



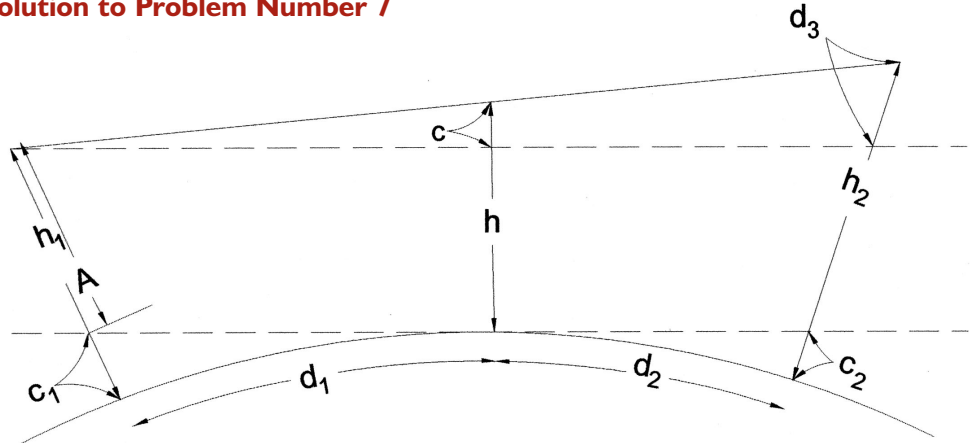
The State Plane Coordinate project (#6) on page 34 of the October issue can't be solved for the following reasons:

1. The Plane Coordinate zone is not provided, therefore you can't compute scale factors and geoid heights.
2. No elevations are provided to be able to perform ellipsoid reductions.
3. No azimuths are provided from either SPC PT#1 to E or SPC PT #2 to B

Also, it should be noted whether this is NAD 27 or NAD 83. From the values, and the fact that the author is from California, I assume these are supposed to be California SPCs, and the values look like NAD 27, they are nowhere close to NAD 83!

Dave Doyle
Via the Internet

Solution to Problem Number 7



$$c_1 = 0.574d_1^2 \quad c_2 = 0.574d_2^2 \quad A = h_1 - 0.574d_1^2$$

$$c = \left(\frac{d_1}{d_1 + d_2} \right) d_3 \quad h = c + A$$

$$c_1 = 0.574(12)^2 = 83' \quad c_2 = 0.574(17)^2 = 166' \quad A = 2247' - 83' = 2164'$$

$$c = \left(\frac{12}{12+17} \right) 66' = 27'$$

$$h = 27' + 2164' = 2191'$$

The intervening mountain is 84' higher than the line of sight.

Solution to Problem Number 8

Extend grade 1 to point Q. The elevation of Q is $7 \times 2\% + 98.00' = 112.00'$. B is 24.00' below Q, therefore 24.00' divided by the difference in grades [2% - (-4%)] or 6% is the distance from V to B: 4 stations, so V is 10 + 00 at elevation 104.00'. The elevation at 9 + 20 along grade 1 (over the pipe) is $2.2 \times 2\% + 98.00' = 102.40'$. The distance to the curve must be 20' for a 6' clearance ($102.40' - 76.40' - 6' = 20'$). The offset at any X is equal to the center O/S times (X divided by half the curve length)². The center offset is always equal to the length times (grade 2 - grade 1) divided by eight.

We have the offset from the curve known: 20.00'. It is at one half the curve length minus 80', so $X = L/2 - 0.8$.

$$20 = \left(\frac{L}{8} \right) (-6\%) \left(\frac{(L/2 - 0.8)^2}{(L/2)} \right)$$

Expanding and solving for L by the quadratic equation yields $L = 23.36$ stations, which can only be rounded down to 23 full stations, not up to 24 full stations.

