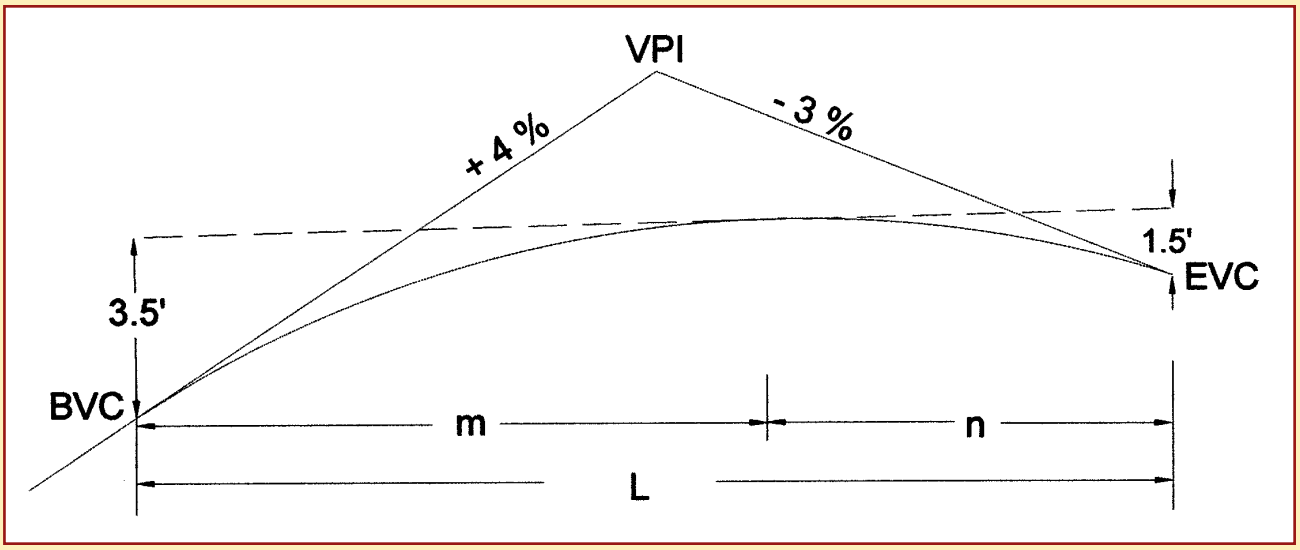
Solution to Problem 28



For any parabola, the offset, t, from the tangent is equal to px^2, where p is a constant and x is the distance from the point of tangency.

$pm^2 = 3.5$, and $pn^2 = 1.5$

$$L = \frac{\sqrt{3.5}}{\sqrt{p}} + \frac{\sqrt{1.5}}{\sqrt{p}}$$

$$p = \frac{3.5 + 2\sqrt{3.5}\sqrt{1.5} + 1.5}{L^2} = \frac{9.5825757}{L^2}$$

The elevation of VPI is 4(L/2) above the BVC, where L is in stations. The elevation of the EVC is 3(L/2) below VPI, or 0.5 above the BVC. The midpoint of the long chord is therefore 0.25 L above the BVC, so the offset to the curve at VPI is 0.875 L (it passes midway between VPI and the chord midpoint).

Since the offset is equal to px^2

$$0.875\,L = \frac{9.5825757}{L^2}(L/2)^2,$$ and L = 2.74 stations, or 274′

(m = 166′, n = 108′)