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Important Formulas of Parallelepiped

Calculators! Examples! Conversions!

List of 16 Important Formulas of Parallelepiped

Important Formulas of Parallelepiped

Angle of Parallelepiped

1) Angle Alpha of Parallelepiped

Open Calculator

fx $$\angle\alpha = a\sin\left(\frac{TSA - (2 \cdot S_a \cdot S_b \cdot \sin(\angle\gamma)) - (2 \cdot S_a \cdot S_c \cdot \sin(\angle\beta))}{2 \cdot S_c \cdot S_b}\right)$$

ex $$44.68305^\circ = a\sin\left(\frac{1960m^2 - (2 \cdot 30m \cdot 20m \cdot \sin(75^\circ)) - (2 \cdot 30m \cdot 10m \cdot \sin(60^\circ))}{2 \cdot 10m \cdot 20m}\right)$$

2) Angle Beta of Parallelepiped

Open Calculator

fx $$\angle\beta = a\sin\left(\frac{TSA - (2 \cdot S_a \cdot S_b \cdot \sin(\angle\gamma)) - (2 \cdot S_b \cdot S_c \cdot \sin(\angle\alpha))}{2 \cdot S_a \cdot S_c}\right)$$

ex $$59.7017^\circ = a\sin\left(\frac{1960m^2 - (2 \cdot 30m \cdot 20m \cdot \sin(75^\circ)) - (2 \cdot 20m \cdot 10m \cdot \sin(45^\circ))}{2 \cdot 30m \cdot 10m}\right)$$

3) Angle Gamma of Parallelepiped

Open Calculator

fx $$\angle\gamma = a\sin\left(\frac{TSA - (2 \cdot S_b \cdot S_c \cdot \sin(\angle\alpha)) - (2 \cdot S_a \cdot S_c \cdot \sin(\angle\beta))}{2 \cdot S_b \cdot S_a}\right)$$

ex $$74.71324^\circ = a\sin\left(\frac{1960m^2 - (2 \cdot 20m \cdot 10m \cdot \sin(45^\circ)) - (2 \cdot 30m \cdot 10m \cdot \sin(60^\circ))}{2 \cdot 20m \cdot 30m}\right)$$

Perimeter of Parallelepiped

4) Perimeter of Parallelepiped

Open Calculator

fx $$P = 4 \cdot (S_a + S_b + S_c)$$

ex $$240m = 4 \cdot (30m + 20m + 10m)$$

Side of Parallelepiped

5) Side A of Parallelepiped

Open Calculator

fx
$$S_a = \frac{V}{S_b \cdot S_c \cdot \sqrt{1 + (2 \cdot \cos(\angle\alpha) \cdot \cos(\angle\beta) \cdot \cos(\angle\gamma)) - \left(\cos(\angle\alpha)^2 + \cos(\angle\beta)^2 + \cos(\angle\gamma)^2\right)}}$$

ex
$$29.99998\text{m} = \frac{3630\text{m}^3}{20\text{m} \cdot 10\text{m} \cdot \sqrt{1 + (2 \cdot \cos(45°) \cdot \cos(60°) \cdot \cos(75°)) - \left(\cos(45°)^2 + \cos(60°)^2 + \cos(75°)^2\right)}}$$

6) Side A of Parallelepiped given Total Surface Area and Lateral Surface Area

Open Calculator

fx
$$S_a = \frac{TSA - LSA}{2 \cdot S_c \cdot \sin(\angle\beta)}$$

ex
$$30.02221\text{m} = \frac{1960\text{m}^2 - 1440\text{m}^2}{2 \cdot 10\text{m} \cdot \sin(60°)}$$

7) Side B of Parallelepiped

Open Calculator

fx
$$S_b = \frac{V}{S_a \cdot S_c \cdot \sqrt{1 + (2 \cdot \cos(\angle\alpha) \cdot \cos(\angle\beta) \cdot \cos(\angle\gamma)) - \left(\cos(\angle\alpha)^2 + \cos(\angle\beta)^2 + \cos(\angle\gamma)^2\right)}}$$

ex
$$19.99999\text{m} = \frac{3630\text{m}^3}{30\text{m} \cdot 10\text{m} \cdot \sqrt{1 + (2 \cdot \cos(45°) \cdot \cos(60°) \cdot \cos(75°)) - \left(\cos(45°)^2 + \cos(60°)^2 + \cos(75°)^2\right)}}$$

