Traverse with One Side Omitted: Length and Bearing

Length and bearing of the one unmeasured side of a closed traverse from the latitudes and departures of the other sides (up to four measured sides).

Method: Closure of latitudes and departures

Input parameters

Unit system: SI

Parameter	Value	Unit
Side 1 length	120.00	m
Side 1 bearing	30.000	°
Side 2 length	150.00	m
Side 2 bearing	120.00	°
Side 3 length	100.00	m
Side 3 bearing	200.00	°
Side 4 length (0 if none)	0	m
Side 4 bearing	0	°

Calculated results

Parameter	Value	Unit
Sum of latitudes of measured sides	-65.046	m
Sum of departures of measured sides	155.70	m
Length of the omitted side	168.74	m
Bearing of the omitted side	292.67	°

Notes for this case

• In a closed traverse ΣL = 0 and ΣD = 0, so the missing side has latitude −ΣL and departure −ΣD of the others: length √(ΣL² + ΣD²) and whole-circle bearing atan2(−ΣD, −ΣL). Any closing error in the measured sides lands entirely in the computed side, so use this only when a side cannot be measured (an obstacle), and never as a check.

Formula and method

$$l_x = \sqrt{(\Sigma L)^2 + (\Sigma D)^2}, \quad \theta_x = \operatorname{atan2}(-\Sigma D, -\Sigma L)$$

Variables

l_1	Side 1 length	m
θ_1	Side 1 bearing	rad
l_2	Side 2 length	m
θ_2	Side 2 bearing	rad
l_3	Side 3 length	m
θ_3	Side 3 bearing	rad
l_4	Side 4 length (0 if none)	m
θ_4	Side 4 bearing	rad
ΣL	Sum of latitudes of measured sides	m
ΣD	Sum of departures of measured sides	m
l_x	Length of the omitted side	m
θ_x	Bearing of the omitted side	rad

Method and standards

Omitted side.

Assumptions and limits

- Error-free measured sides; closed traverse.

References

Closure of latitudes and departures

Report details

Report reference	FCC-P8EZ-AMRP (the same inputs always give the same reference)
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Release checks	3 reference cases of this calculator, computed independently, are checked on every release

Results are for engineering estimation. Verify critical designs against the referenced standards and your own data.

This calculator online

https://calc.firecad.com/civil/surveying/traverse-omitted-measurement

Open this case on calc.firecad.com →

Reopens the calculator with the inputs of this report.