius

30

Comp

Tangent 2

From # or PI 303

To # 304

RP is Right of Line

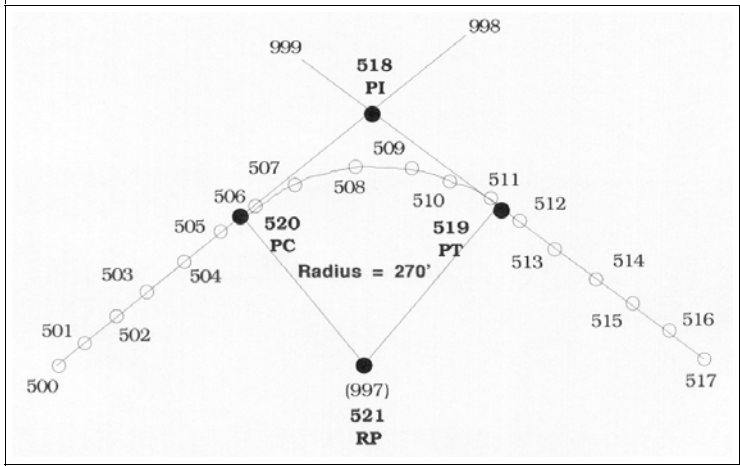
If PI is known, enter the PI # for each 'From #'.

Points used in this example are shown here.

The screenshot shows a software window titled 'Points: Pg #1 of 5'. It includes navigation buttons for back and forward, radio buttons for 'PNEZF' (selected) and 'PA', a 'Jump to Page' section with a 'Find #' field containing '6' and 'Go' buttons, and a 'List Set' checkbox which is checked. Below this is a table with columns 'Pt #...North...East...Elev...FCode'.

Pt #	North	East	Elev	FCode
300	5000.0000	1000.0000		
301	5100.0000	1100.0000		
302	4800.0000	1023.5000		
303	4800.0000	1023.5000		
304	5349.7752	1039.9933		
308	5030.4124	1030.4124		
309	5018.5152	1030.0555		
310	5038.8288	1038.8288		
311	5017.6156	1060.0420		

Another great reason to use this routine is when designing a new roadway in the field. Refer to the diagram below for this example:



Shots 500-517 were taken at the centerline of an existing two-track dirt road. It is desired that the incoming tangent (Backtangent) should be between points 500 and 505, and that the outgoing tangent (Foretangent) be between points 512 and 517. To create the true curve (with the PC and PT

at 90° to the tangents), follow these simple steps:

- **Compute a bogus radius point #997 to determine what radius to use. To do this, use the Compute Radius Point routine (Ctrl-*) and enter 506 as the left point, 508 as the center point, and 511 as the right point. Store this point as some bogus # i.e. 997.**
- **Inverse 997 to points 506 through 511 just to check that the radius to all the points is about the same amount (i.e. 270'). This is the radius you'll use to create the curve.**
- **Be sure to create bogus points (i.e. 998 and 999) so that the two tangent lines actually intersect (a requirement of this routine). To do this, you could use the Field Note reduction routine (Ctrl-F). I.E. BS = 500, Gun = 505, angle = 180°, distance = 1000' to create #998.**

Once you've got 998 and 999, press Shift-Ctrl-Q (this routine) and enter the data shown here.

Prosurv cEZ Comp's 1:36 OK

Fit Curve to Two Tangents

Tangent 1

From# or PI 500
To # 998
RP is Right of Line

Radius

270

Comp

Tangent 2

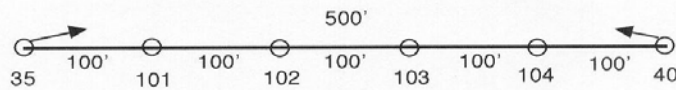
From # or PI 517
To # 999
RP is Right of Line

If PI is known, enter the PI # for each 'From #'



Divide a Line (2D or 3D)

This routine will divide a line into n equal parts. All you need to supply are two points (representing the beginning and end of the line), the number of equal parts, and the starting point number to save the points. **This routine can also compute the points "3-D".** In other words, the slope of the line can be computed and the appropriate computed elevations will be stored with each point. If you need the elevations computed, simply check the "Compute Elevations" check box.



The example above shows a distance of 500' between points 35 and 40. It has 5 divisions which will create 4 points with 100' intervals automatically. The first point will be saved as point #101. The default number of divisions is 2, which would create one point. There will always be one less point created than there are divisions.

