Degree of Curve, Radius and Curve Elements

Degree of curve by the arc and chord definitions for a radius and standard length, and the tangent, curve length, long chord, external and middle ordinate.

Method: Circular curve definitions and elements

Input parameters

Unit system: SI

Parameter	Value	Unit
Radius	600.00	m
Standard length (100 ft = 30.48 m, or 20 m)	30.480	m
Intersection (deflection) angle	24.500	°

Calculated results

Parameter	Value	Unit
Degree of curve, arc definition	2.9106	°
Degree of curve, chord definition	2.9109	°
Tangent length	130.27	m
Curve length	256.56	m
Long chord	254.61	m
External distance	13.980	m
Middle ordinate	13.661	m

Notes for this case

• Arc definition (highways): D_a is the central angle subtended by an arc of the standard length, D_a = L_s/R (radians; 5,729.578/R degrees for 100 ft). Chord definition (railways): a chord of the standard length subtends D_c, sin(D_c/2) = L_s/2R. Curve elements: T = R tan(I/2), L = RI, LC = 2R sin(I/2), E = R[sec(I/2) − 1], M = R[1 − cos(I/2)].

Formula and method

$$D_a = \frac{L_s}{R}, \quad \sin\frac{D_c}{2} = \frac{L_s}{2R}, \quad T = R\tan\frac{I}{2}, \quad E = R\left(\sec\frac{I}{2} - 1\right)$$

Variables

R	Radius	m
L_s	Standard length (100 ft = 30.48 m, or 20 m)	m
I	Intersection (deflection) angle	rad
D_a	Degree of curve, arc definition	rad
D_c	Degree of curve, chord definition	rad
T	Tangent length	m
L	Curve length	m
LC	Long chord	m
E	External distance	m
M	Middle ordinate	m

Method and standards

Degree of curve.

Assumptions and limits

- Simple circular curve.

References
Circular curve definitions and elements

Report details

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

This calculator online
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