Partitioning a Triangular Parcel by a Line Parallel to a Side

Location of a dividing line parallel to side BC that cuts a required area off at corner A of a triangular parcel, from the coordinates of its corners.

Method: Partition of land by similar triangles

Input parameters

Unit system: SI

Parameter	Value	Unit
Northing of A	1,000.0	m
Easting of A	1,000.0	m
Northing of B	1,400.0	m
Easting of B	1,100.0	m
Northing of C	1,100.0	m
Easting of C	1,500.0	m
Area to cut off at A	40,000	m²

Calculated results

Parameter	Value	Unit
Area of the triangle	95,000	m²
Ratio AD/AB = AE/AC	0.64889	
Northing of D on AB	1,259.6	m
Easting of D on AB	1,064.9	m
Northing of E on AC	1,064.9	m
Easting of E on AC	1,324.4	m
Length of the dividing line	324.44	m

Notes for this case

• A line parallel to BC cuts off a triangle ADE similar to ABC; areas of similar triangles scale with the square of their sides, so AD/AB = AE/AC = √(A_req/A_T). The triangle area is from coordinates (half the cross product). For a polygon, cut it into a triangle and trapezoids, or solve the trapezoid by a quadratic.

Formula and method

$$k = \sqrt{\frac{A_{req}}{A_T}}, \quad D = A + k(B - A), \quad E = A + k(C - A)$$

Variables

NA	Northing of A	m
EA	Easting of A	m
NB	Northing of B	m
EB	Easting of B	m
NC	Northing of C	m
EC	Easting of C	m
A_{req}	Area to cut off at A	m²
A_T	Area of the triangle	m²
k	Ratio AD/AB = AE/AC	-

N_D	Northing of D on AB	m
E_D	Easting of D on AB	m
N_E	Northing of E on AC	m
E_E	Easting of E on AC	m
DE	Length of the dividing line	m

Method and standards

Land partition.

Assumptions and limits

- Plane triangle; straight sides.

References

Partition of land by similar triangles

Report details

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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/land-partition-parallel-line

Open this case on calc.firecad.com →

Reopens the calculator with the inputs of this report.