Area and Perimeter of Common Shapes

Area and perimeter of a rectangle, circle, triangle (three sides), isosceles trapezium, ellipse, circular sector or annulus from its dimensions.

Method: Plane geometry; Heron's formula; Ramanujan (1914) ellipse perimeter approximation

Input parameters

Unit system: SI

Parameter	Value	Unit
Shape	Triangle (sides a, b, c)	
Dimension a	3.0000	m
Dimension b	4.0000	m
Dimension c	5.0000	m
Sector angle	60.000	°

Calculated results

Parameter	Value	Unit
Area	6.0000	m²
Perimeter	12.000	m

Notes for this case

- Annulus perimeter counts both edges.

Formula and method

$$A_{rect}=ab,\ P=2(a+b);\quad A_{circle}=\frac{\pi a^2}{4},\ P=\pi a\ (a=\text{diameter});\quad A_{trap}=\frac{a+b}{2}c,\ P=a+b+2\sqrt{c^2+\left(\frac{a-b}{2}\right)^2}$$

$$A_{sector}=\frac{a^2\theta}{2},\ P=2a+a\theta\ (a=\text{radius});\quad A_{annulus}=\frac{\pi(a^2-b^2)}{4},\ P=\pi(a+b)\ (a,b=\text{diameters});\quad A_{ellipse}=\pi ab$$

$$A_{\triangle}=\sqrt{s(s-a)(s-b)(s-c)},\quad P_{ellipse}\approx\pi(a+b)\left(1+\frac{3h}{10+\sqrt{4-3h}}\right),\ h=\frac{(a-b)^2}{(a+b)^2}$$

Variables

shape	Shape	-
a	Dimension a	m
b	Dimension b	m
c	Dimension c	m
θ	Sector angle	rad
A	Area	m²
P	Perimeter	m

Method and standards

Plane geometry.

Assumptions and limits

- Plane figures.

References

- Plane geometry; Heron's formula; Ramanujan (1914) ellipse perimeter approximation

Report details

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Release checks	7 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/area-of-shapes

Open this case on calc.firecad.com →

Reopens the calculator with the inputs of this report.