8) Side B of Parallelepiped given Lateral Surface Area

Open Calculator

fx
$$S_b = \frac{LSA}{2 \cdot (S_a \cdot \sin(\angle\gamma) + S_c \cdot \sin(\angle\alpha))}$$

ex
$$19.9729\text{m} = \frac{1440\text{m}^2}{2 \cdot (30\text{m} \cdot \sin(75°) + 10\text{m} \cdot \sin(45°))}$$

9) Side C of Parallelepiped

Open Calculator

fx
$$S_c = \frac{V}{S_b \cdot S_a \cdot \sqrt{1 + (2 \cdot \cos(\angle\alpha) \cdot \cos(\angle\beta) \cdot \cos(\angle\gamma)) - \left(\cos(\angle\alpha)^2 + \cos(\angle\beta)^2 + \cos(\angle\gamma)^2\right)}}$$

ex
$$9.999994\text{m} = \frac{3630\text{m}^3}{20\text{m} \cdot 30\text{m} \cdot \sqrt{1 + (2 \cdot \cos(45°) \cdot \cos(60°) \cdot \cos(75°)) - \left(\cos(45°)^2 + \cos(60°)^2 + \cos(75°)^2\right)}}$$

10) Side C of Parallelepiped given Total Surface Area and Lateral Surface Area

Open Calculator

fx
$$S_c = \frac{TSA - LSA}{2 \cdot S_a \cdot \sin(\angle\beta)}$$

ex
$$10.0074\text{m} = \frac{1960\text{m}^2 - 1440\text{m}^2}{2 \cdot 30\text{m} \cdot \sin(60°)}$$

Surface Area of Parallelepiped

11) Lateral Surface Area of Parallelepiped

Open Calculator

fx
$$LSA = 2 \cdot ((S_a \cdot S_b \cdot \sin(\angle\gamma)) + (S_b \cdot S_c \cdot \sin(\angle\alpha)))$$

ex
$$1441.954\text{m}^2 = 2 \cdot ((30\text{m} \cdot 20\text{m} \cdot \sin(75°)) + (20\text{m} \cdot 10\text{m} \cdot \sin(45°)))$$

12) Lateral Surface Area of Parallelepiped given Total Surface Area

Open Calculator

fx
$$LSA = TSA - 2 \cdot S_a \cdot S_c \cdot \sin(\angle\beta)$$

ex
$$1440.385\text{m}^2 = 1960\text{m}^2 - 2 \cdot 30\text{m} \cdot 10\text{m} \cdot \sin(60°)$$

13) Total Surface Area of Parallelepiped

Open Calculator

fx
$$TSA = 2 \cdot ((S_a \cdot S_b \cdot \sin(\angle\gamma)) + (S_a \cdot S_c \cdot \sin(\angle\beta)) + (S_b \cdot S_c \cdot \sin(\angle\alpha)))$$

ex
$$1961.569\text{m}^2 = 2 \cdot ((30\text{m} \cdot 20\text{m} \cdot \sin(75°)) + (30\text{m} \cdot 10\text{m} \cdot \sin(60°)) + (20\text{m} \cdot 10\text{m} \cdot \sin(45°)))$$

14) Total Surface Area of Parallelepiped given Lateral Surface Area

Open Calculator

fx
$$TSA = LSA + 2 \cdot S_a \cdot S_c \cdot \sin(\angle\beta)$$

ex
$$1959.615\text{m}^2 = 1440\text{m}^2 + 2 \cdot 30\text{m} \cdot 10\text{m} \cdot \sin(60°)$$

Volume of Parallelepiped

15) Volume of Parallelepiped

fx Open Calculator

$$V = S_a \cdot S_b \cdot S_c \cdot \sqrt{1 + (2 \cdot \cos(\angle\alpha) \cdot \cos(\angle\beta) \cdot \cos(\angle\gamma)) - \left(\cos(\angle\alpha)^2 + \cos(\angle\beta)^2 + \cos(\angle\gamma)^2\right)}$$

ex

$$3630.002\mathrm{m^3} = 30\mathrm{m} \cdot 20\mathrm{m} \cdot 10\mathrm{m} \cdot \sqrt{1 + (2 \cdot \cos(45^\circ) \cdot \cos(60^\circ) \cdot \cos(75^\circ)) - \left(\cos(45^\circ)^2 + \cos(60^\circ)^2 + \cos(75^\circ)^2\right)}$$

