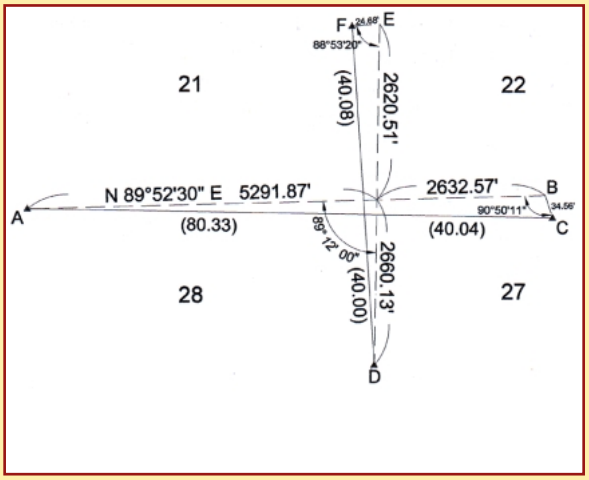
Solution to Problem Number 15



Establish a coordinate system and traverse to the four corners.
(e.g.: A = N 5000, E 0, SO C = N 4982.733, E 7925.001, D = N 2351.600, E 5260.519, F = N 7631.685, E 5298.050. AC = S 89°52'31" E 7925.02' and DF = N 0°24'26" E 5280.22')

The manual of instructions for the survey of the public lands of the United States (1973), SECTION 5-28 STATES "Lost interior corners of four sections, where all lines have been run, will be reestablished by double proportionate measurement."

The proportionate point in a north-south direction is:

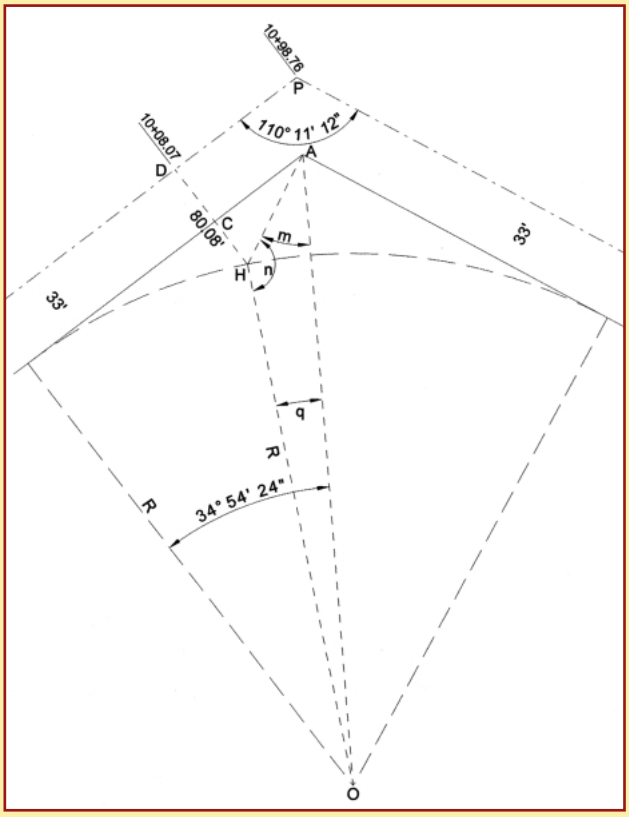
$$\frac{40.00}{40.00+40.08} \times 5280.22' = 2637.47' \text{ north of D along line DF}$$

The proportionate point in an east-west direction is:

$$\frac{80.33}{80.33+40.04} \times 7925.02' = 5288.83' \text{ east of A along line AC}$$

The corner will be due east or west and due north or south of the proportionate points. The final coordinate of the corner will be N 4989.003, E 5288.817
(Note that the intersection of straight lines joining the found corners is about 10' east of this point)

Solution to Problem Number 16



DP = 90.69', AC = DP - 33 tan 34°54'24" = 67.663', CH = 80.08' – 33' = 47.08'

$$\text{ANGLE CAH} = \arctan \frac{47.08'}{67.663'} = 34^\circ\, 49'49''$$

$$AH = \frac{67.663'}{\cos 34^\circ 49'49''} = 82.431' \quad (\text{or } AH\approx = 67.663\approx + 47.08\approx)$$

$$\text{ANGLE } m = 90^\circ - 34^\circ 54'24'' - 34^\circ 49'49'' = 20^\circ 15'47''$$

$$AO = \frac{R}{\cos 34^\circ 54'24''}$$

$$\frac{\sin n}{AO} = \frac{\sin 20^\circ 15'47''}{R}, \quad \sin n = \frac{R}{\cos 34^\circ 54'24''} \times \frac{\sin 20^\circ 15'47''}{R}$$

$n = 155^\circ 01'10''$ (not $24^\circ 58'50''$)
$q = 180^\circ - 155^\circ 01'10'' - 20^\circ 15'47'' = 4^\circ 43'03''$

$$\frac{R}{\sin m} = \frac{AH}{\sin q}, \quad R = \frac{82.431 \sin 20^\circ 15'47''}{\sin 4^\circ 43'03''} = 347.12'$$

This radius may be rounded to the nearest foot, R=347', or nearest five feet, R=345', but not to R=350'.