Circular Segment Area, Chord and Arc Length

Area, chord, arc length and central angle of a circular segment from the radius and the segment height, as for the liquid in a horizontal pipe or a cut circle.

Method: Circle geometry

Input parameters

Unit system: SI

Parameter	Value	Unit
Radius	1.0000	m
Segment height (sagitta)	0.50000	m

Calculated results

Parameter	Value	Unit
Central angle	120.00	°
Chord length	1.7321	m
Arc length	2.0944	m
Segment area	0.61418	m²
Share of the full circle	19.550	%

Formula and method

$$\theta = 2\arccos\frac{R-h}{R}, \quad A = \frac{R^2}{2}(\theta - \sin\theta)$$

$$c = 2\sqrt{h(2R-h)}, \quad s = R\theta$$

Variables

R	Radius	m
h	Segment height (sagitta)	m
θ	Central angle	rad
C	Chord length	m
S	Arc length	m
A	Segment area	m²
$A/(\pi R^2)$	Share of the full circle	-

Method and standards

Plane geometry of the circle.

Assumptions and limits

- Height from 0 to the diameter.

References

- Circle geometry

Report details

Report reference	FCC-QBZ0-VKW7 (the same inputs always give the same reference)
Generated	17 November 2026, 19:44 UTC
Calculator	Circular Segment Area, Chord and Arc Length
Method last reviewed	12 November 2026
Software release	FireCAD Calc, release of 17 November 2026
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/general/geometry/circular-segment

Open this case on calc.firecad.com →

Reopens the calculator with the inputs of this report.