LaTeX Tutorial 2: Basic Math Notation

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1 Superscripts:

$$2x^3$$

More than 1 character in the exponent:

$$2x^{34}$$

Functions in the exponent:

$$2x^{3x+4}$$

Power to a Power exponents:

$$2x^{3x^4+5}$$

2 Subscripts:

$$x_1 + x_{12}$$

Subscript in a subscript:

$$x_{1_{12}} + y_{1_{2_3}}$$

Series:

$$a_0 + a_1 + a_2 + \ldots + a_n$$

3 Greek Letters:

Some Popular Examples:

$$\pi \ \Pi \ \alpha \ \varepsilon$$

Equations With Greek Letters: Area of a circle:

$$A = \pi r^2$$

4 Trigonometric Functions:

Some Popular Examples:

$$y = \sin(x)$$

$$y = \cos(\theta)$$

$$\theta = \tan^{-1}\left(\frac{y}{x}\right)$$

$$\theta = \arcsin\left(\frac{y}{r}\right)$$

5 Log Functions:

Common Log (Base 10): $y = \log(x)$

Log Base 2 (Binary): $y = \log_2(x)$

Log Base e (Natural Log): $y = \ln(x)$

Another Way:

Common Log (Base 10): $y = \log(x)$

Log Base 2 (Binary): $y = \log_2(x)$

Log Base e (Natural Log): $y = \ln(x)$

6 Roots:

Square Roots: $\sqrt{2}$

Cube Roots: $\sqrt[3]{8} = 2$

nth root: $\sqrt[n]{x}$

Pythagorean Theorem: $r = \sqrt{x^2 + y^2}$

Square Root Inside a Square Root: $\sqrt{1 + \sqrt{3x^2 + 3}}$

7 Fractions:

A Simple Fraction (Display Mode):

$$\frac{2}{3}$$

In a sentence (resized):

Is the glass $\frac{1}{2}$ empty or $\frac{1}{2}$ full?

In a sentence (Display Mode):

Is the glass $\dfrac{1}{2}$ empty or $\dfrac{1}{2}$ full?

With ams packages: $\dfrac{1}{2}$ empty or $\dfrac{1}{2}$ full?

More Complex Fractions:

$$\frac{\sqrt{x+1}}{\sqrt{x+2}}$$

$$\frac{1}{1+\alpha e^{-x}}$$

$$\frac{x^3}{1+\frac{1}{\sqrt{x}}}$$

8 Percents / Per Milles / Per Myriads (Basis Points):

$$35\%_{000} = 3.5\%_{00} = 0.35\%$$

$$3.5 \text{ mills} = \frac{3.5}{1000} = 0.0035 = \frac{35}{10000} = 3.5 \times 10^{-3} = 0.35\%$$

$$3.5 \text{ mills} = \frac{\$3.50}{\$1{,}000} = \frac{7}{2000} = \frac{35}{10{,}000} = 3.5 = 10^{-3} = \left(\frac{7}{20}\right)\% = 3.5\%_{00}$$

$$3.5 \text{ mills} = \frac{3.5}{10^3} = \frac{7}{2 \cdot 10^3} = \frac{35}{10^4} = 3.5 \times 10^{-3} = \frac{7}{20} \times 10^{-2} = 35\%_{000}$$

$$.35\% \equiv 3.5 \text{ mills} \equiv 35 \text{ basis points}$$