

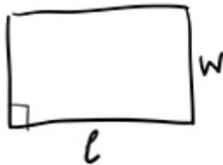


Complete Mathematics Formula Sheet

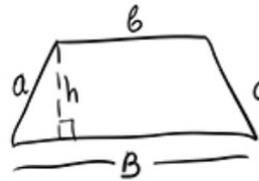
Geometry, Trigonometry, Algebra, and Calculus

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SmartyNotesPro

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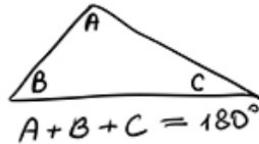
$$P = 2l + 2w$$
$$A = lw$$



$$P = a + b + c + B$$
$$A = \frac{1}{2} h(b + B)$$



$$P = 4s$$
$$A = s^2$$

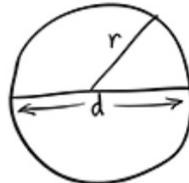


$$A + B + C = 180^\circ$$

$$P = 2a + 2b$$
$$A = bh$$



$$P = a + b + c$$
$$A = \frac{1}{2} bh$$

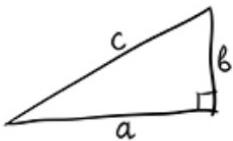
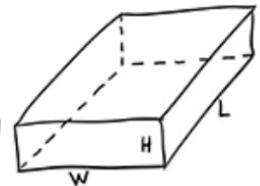


$$C = \pi d$$
$$C = 2\pi r$$
$$A = \pi r^2$$
$$\pi = 3.14$$

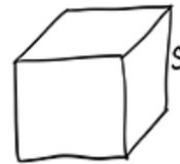
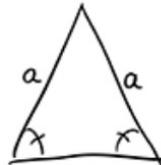
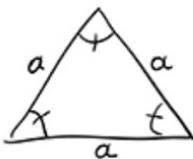


$$V = \frac{4}{3} \pi r^3$$

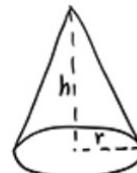
$$V = LWH$$
$$S = 2LH + 2LW + 2WH$$



$$P = a + b + c$$
$$A = \frac{1}{2} ab$$
$$a^2 + b^2 = c^2$$



$$V = s^3$$



$$V = \frac{1}{3} \pi r^2 h$$



$$V = \pi r^2 h$$
$$SA = 2\pi r^2 + 2\pi rh$$

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1 Geometry Formulas

1.1 2D Shapes

Area and Perimeter Formulas

- **Square:**

$$A = s^2, \quad P = 4s$$

where s is the side length.

- **Rectangle:**

$$A = l \times w, \quad P = 2(l + w)$$

where l is the length and w is the width.

- **Circle:**

$$A = \pi r^2, \quad C = 2\pi r$$

where r is the radius.

- **Triangle:**

$$A = \frac{1}{2} \times b \times h, \quad P = a + b + c$$

where b is the base, h is the height, and a, b, c are the sides.

1.2 3D Shapes

Surface Area and Volume Formulas

- **Cube:**

$$V = s^3, \quad SA = 6s^2$$

where s is the side length.

- **Sphere:**

$$V = \frac{4}{3}\pi r^3, \quad SA = 4\pi r^2$$

where r is the radius.

- **Cylinder:**

$$V = \pi r^2 h, \quad SA = 2\pi r^2 + 2\pi r h$$

where r is the radius and h is the height.

1.3 Triangle Properties

Heron's Formula and Laws

- **Heron's Formula:** Area of a triangle with sides a, b, c :

$$A = \sqrt{s(s-a)(s-b)(s-c)}$$

where $s = \frac{a+b+c}{2}$ is the semi-perimeter.

