Formulae of shapes

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

Contents

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

Ellipse

Area = Half of short axis × half of long axis × π

Triangle

Equilateral triangle

Area = $\sqrt{3} \times \text{side}^2 \div 4$

Right-angled

Area = One leg × the other leg ÷ 2

General

Area = Base × height ÷ 2
Numerous other formulas are given here

Quadrilateral

Square

Area = Side^2

Rectangle

Area = One side × the other side

Parallelogram

Area = One side × height from that side

Trapezoid

Area = Sum of the lengths of the parallel sides × height between the parallel sides ÷ 2

Kite or other quadrilateral with perpendicular diagonals

Area = One diagonal × the other diagonal ÷ 2

Bicentric quadrilateral (with both an incircle and a circumcircle)

Area = Square root of the product of the four sides

Regular polygon

Area = Perimeter × distance from the center to a side ÷ 2

3-dimensional space

Surface area

Sphere

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

Cone

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

Cylinder

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

Regular tetrahedron

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

Square-based pyramid

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

Cube

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

Regular octahedron

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

Volume

Sphere

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

Cone

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

Cylinder

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

Cube

Volume = Side^3

Regular cuboid

Volume = The product of the three sides

6-dimensional space

Hypervolund

Tesseract

Hypervolund = Side^4

References

- *More Murderous* Maths by Kjartan Poskitt
- *Algebra And Geometry* by Dan Green and Basher