2D & 3D Geometric Shapes

Square

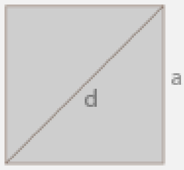
Formula

$$\text{Area } A = a^2$$

$$\text{Perimeter } P = 4a$$

$$\text{Diagonal } D = \sqrt{2}\,a$$

$$\text{Side } a = \frac{P}{4}$$



Square

a → length of side

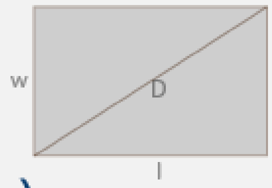
P → Perimeter

Rectangle

Formula

$$\text{Area } A = wl$$

$$\text{Perimeter } P = 2(l + w)$$



Rectangle

$$\text{Diagonal } D = \sqrt{w^2 + l^2}$$

$$\text{Length } l = \frac{A}{w}$$

$$\text{Width } w = \frac{A}{l}$$

l → length

w → width

P → Perimeter

A → Area

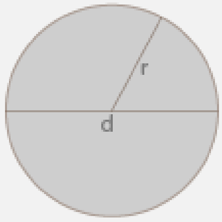
D → Diagonal

Circle

Formula

Area A $= \pi r^2$

Circumference C $= 2\pi r$



Circle

Diameter d $= 2r$

Radius r $= \sqrt{\dfrac{A}{\pi}}$

r ⟶ radius

C ⟶ circumference

A ⟶ Area

Triangle

Formula

Area A $= \dfrac{bh}{2}$

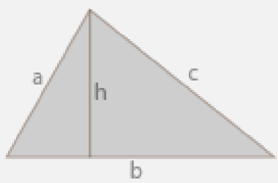
Perimeter P $= a + b + c$

b ⟶ base

h ⟶ height

a ⟶ side

c ⟶ side



Triangle

Cube

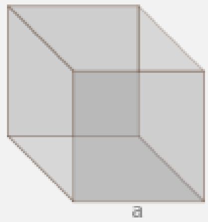
Formula

$$\text{Volume } V = a^3$$

$$\text{Surface area } A = 6a^2$$

$$\text{Diagonal } d = \sqrt{3}\, a$$

$$\text{Edges } a = \sqrt[3]{V}$$



Cube

a ⟶ edges

V ⟶ Volume

d ⟶ diagonal

Sphere

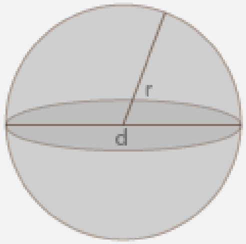
Formula

$$\text{Volume } V = \frac{4}{3}\pi r^3$$

$$\text{Surface area } A = 4\pi r^2$$

$$\text{Diameter } d = 2r$$

$$\text{Radius } r = \frac{d}{2}$$



Sphere

r → radius

d → diameter

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Cylinder

Formula

$$\text{Volume } V = \pi r^2 h$$

$$\text{Surface area } A = 2\pi rh + 2\pi r^2$$

$$\text{Lateral area } A_L = 2\pi rh$$

$$\text{Base area } A_B = \pi r^2$$

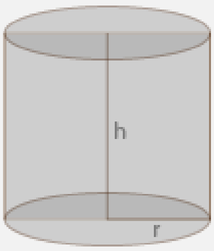
$$\text{Height } h = \frac{V}{\pi r^2}$$

$$\text{Radius } r = \sqrt{\frac{V}{\pi h}}$$

r ⟶ radius

V ⟶ Volume

h ⟶ height



Cylinder

Pyramid

Formula

$$\text{Volume } V = lwh/3$$

$$\text{Surface area } A = lw + l\sqrt{\left(\frac{w}{2}\right)^2 + h^2} + w\sqrt{\left(\frac{l}{2}\right)^2 + h^2}$$

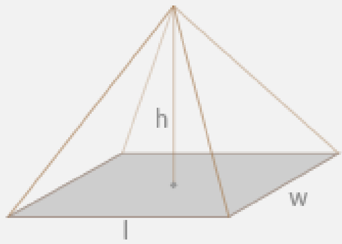
$$\text{Lateral area } A_L = l\sqrt{\left(\frac{w}{2}\right)^2 + h^2} + w\sqrt{\left(\frac{l}{2}\right)^2 + h^2}$$

$$\text{Base area } A_B = lw$$

l → length

w → width

h → height



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Tank Capacity

Formula

Rectangular Tank :

