

# Lambda School LaTeX equation practice

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## Abstract

Abstract:*italics*

## 1 Basic Algebra formulas

Algebra also includes real numbers, complex numbers, matrices, vectors and much more. X, Y, A, B are the most commonly used letters that represent the algebraic problems and equation.

## 2 Some examples to get started

$$\begin{aligned}(a+b)^2 &= (a^2 + b^2 + 2ab) \\ (a-b)^2 &= (a^2 + b^2 - 2ab) \\ (a+b)^3 &= (a^3 + 3a^2b + 3ab^2 + b^3) \\ (a-b)^3 &= (a^3 - 3a^2b - 3ab^2 + b^3)\end{aligned}$$

### 2.1 Vector Triple Product

$$\vec{A} \times (\vec{B} \times \vec{C}) = \vec{B} \times (\vec{A} \cdot \vec{C}) + \vec{C} \times (\vec{A} \cdot \vec{B}) \quad (1)$$

### 2.2 Chain rule

$$\begin{aligned}\frac{\partial \sin(x^2 + xy)}{\partial x} &= \frac{d \sin(x^2 + xy)}{dx^2 + xy} \frac{\partial (x^2 + xy)}{\partial x} \\ &= \cos(x^2 + xy) \left( \frac{dx^2}{dx} + \frac{dx}{dx} y \right) \\ &= \cos(x^2 + xy)(2x + y)\end{aligned}$$

### 2.3 subscripts and superscripts

Let  $x_3, 5x = 5 \frac{1}{5}$

$x^3, x^{\sin(y)}$

$x_3, x_{\sin(y)}$

$x_j^{k_i}$

$A^{i^{i^{i^{i^{i}}}}}$

$x \frac{e^{i\pi}}{\ln(x)}$

## 2.4 More advanced expressions: sums, derivatives, partials etc

$$\sum_{i=0,k}^{2k} x_i$$

$$\frac{\mathrm{d}y}{\mathrm{d}x}f(x)$$

$$\sum_{i=0,k}^{2k} x_i$$

## 2.5 Matrices, Vectors

$$\begin{bmatrix} a_1 & a_2 & a_3 \\ b_1 & b_2 & b_3 \\ c_1 & c_2 & c_3 \end{bmatrix} \begin{pmatrix} a_1 & a_2 & a_3 \\ b_1 & b_2 & b_3 \\ c_1 & c_2 & c_3 \end{pmatrix} \begin{vmatrix} a_1 & a_2 & a_3 \\ b_1 & b_2 & b_3 \\ c_1 & c_2 & c_3 \end{vmatrix}$$

$$\left\| \begin{pmatrix} a_1 & a_2 & a_3 \\ b_1 & b_2 & b_3 \\ c_1 & c_2 & c_3 \end{pmatrix} \right\|$$

$$\begin{pmatrix} \alpha \\ \Omega \end{pmatrix} \begin{pmatrix} x_1 \\ x_2 \end{pmatrix}$$

$$\begin{pmatrix} \alpha \\ \Omega \end{pmatrix} \left\{ \begin{pmatrix} a_1 & a_2 & a_3 \\ b_1 & b_2 & b_3 \\ c_1 & c_2 & c_3 \end{pmatrix} \right\}$$

## 2.6 Representing Greek Letters

$$\alpha \varsigma \tau \Lambda \eta \varphi$$