

Answers to "Test Yourself" No. 23

A Horizontal and Vertical Curve

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Horizontal Part:

$$L = \frac{2\pi R\Delta}{360} = 3450.07$$

$$PC Sta = 63 + 55.05$$

For PC Coordinates:

$$\text{Azimuth, PT to PC} = 104^\circ 15' 34.5''$$

$$LC = 3328.94$$

$$\text{Coordinates are: } 5415.01 \text{ N} \\ 12,566.30 \text{ E}$$

For 77+69.18 Coordinates:

$$\text{Bearing, PC to } 77+69.18 = \text{N}60^\circ 08' 19'' \text{W}$$

$$\text{Subchord, PC to point} = 1405.71$$

$$\text{Coordinates of } 77+69.18: 6114.92 \text{ N} \\ 11,347.22 \text{ E}$$

Vertical Part:

$$\text{Elevation} = \frac{g_2 - g_1}{2L} x^2 + g_1 x + \text{Elev BVC}$$

x is the distance, in Stations, from BVC to the point, which is 28.2607.
L is in Stations as well.

$$\text{Elevation} = \frac{-1.893 - 2.765}{(2)(40)} (28.2607)^2 + (2.765)(28.2607) + 421.67$$

$$\text{Elevation} = 453.31 \text{ feet}$$

x, Stations, BVC to high point is given by:

$$x = \frac{-g_1(L)}{g_2 - g_1} = \frac{(-2.765)(40)}{-1.893 - 2.765} = 23.74410 \text{ (Stations)}$$

For this "x," the high point Station = 73+17.52

At this point the elevation is (by the general equation for elevation along a vertical curve, previously given): 454.50 feet.