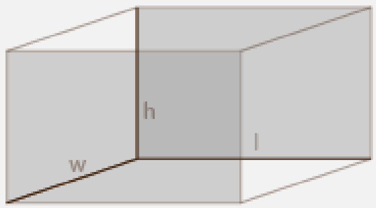
$$\text{Volume } V = lwh$$

$$\text{Surface area } A = 2(lw + lh + wh)$$

l ⟶ length

w ⟶ width

h ⟶ height



Rectangular Tank

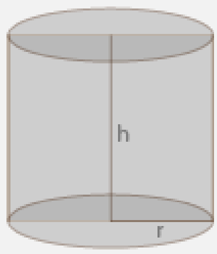
Cylinder Tank :

$$\text{Volume } V = \pi r^2 h$$

$$\text{Surface area } A = 2\pi r(h + r)$$

r ⟶ radius

h ⟶ height



Cylinder Tank

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Cone

Formula

$$\text{Volume } V = \frac{\pi r^2 h}{3}$$

$$\text{Surface area } A = \pi r\left(r + \sqrt{h^2 + r^2}\right)$$

$$\text{Lateral area } A_L = \pi r \sqrt{h^2 + r^2}$$

$$\text{Base area } A_B = \pi r^2$$

$$\text{Height } h = 3\frac{V}{\pi r^2}$$

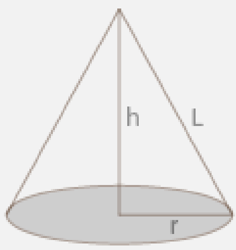
$$\text{Radius } r = \sqrt{3\frac{V}{\pi h}}$$

$$\text{Slant height } L = \sqrt{r^2 + h^2}$$

r ⟶ radius

V ⟶ Volume

h ⟶ height



Cone

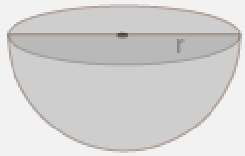
Hemisphere

Formula

$$\text{Volume } V = \frac{2}{3}\pi r^3$$

$$\text{Surface area } A = 2\pi r^2$$

r ⟶ radius



Hemisphere

getcalc.com

Prism

Formula

Rectangular Prism :

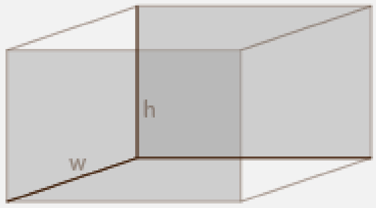
$$\text{Volume } V = lwh$$

$$\text{Surface area } A = 2(lw + lh + wh)$$

l ⟶ length

w ⟶ width

h ⟶ height



Rectangular Prism

Triangular Prism :

$$\text{Volume } V = \frac{bhl}{2}$$

$$\text{Surface area } A = 2B + Ph$$

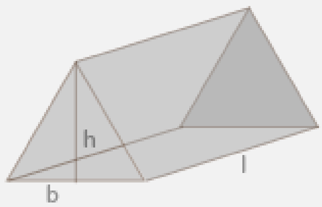
b ⟶ base

h ⟶ height

l ⟶ length

P ⟶ Perimeter of base

B ⟶ Area of base



Triangular Prism

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Circle Sector - Arc

Formula

$$A = \frac{\pi r^2 \theta}{360}$$

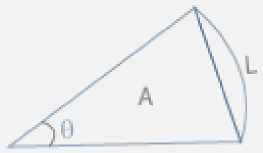
$$L = \frac{2\pi r\theta}{360}$$

A ⟶ Area of circle sector

L ⟶ Length of circle sector

r ⟶ radius

θ ⟶ Angle



Circle Sector

Ellipse

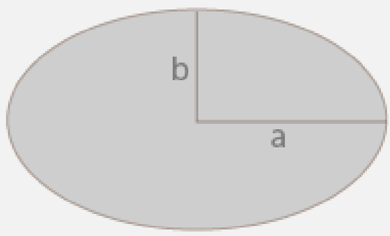
Formula

$$\text{Area } A = \pi ab$$

$$\text{Perimeter } P = 2\pi\sqrt{\frac{a^2 + b^2}{2}}$$

a ⟶ Major axis length

b ⟶ Minor axis length



Ellipse

Hyperbola

Formula

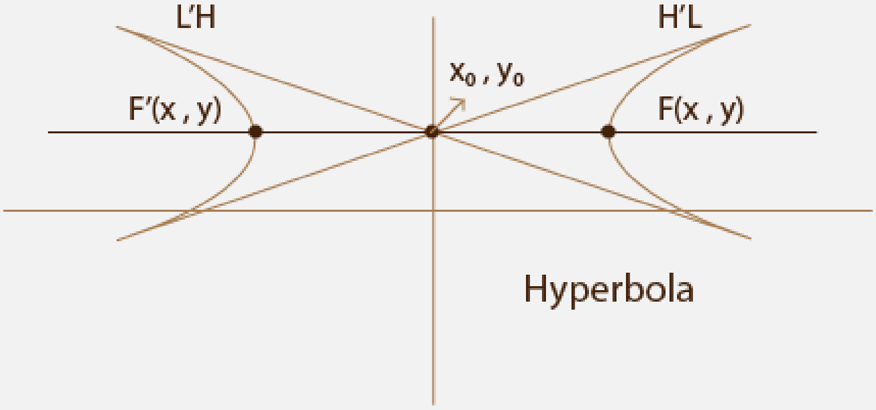
$$F(x, y) = \left(x_0 + \sqrt{a^2 + b^2}, y_0\right)$$

