Worked answer key

Closed traverse A–B–C–D–A. Start at N 1000.000 m, E 500.000 m. Bearings reference grid north. Use horizontal distances.

For AB, latitude = 100 cos 30° = +86.6025 m. Departure = 100 sin 30° = +50.0000 m. Reverse signs when a bearing points south or west.

Course	ΔN (m)	ΔE (m)	End N (m)	End E (m)
AB	+86.6025	+50.0000	1086.6025	550.0000
BC	-40.0000	+69.2820	1046.6025	619.2820
CD	-86.6025	-50.0000	960.0000	569.2820
DA′	+39.9800	-69.2474	999.9800	500.0346

The final point falls 0.0200 m south and 0.0346 m east of A. The horizontal gap is 0.0400 m. The perimeter is 359.96 m, giving 359.96 / 0.04 = 8,999 and a relative precision of 1:8,999.

Geometric check: BC and the final leg point in opposite directions. The latter is shorter by 0.04 m. The residual therefore points along BC, S 60° E.