

# Formulae of shapes

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This article gives some formulae of some shapes, using words rather than symbols.

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## 2-dimensional space

### Perimeter

#### Circle/spherical digon/spherical henagon

Perimeter =  $\pi \times$  diameter.

#### Polygons

Perimeter = The sum of the lengths of the sides.

### Area

#### Circle/spherical digon/spherical henagon

Area =  $\pi \times$  radius<sup>2</sup>

#### Ellipse

Area = Half of short axis  $\times$  half of long axis  $\times \pi$

#### Triangle

##### Equilateral triangle

Area =  $\sqrt{3} \times$  side<sup>2</sup>  $\div 4$

##### Right-angled

Area = One leg  $\times$  the other leg  $\div 2$

##### General

Area = Base  $\times$  height  $\div 2$   
Numerous other formulas are given here

### Quadrilateral

#### Square

$$\text{Area} = \text{Side}^2$$

**Rectangle**

$$\text{Area} = \text{One side} \times \text{the other side}$$

**Parallelogram**

$$\text{Area} = \text{One side} \times \text{height from that side}$$

**Trapezoid**

$$\text{Area} = \text{Sum of the lengths of the parallel sides} \times \text{height between the parallel sides} \div 2$$

**Kite or other quadrilateral with perpendicular diagonals**

$$\text{Area} = \text{One diagonal} \times \text{the other diagonal} \div 2$$

**Bicentric quadrilateral (with both an incircle and a circumcircle)**

$$\text{Area} = \text{Square root of the product of the four sides}$$

**Regular polygon**

$$\text{Area} = \text{Perimeter} \times \text{distance from the center to a side} \div 2$$

## 3-dimensional space

**Surface area****Sphere**

$$\text{Surface area} = 4 \times \text{radius}^2 \times \pi$$

**Cone**

$$\text{Surface area} = \pi \times (\text{radius of base})^2 + \pi \times (\text{radius of base}) \times \text{height of cone}$$

**Cylinder**

$$\text{Surface area} = 2 \times \pi \times \text{radius} \times \text{height} + 2 \times \pi \times \text{radius}^2$$

**Regular tetrahedron**

$$\text{Surface area} = \sqrt{3} \times (\text{edge length})^2$$

**Square-based pyramid**

$$\text{Surface area} = (\text{Side of base})^2 + 2 \times (\text{side of base}) \times \text{slant height}$$

**Cube**

$$\text{Surface area} = (\text{Side})^2 \times 6$$

**Regular octahedron**

$$\text{Surface area} = 2 \times \sqrt{3} \times (\text{edge length})^2$$

**Volume****Sphere**

$$\text{Volume} = \frac{4}{3} \times \pi \times \text{radius}^3$$

**Cone**

$$\text{Volume} = \frac{1}{3} \times \pi \times (\text{radius of base})^2 \times \text{height}$$

**Cylinder**

$$\text{Volume} = \pi \times \text{radius}^2 \times \text{height}$$

**Cube**

$$\text{Volume} = \text{Side}^3$$

**Regular cuboid**

$$\text{Volume} = \text{The product of the three sides}$$

**6-dimensional space****Hypervolund****Tesseract**

$$\text{Hypervolund} = \text{Side}^4$$

**References**

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- *Algebra And Geometry* by Dan Green and Basher

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