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# LaTeX - Tutorial for Beginners

## 1 Common Mathematical Notation

superscripts

$$2x^3$$

$$2x^12$$

$$2x^{12}$$

subscripts

$$x_{12}$$

$$x_{1_2}$$

$$a_0, a_1, \dots, a_{100}$$

Greek letters

$$\pi$$

$$\Pi$$

$$\alpha$$

$$A = \pi r^2$$

Trig functions

$$y = \sin x$$

$$y = \cos x$$

$$y = \sin^{-1} \theta$$

Log functions

$$y = \log x$$

$$y = \log_5 x$$

$$y = \ln x$$

Roots

$$y = \sqrt{x}$$

$$y = \sqrt[3]{2}$$

$$f(x) = \sqrt{x^2 + y^2}$$

$$\sqrt{1+\sqrt{x}}$$

Fractions

$$\frac{2}{4}$$

Normal  $\frac{2}{4}$

Display  $\frac{2}{4}$

## 2 Brackets, Tables and Arrays

### 2.1 Brackets

The distributive property states that  $a(b+c) = ab+ac$  for all  $a,b,c \in \mathbb{R}$ .

The equivalence class of  $a$  is  $[a]$ .

The set  $A$  is defined to be  $\{1,2,3\}$ .

$$\left(\frac{1}{x^2-1}\right)$$

$$2\left\langle \frac{x}{y}\right\rangle$$

$$2\left|\frac{1}{x^2-1}\right|$$

$$\left.\frac{dy}{dx}\right|_{x=1}$$

### 2.2 Table

$x$	1	2	3	4	5
$f(x)$	6	7	8	9	$\frac{4}{7}$

$x$	1	2	3	4	5
$f(x)$	$\frac{1}{2}$	7	8	9	$\frac{4}{7}$

Table 1: These values represent the function  $f(x)$ .

$f(x)$	$f'(x)$
$x > 0$	The function $f(x)$ is increasing.

Table 2: The relationship between  $f(x)$  and  $f'(x)$ .

$f(x)$	$f'(x)$
$x > 0$	The function $f(x)$ is increasing. The function $f(x)$ is increasing. The function $f(x)$ is increasing.

Table 3: The relationship between  $f(x)$  and  $f'(x)$ .

### 2.3 Equation Arrays

$$5x^2\text{text} \tag{1}$$

$$5x^2 - 9 = x + 3 \tag{2}$$

$$\sqrt{x + \sqrt{x}} + 1 = \sqrt{3} \tag{3}$$

$$5x^2\text{text}$$

$$5x^2 - 9 = x + 3$$

$$\sqrt{x + \sqrt{x}} + 1 = \sqrt{3}$$

### 3 Creating Lists

1. pencil
2. calculator
3. ruler
4. notebook
  - (a) notes
  - (b) homework
  - (c) assessments
    - i. tests

- ii. quizzes
  - iii. journal entries
5. highlighters

- pencil
- calculator
- ruler
- notebook

## 4 Text Document Formatting

This will produce *italicized* text.

This will produce **bold face** text.

This will produce `typewriter font` text.

Please visit Michelle Krummel's website at: <http://michellekrummel.com>.

Please excuse my dear aunt Sally.

Please excuse my   dear aunt Sally.

Please excuse my   dear aunt Sally.

Please excuse my   dear aunt Sally.

Please excuse my   dear aunt Sally.

Please excuse my   dear aunt Sally.

Please excuse my   dear aunt Sally.

Please excuse my   dear aunt Sally.

Please excuse my   dear aunt Sally.

This line is centered.

This line is flushright.

## 5 Packages, Macros, and Graphics

Using geometry package to control margin and paper.

Using amsfonts, amsmath, amssymb to write special math notation.

Using graphicx to insert picture from your device.

Using float to align, and control the insert position of table or picture.

## 6 Calculus Notation

The function  $f(x) = (x - 3)^2 + \frac{1}{2}$  has domain  $D_f : (-\infty, \infty)$  and range  $R_f : [\frac{1}{2}, \infty)$

$$\lim_{x \rightarrow 0} f(x)$$

$$\lim_{x \rightarrow a} \frac{f(x) - f(a)}{x - a} = f'(a)$$

$$\int \sin x \, dx = -\cos x + C$$

$$\int_a^b$$

$$\int_a^b$$

$$\int_a^b x^2 \, dx = \left[ \frac{x^3}{3} \right]_a^b$$

$$\sum_{n=1}^{\infty}$$

$$\int_a^b f(x) \, dx = \lim_{x \rightarrow \infty} \sum_{k=1}^n f(x_k) \cdot \Delta x$$

$$\vec{v} = v_1 \vec{i} + v_2 \vec{j} = (v_1, v_2)$$