$$F'(x, y) = \left(x_0 - \sqrt{a^2 + b^2}, y_0\right)$$

$$\text{Eccentricity} = \sqrt{a^2 + b^2}$$

$$\text{Asymptotes } H'L = \frac{b}{a}x + \left(y_0 - \frac{b}{a}x_0\right)$$

$$\text{Asymptotes } L'H = -\frac{b}{a}x + \left(y_0 + \frac{b}{a}x_0\right)$$



Trapezoid

Formula

$$\text{Area } A = \frac{h(b_1 + b_2)}{2}$$

$$\text{Perimeter } P = b_1 + b_2 + s_1 + s_2$$

$$\text{Height } h = \sqrt{s^2 - (b_1 - b_2)^2}$$

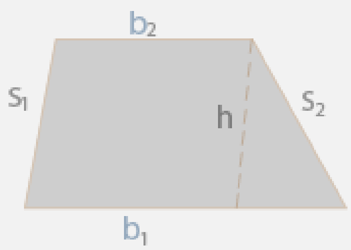
s_1 ⟶ Side 1

s_2 ⟶ Side 2

h ⟶ Height

b_1 ⟶ Base 1

b_2 ⟶ Base 2



Trapezoid

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Distance between Two Points

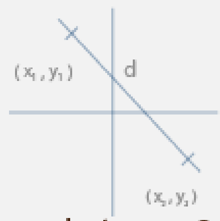
Formula

$$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

(x_1, y_1) ⟶ Point 1

(x_2, y_2) ⟶ Point 2

d ⟶ distance between (x_1, y_1) & (x_2, y_2)



Distance between 2 points

getcalc.com

Line Slope

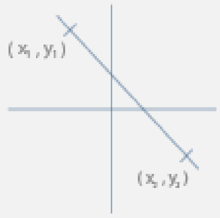
Formula

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

(x_1, y_1) → Point 1

(x_2, y_2) → Point 2

m → slope of a line



slope of a line

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Rectangular - Polar Coordinates

Formula

Rectangular to Polar co-ordinates :

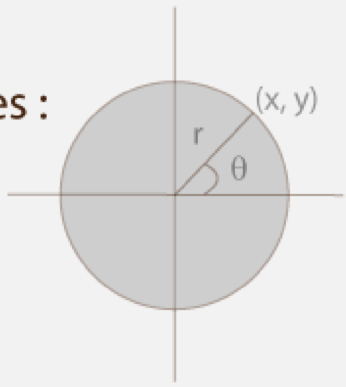
$$\text{Angle } \theta = \tan^{-1}\left(\frac{y}{x}\right)$$

$$\text{Radius } r = \sqrt{x^2 + y^2}$$

Polar to Rectangular co-ordinates :

$$x = r\cos\theta$$

$$y = r\sin\theta$$



Rectangular - Polar co-ordinates

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Line Mid Point

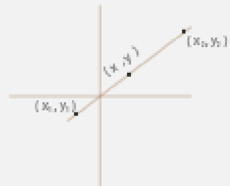
Formula

$$(x, y) = \left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2}\right)$$

$(x_1, y_1) \longrightarrow$ point 1

$(x_2, y_2) \longrightarrow$ point 2

$(x, y) \longrightarrow$ Mid point between (x_1, y_1) & (x_2, y_2)



Mid-point of a line

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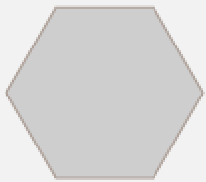
Hexagon

Formula

$$\text{Area } A = \frac{3\sqrt{3}\, s^2}{2}$$

$$\text{Perimeter } P = 6s$$

$$\text{Side } s = 3^{1/4}\sqrt{\frac{2A}{9}}$$



Hexagon

$s \longrightarrow$ side length

$P \longrightarrow$ Perimeter

$A \longrightarrow$ Area

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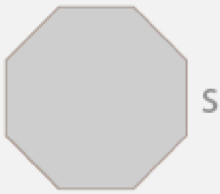
Octagon

Formula

$$\text{Area } A = 2(1+\sqrt{2})\, s^2$$



Octagon

$$\text{Perimeter } P = 8s$$

$$\text{Side } s = \sqrt{\sqrt{2}\,\frac{A}{2} - \frac{A}{2}}$$

s ⟶ side length

P ⟶ Perimeter

A ⟶ Area

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Polygon

Formula

$$\text{Area } A = \frac{S}{2\tan\left(\frac{180}{n}\right)}$$

$$\text{Perimeter } P = S\,n$$

Polygon

S ⟶ Side length

n ⟶ No of sides

A ⟶ Area

P ⟶ Perimeter

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Rhombus

Formula

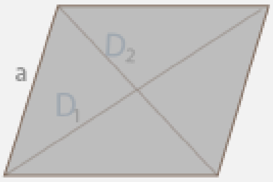
$$\text{Area } A = \frac{D_1 D_2}{2}$$

$$\text{Perimeter } P = 4a$$

D_1 ⟶ Diagonal 1

D_2 ⟶ Diagonal 2

a ⟶ Side



Rhombus