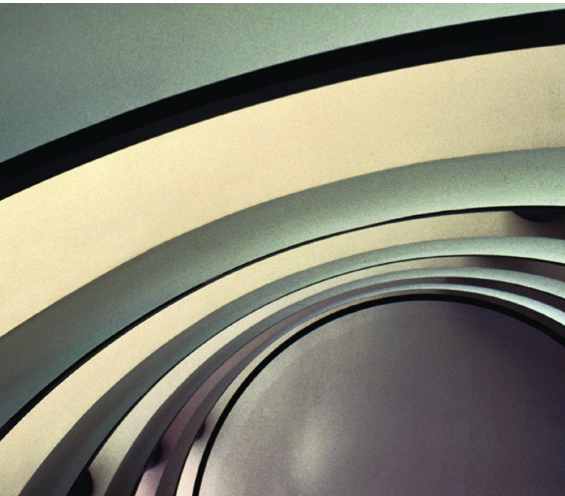




**By Richard L. Elgin, PhD, LS, PE**

Dr. Richard Elgin is President of Elgin Surveying & Engineering in Rolla, Missouri. He serves as Adjunct Professor of Surveying at the University of Missouri-Rolla (UMR), and is a principal in the firm of Elgin, Knowles & Senne, Inc.

## Computing Horizontal and Vertical Curves




**For this combination horizontal and vertical curve system, compute the horizontal coordinates and elevation for Station 142+69.09. For the horizontal circular curve, the PI coordinates are 246,198.62 North and 111,694.87 East. The bearing from the PC to the PI is North 84°01'42" West. The curve's "Delta" (or "I") is 38°38'16" Left and its D is exactly 3°. The PT Station is 149+26.42. For this route centerline the vertical curve beginning point (BVC) is at Station 132+61.97. The vertical curve's length is 1400.00 feet. Its grades are positive 2.5% entering the curve (g1) and negative 3.0% leaving (g2). The vertical curve's BVC elevation is 1126.94. The coordinates and elevation are in feet.**

# H

ere is a word problem taken from a recent sophomore-level "Fundamentals of Surveying" final exam for Civil Engineering students at the University of Missouri-Rolla. (UMR has been designated as one of the nation's top 25 undergraduate civil engineering programs by U.S. News.) This problem would be too long for either of the NCEES exams, but split into two parts (its horizontal and vertical components), it would be appropriate for the "Fundamentals" exam. You must create your own diagram.

For the solution to this problem (and much more), please visit our website at: [www.TheAmericanSurveyor.com](http://www.TheAmericanSurveyor.com).

Good luck! 

*For more information about the PLS exam and its contents, visit the NCEES website at [www.ncees.com](http://www.ncees.com).*