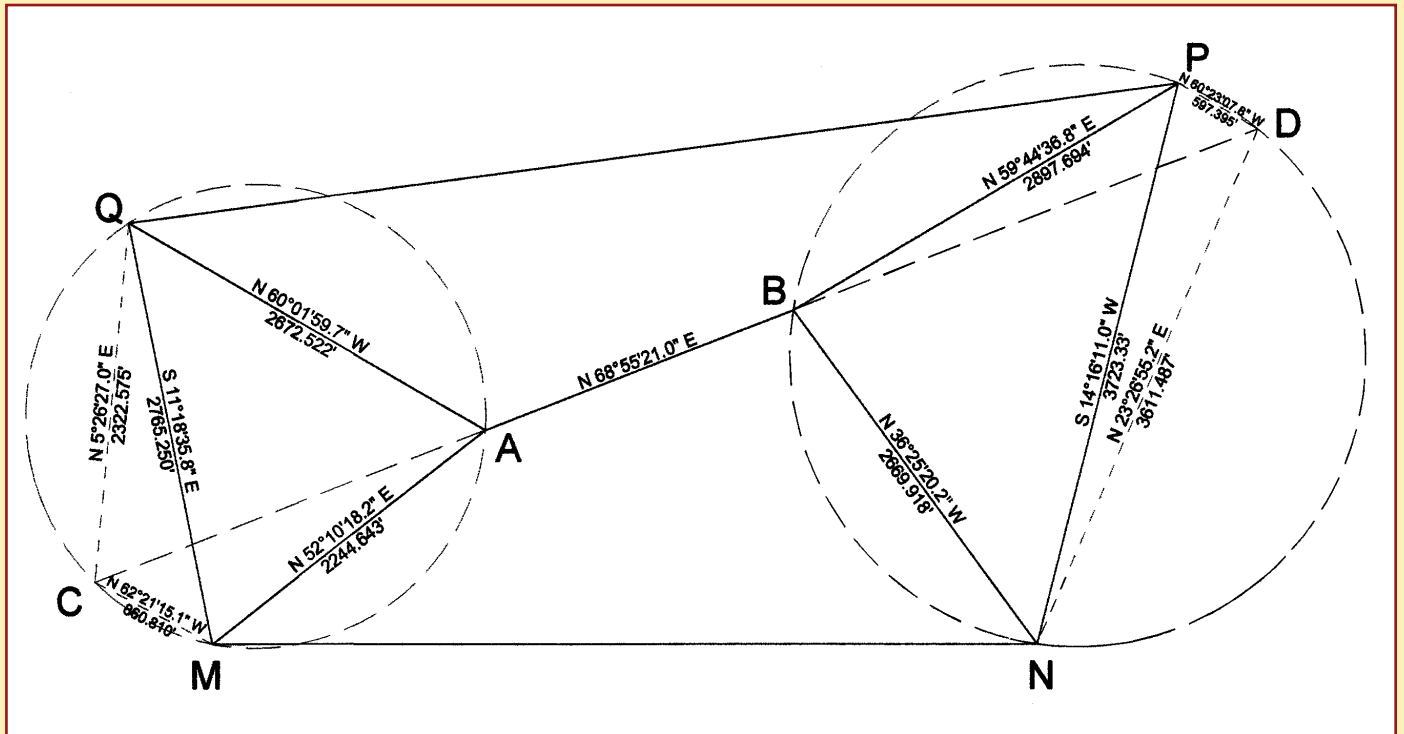




Solution to Problem 24



(A problem of this type was first published in *Surveying Australia* and again in *The Canadian Surveyor*, now *Geomatica*, in the Spring 1987 edition and called the "Australian Double Resection")

Construct a circle through MAQ and another circle through PBN.

Extended AB in both directions to intersect the circles at C and D.

Draw CQ, CM, PD, and ND.

Angle CAQ = $51^{\circ}02'39.3''$ (the supplement of $128^{\circ}57'20.7''$) = angle CMQ since they both intercept the same arc on the circle. Also, angle CAM = angle CQM = $67^{\circ}47'42.1'' - 51^{\circ}02'39.3'' = 16^{\circ}45'02.8''$. Likewise, angle PND = angle PBD = $9^{\circ}10'44.2''$ (the supplement of $170^{\circ}49'15.8''$), and angle DBN = angle DPN = $83^{\circ}50'03.0'' - 9^{\circ}10'44.2'' = 74^{\circ}39'18.8''$.

Bearings can now be computed for PD, PN, QC, and MC from lines PN and QM. Coordinates can be calculated for C and D: C = N 1633.980, E 5780.676, D = N 4547.799, E 13340.849. An inverse yields CD = N $68^{\circ}55'21.0''$ E 8102.256'.

Bearings can now be calculated for AQ, AM, BP, and BN from line CD and coordinates can be calculated for A and B: A = N 2611.193, E 8316.147 and B = N 3382.945, E 10318.525.