- **Law of Sines:**

$$\frac{a}{\sin(A)} = \frac{b}{\sin(B)} = \frac{c}{\sin(C)}$$

- **Law of Cosines:**

$$c^2 = a^2 + b^2 - 2ab \cdot \cos(C)$$

2 Trigonometry Formulas

2.1 Basic Identities

Trigonometric Identities

- **Sine, Cosine, and Tangent:**

$$\sin(\theta) = \frac{\text{Opposite}}{\text{Hypotenuse}}, \quad \cos(\theta) = \frac{\text{Adjacent}}{\text{Hypotenuse}}, \quad \tan(\theta) = \frac{\text{Opposite}}{\text{Adjacent}}$$

- **Pythagorean Identity:**

$$\sin^2(\theta) + \cos^2(\theta) = 1$$

2.2 Advanced Trigonometric Formulas

Angle Sum and Difference

- **Sum and Difference of Angles:**

$$\sin(A \pm B) = \sin A \cos B \pm \cos A \sin B$$

$$\cos(A \pm B) = \cos A \cos B \mp \sin A \sin B$$

- **Double Angle Formulas:**

$$\sin(2A) = 2 \sin(A) \cos(A), \quad \cos(2A) = \cos^2(A) - \sin^2(A)$$

- **Half-Angle Formula:**

$$\sin\left(\frac{A}{2}\right) = \pm \sqrt{\frac{1 - \cos(A)}{2}}$$

2.3 Unit Circle and Graphs

Unit Circle Values

- **Important Unit Circle Values:**

$$\sin(0^\circ) = 0, \quad \sin(30^\circ) = \frac{1}{2}, \quad \sin(45^\circ) = \frac{\sqrt{2}}{2}, \quad \sin(90^\circ) = 1$$

$$\cos(0^\circ) = 1, \quad \cos(30^\circ) = \frac{\sqrt{3}}{2}, \quad \cos(45^\circ) = \frac{\sqrt{2}}{2}, \quad \cos(90^\circ) = 0$$

3 Algebra Formulas

3.1 Exponents and Radicals

Exponent and Radical Laws

- **Laws of Exponents:**

$$a^m \cdot a^n = a^{m+n}, \quad \frac{a^m}{a^n} = a^{m-n}, \quad (a^m)^n = a^{m \cdot n}$$

- **Radical Rules:**

$$\sqrt{a} \cdot \sqrt{b} = \sqrt{ab}, \quad \frac{\sqrt{a}}{\sqrt{b}} = \sqrt{\frac{a}{b}}$$

3.2 Factoring and Quadratic Formula

Factoring Identities

- **Difference of Squares:**

$$a^2 - b^2 = (a - b)(a + b)$$

- **Perfect Square Trinomial:**

$$a^2 + 2ab + b^2 = (a + b)^2$$

- **Quadratic Formula:**

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

4 Calculus Formulas

4.1 Limits and Continuity

Limits

- **Limit Definition of Derivative:**

$$f'(x) = \lim_{h \rightarrow 0} \frac{f(x+h) - f(x)}{h}$$

- **Continuity:**

$$\lim_{x \rightarrow c} f(x) = f(c)$$

4.2 Derivatives and Integration

Derivatives and Common Formulas

- **Power Rule:**

$$\frac{d}{dx}(x^n) = nx^{n-1}$$

- **Product Rule:**

$$\frac{d}{dx}[f(x) \cdot g(x)] = f'(x)g(x) + f(x)g'(x)$$

- **Quotient Rule:**

$$\frac{d}{dx} \left[\frac{f(x)}{g(x)} \right] = \frac{f'(x)g(x) - f(x)g'(x)}{[g(x)]^2}$$

- **Basic Integrals:**

$$\int x^n dx = \frac{x^{n+1}}{n+1} + C$$

4.3 Fundamental Theorem of Calculus

Fundamental Theorem

- **First Fundamental Theorem:**

$$\int_a^b f(x) dx = F(b) - F(a)$$

- **Area under Curves:**

$$\text{Area} = \int_a^b f(x) dx$$

Quick Reference Sheet

- **Geometry:** $A = \pi r^2$, $P = 2(l + w)$, $c^2 = a^2 + b^2$
- **Trigonometry:** $\sin^2(\theta) + \cos^2(\theta) = 1$, $\tan(\theta) = \frac{\sin(\theta)}{\cos(\theta)}$
- **Algebra:** $a^m \cdot a^n = a^{m+n}$, $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$
- **Calculus:** $\frac{d}{dx}(x^n) = nx^{n-1}$, $\int x^n dx = \frac{x^{n+1}}{n+1} + C$