

Volume & Surface Area Formulas — 3D Solids

Every three-dimensional volume and surface-area formula.

Cube

Volume: $V = s^3$

Surface area: $SA = 6s^2$

Space diagonal: $d = s\sqrt{3}$

Rectangular Prism

Volume: $V = l w h$

Surface area: $SA = 2(lw + lh + wh)$

Space diagonal: $d = \sqrt{l^2 + w^2 + h^2}$

Triangular Prism

Volume: $V = A_{\text{base}} \cdot L$

Surface area: $SA = 2A_{\text{base}} + (a+b+c)L$

Cylinder

Volume: $V = \pi r^2 h$

Lateral surface: $LSA = 2\pi r h$

Surface area: $SA = 2\pi r(r + h)$

Cone

Slant height: $\ell = \sqrt{r^2 + h^2}$

Volume: $V = 1/3\pi r^2 h$

Lateral surface: $LSA = \pi r \ell$

Surface area: $SA = \pi r(r + \ell)$

Sphere

Volume: $V = 4/3\pi r^3$

Surface area: $SA = 4\pi r^2$

Hemisphere

Volume: $V = 2/3\pi r^3$

Curved surface: $2\pi r^2$

Total surface area: $SA = 3\pi r^2$

Pyramid

Slant height: $\ell = \sqrt{(b/2)^2 + h^2}$

Volume: $V = 1/3 b^2 h$

Lateral surface: $LSA = 2 b \ell$

Surface area: $SA = b^2 + 2 b \ell$