Simplifying Exponents *With Common Bases*

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1 Introduction

The goal of this document is to serve as a personal reference to understand how exponents *(with common bases),* can be simplified. This document also serves as my first ever *LaTeX* creation. I am very excited to continue using this tool to aid in my mathematical endeavors.

2 The Basic Simplification Techniques

The product rule:

If y and z are integers and x is a real number, then:

$$x^y \cdot x^z = x^{y+z}$$

The quotient rule:

If x is a nonzero real number and y and z are integers, then:

$$\frac{x^y}{x^z} = x^{y-z}$$

Negative Exponents:

If x is a real number other than 0 and y is a positive integer, then:

$$a^{-n} = \frac{1}{a^n}$$

$$\frac{1}{a^{-n}} = \frac{a^n}{1} \text{ or } a^n$$

Zero Exponent:

$$a^0 = 1$$