Test

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LaTeXExample

1 Introduction

This document will be used to demonstrate various base functions available in LaTeX.

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2 Text Formatting

This is italicized text

This is bolded text

This is underlined text

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3 Math Formatting

Display Style Math Example:

$$f(x) = (x + 2)^2 - 9$$

Align * environment variation:

$$\begin{aligned} f(x) &= (x+2)^2 - 9 \\ f(1) &= (1+2)^2 - 9 \\ &= 9 - 9 \\ &= 0 \end{aligned}$$

Numbered align* with multiple equations per line:

$$x + 2y = 8 \qquad x - y = -1 \tag{1}$$
$$x + 2y = 8 \qquad 2x - 2y = -2 \tag{2}$$

$$\begin{aligned} x + 2y &= 8 \\ 2x - 2y &= -2 \\ 3x &= 6 \\ x &= 2 \end{aligned}$$

This is a function of x.

Display Style Equation: $\sum_{n=1}^{\infty} \frac{1}{n^2} = \frac{\pi^2}{6}$

Inline Equation: $\sum_{n=1}^{\infty} \frac{1}{n^2} = \frac{\pi^2}{6}$

Auto Scaled brackets: $\left(\sum_{n=0}^{N} \left(\frac{1}{a+b}\right)^2\right)^2$

Annotated Equation: $n = ab$ where a and b are natural numbers

AMS blackboard font: $\mathbb{Z} \in \{1, 2, 3, 4\}$

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4 Code Styling

```cpp
#include <iostream>
using namespace std;

int main() {
    cout << "Hello World!";
    return 0;
}
```

Listing 1: C++ example

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5 Images And Tables

Tabular example:

Left	Center	Right
A	B	C

Matrix/Array example:

$$\begin{bmatrix} a_1 & a_2 & a_3 \\ a_4 & a_5 & a_6 \end{bmatrix}$$

This can also be done the AMS way:

$$\begin{pmatrix} a_1 & a_2 & a_3 & \cdots \\ a_4 & a_5 & a_6 & \cdots \end{pmatrix}$$

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6 Calculus Notation

Polynomials: $f(x) = a_n x^n + a^{n-1}x^{n-1} + \cdots + a_1 x + a_0$

Exponentials: $c_1 e^{r_1 x} + c_2 e^{r_2 x} + \cdots + c_n e^{r_n x}$

Limits: $\lim_{x \to \infty} \frac{x^2 + 1}{x^2 - 1} = 1$

Summations: $\sum_{\substack{n=0 \\ n \text{ odd}}}^{\infty} a_x x^n$

Integrals: $\int_0^{\infty} f(x)\,\mathrm{d}x$, $\int_a^b f(x)\,dx = F(x)\Big|_a^b$

Derivatives: $\frac{df}{dx}$, $f'(x)$

Partial derivatives: $\frac{\partial f}{\partial x}$

Vectors: $\vec{r}(t) = \langle x(t), y(t), z(y) \rangle$

Calc 3 Construct: $\oint \vec{e} \cdot d\vec{s} = \frac{d\Phi_B}{dt}$

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7 Extra Math

Square Root: $\sqrt{x}$, $\sqrt[3]{\frac{x}{y}}$

Quadratic Formula: If $ax^2 + bx + c = 0$ then $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

Set Theory: $\{x \in S \mid P(x)\}$, $\{\forall x \exists a \mid a = x, \therefore x = x\}$

Combinatorics: $\binom{n}{k}$, ${}_nC_k$, ${}_nP_k$