

Lambda School LaTeX Equation practice

Thomson Comer and Lambda School Students

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Lambda School

Abstract: *Italics*

1 Background

We need to do math, mostly.

2 Math in LaTeX

1. Basic math There are two canonical ways of creating math in LaTeX: [2]

Inline Math:

Let $x=1$, $5x = 5$

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

Block Math:

$$y = 2$$

$$x = 1 \quad (1)$$

2. Subscripts and superscripts

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

$$x^3, x^{\sin(y)} \quad (2)$$

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

Figure 1: A Creative Commons Bird.



$$x_3, x_{sin(y)} \tag{3}$$

Combine subscript and superscript!

$$\begin{aligned} &x_j^K i \\ &x_j^{K i + e^{i \pi}} \\ &A^{i^{i^{i^i}}} \end{aligned}$$

3. Fractions

$$\begin{aligned} &\$x\backslash\frac{e^{\{i\backslash\pi\}}\{\ln(x)\}}{\$} \\ &x \frac{e^{i \pi}}{\ln(x)} \\ &a x \end{aligned}$$

4. More advanced expressions: sums, derivatives, partials, etc

$$\begin{aligned} &\sum_{i=0,k}^{2k} x_i \\ &\frac{dy}{dx} f(x) \end{aligned}$$
$$\sum_{i=0,k}^{2k} x_i \tag{4}$$

Figure 2: A picture of a gull.



5. Matrices, vectors

$$\begin{pmatrix} x \\ y \end{pmatrix} \begin{pmatrix} \Lambda \\ \Gamma \end{pmatrix} \quad (5)$$

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

$$\left\{ \begin{matrix} a_1 & a_2 & a_3 \\ b_1 & b_2 e^{i\pi} & b_3 \\ c_1 & c_2 & c_3 \end{matrix} \right\}$$

6. Greek letters

$$\alpha A \beta \eta \zeta$$

3 Other skills in LaTeX

1. Figures

Figures are: an image, a caption, a figure #, a subtitle, and the metadata for that stuff.

But did you see my creative commons seagull at Figure 1?

See Figure 2.

2. Citations

4 Your Assignment

Write a LaTeX with introduction, background, and the following math expressions:

1. $y = f(x)$

2. $y = \mathbf{m}x + \mathbf{b}$
3. $dy/dx = nx^{(n-1)}$
4. Finite difference
5. Vector properties
6. Vector magnitude
7. L1 norm
8. L2 norm
9. Matrix multiplication
10. Matrix inversion
11. Correlation
12. SVD and PCA

References

- [1] Donald E. Knuth (1986) *The T_EX Book*, Addison-Wesley Professional.
- [2] Leslie Lamport (1994) *L_AT_EX: a document preparation system*, Addison Wesley, Massachusetts, 2nd ed.