16) Volume of Parallelepiped given Total Surface Area and Lateral Surface Area

fx Open Calculator

$$V = \frac{1}{2} \cdot \frac{TSA - LSA}{\sin(\angle\beta)} \cdot S_b \cdot \sqrt{1 + (2 \cdot \cos(\angle\alpha) \cdot \cos(\angle\beta) \cdot \cos(\angle\gamma)) - \left(\cos(\angle\alpha)^2 + \cos(\angle\beta)^2 + \right.}$$

ex

$$3632.69\mathrm{m^3} = \frac{1}{2} \cdot \frac{1960\mathrm{m^2} - 1440\mathrm{m^2}}{\sin(60^\circ)} \cdot 20\mathrm{m} \cdot \sqrt{1 + (2 \cdot \cos(45^\circ) \cdot \cos(60^\circ) \cdot \cos(75^\circ)) - \left(\cos(45^\circ)^2 + \cos(60^\circ)^2 \right.}$$

Variables Used

- **$\angle\alpha$** Angle Alpha of Parallelepiped *(Degree)*
- **$\angle\beta$** Angle Beta of Parallelepiped *(Degree)*
- **$\angle\gamma$** Angle Gamma of Parallelepiped *(Degree)*
- **LSA** Lateral Surface Area of Parallelepiped *(Square Meter)*
- **P** Perimeter of Parallelepiped *(Meter)*
- **S_a** Side A of Parallelepiped *(Meter)*
- **S_b** Side B of Parallelepiped *(Meter)*
- **S_c** Side C of Parallelepiped *(Meter)*
- **TSA** Total Surface Area of Parallelepiped *(Square Meter)*
- **V** Volume of Parallelepiped *(Cubic Meter)*

Constants, Functions, Measurements used

- Function: **asin**, asin(Number)
  Inverse trigonometric sine function
- Function: **cos**, cos(Angle)
  Trigonometric cosine function
- Function: **sin**, sin(Angle)
  Trigonometric sine function
- Function: **sqrt**, sqrt(Number)
  Square root function
- Measurement: **Length** in Meter (m)
  Length Unit Conversion
- Measurement: **Volume** in Cubic Meter (m^3)
  Volume Unit Conversion
- Measurement: **Area** in Square Meter (m^2)
  Area Unit Conversion
- Measurement: **Angle** in Degree (°)
  Angle Unit Conversion

Check other formula lists

- Anticube Formulas
- Antiprism Formulas
- Barrel Formulas
- Bent Cuboid Formulas
- Bicone Formulas
- Capsule Formulas
- Circular Hyperboloid Formulas
- Cuboctahedron Formulas
- Cut Cylinder Formulas
- Cut Cylindrical Shell Formulas
- Cylinder Formulas
- Cylindrical Shell Formulas
- Diagonally Halved Cylinder Formulas
- Disphenoid Formulas
- Double Calotte Formulas
- Double Point Formulas
- Ellipsoid Formulas
- Elliptic Cylinder Formulas
- Elongated Dodecahedron Formulas
- Flat End Cylinder Formulas
- Frustum of Cone Formulas
- Great Dodecahedron Formulas
- Great Icosahedron Formulas
- Great Stellated Dodecahedron Formulas
- Half Cylinder Formulas
- Half Tetrahedron Formulas
- Hemisphere Formulas
- Hollow Cuboid Formulas
- Hollow Cylinder Formulas
- Hollow Frustum Formulas
- Hollow Hemisphere Formulas
- Hollow Pyramid Formulas
- Hollow Sphere Formulas
- Ingot Formulas
- Obelisk Formulas
- Oblique Cylinder Formulas
- Oblique Prism Formulas
- Obtuse Edged Cuboid Formulas
- Oloid Formulas
- Paraboloid Formulas
- Parallelepiped Formulas
- Prismatoid Formulas
- Ramp Formulas
- Regular Bipyramid Formulas
- Rhombohedron Formulas
- Right Wedge Formulas
- Semi Ellipsoid Formulas
- Sharp Bent Cylinder Formulas
- Skewed Three Edged Prism Formulas
- Small Stellated Dodecahedron Formulas
- Solid of Revolution Formulas
- Sphere Formulas
- Spherical Cap Formulas
- Spherical Corner Formulas
- Spherical Ring Formulas
- Spherical Sector Formulas
- Spherical Segment Formulas
- Spherical Wedge Formulas
- Spherical Zone Formulas
- Square Pillar Formulas
- Star Pyramid Formulas
- Stellated Octahedron Formulas
- Toroid Formulas
- Torus Formulas
- Trirectangular Tetrahedron Formulas
- Truncated Rhombohedron Formulas

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