Mathematical Document

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Abstract

This document contains advanced mathematical notation.

1 Introduction

This is an example with inline math: $E = mc^2$.

2 Theorems and Proofs

Theorem 1. *For any integers a and b, if $a|b$ and $b|c$, then $a|c$.*

Proof. Since $a|b$, there exists an integer k such that $b = ka$. Similarly, since $b|c$, there exists an integer m such that $c = mb$. Therefore, $c = m(ka) = (mk)a$, which shows $a|c$. □

3 Equations

Display equations:

$$\int_{-\infty}^{\infty} e^{-x^2} dx = \sqrt{\pi} \tag{1}$$

Aligned equations:

$$f(x) = x^2 + 2x + 1 \tag{2}$$
$$= (x + 1)^2 \tag{3}$$

Matrix notation:

$$A = \begin{pmatrix} a_{11} & a_{12} \\ a_{21} & a_{22} \end{pmatrix}$$