

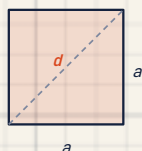
Geometry Formulas

2D shapes, 3D solids and theorems with labelled drawings and every formula, ready to print.

20
shapes & theorems

2D Shapes AREA AND PERIMETER OF FLAT FIGURES.

2D SHAPES



Square

Area $A = a^2$

Perimeter $P = 4a$

Diagonal $d = a\sqrt{2}$

a side length

2D SHAPES



Rectangle

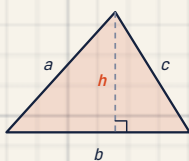
Area $A = l \times w$

Perimeter $P = 2(l + w)$

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

l length · w width

2D SHAPES



Triangle

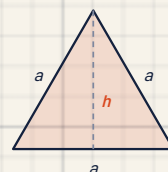
Area $A = \frac{1}{2} \times b \times h$

Perimeter $P = a + b + c$

Angle sum $\angle A + \angle B + \angle C = 180^\circ$

b base · h perpendicular height · a, c other sides

2D SHAPES



Equilateral Triangle

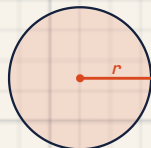
Area $A = (\sqrt{3} / 4) a^2$

Height $h = (\sqrt{3} / 2) a$

Perimeter $P = 3a$

a side length

2D SHAPES



Circle

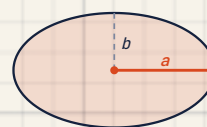
Area $A = \pi r^2$

Circumference $C = 2\pi r$

Diameter $d = 2r$

r radius · d diameter · $\pi \approx 3.14159$

2D SHAPES



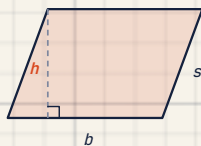
Ellipse

Area $A = \pi ab$

Perimeter (approx.) $P \approx \pi [3(a + b) - \sqrt{((3a + b)(a + 3b))}]$

a semi-major axis · b semi-minor axis

2D SHAPES



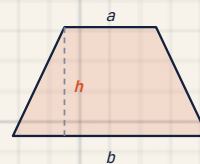
Parallelogram

Area $A = b \times h$

Perimeter $P = 2(b + s)$

b base · h perpendicular height · s slanted side

2D SHAPES



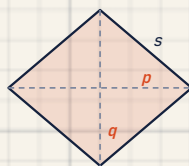
Trapezoid

Area $A = \frac{1}{2} (a + b) \times h$

Median $m = \frac{1}{2} (a + b)$

a top parallel side · b bottom parallel side · h height

2D SHAPES



Rhombus

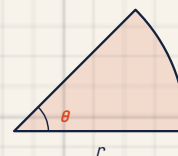
Area $A = \frac{1}{2} \times p \times q$

Side $s = \frac{1}{2} \sqrt{(p^2 + q^2)}$

Perimeter $P = 4s$

p, q diagonals · s side

2D SHAPES



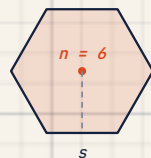
Sector of a Circle

Area $A = \left(\frac{\theta}{360^\circ}\right) \times \pi r^2$

Arc length $L = \left(\frac{\theta}{360^\circ}\right) \times 2\pi r$

r radius · θ central angle in degrees

2D SHAPES



Regular Polygon

Area $A = n s^2 / (4 \tan(180^\circ / n))$

Perimeter $P = n \times s$

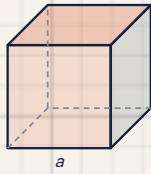
Interior angle $\alpha = (n - 2) \times 180^\circ / n$

n number of sides · s side length

3D Solids

VOLUME AND SURFACE AREA OF SOLID FIGURES.

3D SOLIDS



Cube

Volume

$$V = a^3$$

Surface area

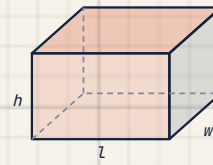
$$SA = 6a^2$$

Space diagonal

$$d = a\sqrt{3}$$

a edge length

3D SOLIDS



Cuboid (Rectangular Prism)

Volume

$$V = l \times w \times h$$

Surface area

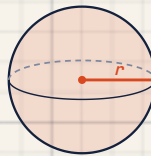
$$SA = 2(lw + lh + wh)$$

Space diagonal

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

l length · w width · h height

3D SOLIDS



Sphere

Volume

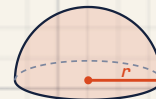
$$V = \left(\frac{4}{3}\right) \pi r^3$$

Surface area

$$SA = 4\pi r^2$$

r radius

3D SOLIDS



Hemisphere

Volume

$$V = \left(\frac{2}{3}\right) \pi r^3$$

Curved surface area

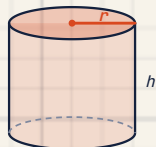
$$CSA = 2\pi r^2$$

Total surface area

$$TSA = 3\pi r^2$$

r radius

3D SOLIDS



Cylinder

Volume

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

Curved surface area

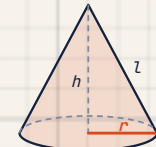
$$CSA = 2\pi r h$$

Total surface area

$$TSA = 2\pi r(r + h)$$

r radius · h height

3D SOLIDS



Cone

Volume

$$V = \left(\frac{1}{3}\right) \pi r^2 h$$

Slant height

$$l = \sqrt{r^2 + h^2}$$

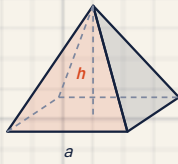
Curved surface area

$$CSA = \pi r l$$

Total surface area

$$TSA = \pi r(r + l)$$

r radius · h height · l slant height



Square Pyramid

Volume $V = \left(\frac{1}{3} \right) a^2 h$

Slant height $s = \sqrt{h^2 + \left(\frac{a}{2} \right)^2}$

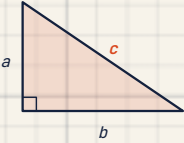
Surface area $SA = a^2 + 2as$

a base edge · h height · s slant height

Theorems

CORE RULES OF GEOMETRY AND COORDINATE GEOMETRY.

THEOREMS

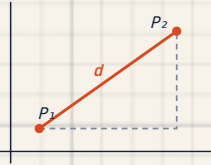


Pythagorean Theorem

Theorem	$a^2 + b^2 = c^2$
Hypotenuse	$c = \sqrt{a^2 + b^2}$
Missing leg	$a = \sqrt{c^2 - b^2}$

a, b legs · c hypotenuse

THEOREMS



Distance & Midpoint

Distance	$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$
Midpoint	$M = ((x_1 + x_2) / 2, (y_1 + y_2) / 2)$
Slope	$m = (y_2 - y_1) / (x_2 - x_1)$

(x_1, y_1) first point · (x_2, y_2) second point