



Math122 College Algebra

Professor Douglas J. Ryan

P.4

Integer Exponents

- If a is any real number and n is a positive integer, a^n is the n^{th} power of a
- $a^n = \underbrace{a \cdot a \cdot \cdots \cdot a}_{n \text{ factors of } a}$ (a is the base; n is the exponent)
- Evaluate
 1. $\left(\frac{1}{2}\right)^3$
 2. $(-2)^4$
 3. -2^4

Zero and Negative Exponents

- Let a be any non-zero real number and n be a positive integer, then

1. $a^0 = 1$

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

- Evaluate

1. $\left(\frac{1}{2}\right)^0$

2. 2^{-2}

Laws of Exponents

1. $a^m a^n =$

2. $\frac{a^m}{a^n} =$

3. $(a^m)^n =$

4. $(ab)^n =$

5. $\left(\frac{a}{b}\right)^n =$

Problem

- Simplify each of the following:

1. $(3a^2b^3)(3ab^3)^2$

2. $\left(\frac{x}{y}\right)^2 \left(\frac{y^3x}{z}\right)^2$

More Laws of Exponents

$$6. \left(\frac{a}{b}\right)^{-n} =$$

$$7. \frac{a^{-n}}{b^{-m}} =$$

Problem

- Eliminate negative exponents and simplify

1. $\frac{12xy^{-6}}{3x^{-3}y^2}$

2. $\left(\frac{x}{z^2}\right)^{-2}$

Scientific Notation

- Scientific notation is often used in writing very large and very small numbers
- A positive number x written in scientific notation is
 - $x = a \cdot 10^n$ where $1 \leq a \leq 10$ and n is an integer
- Write each of the following in scientific notation
 1. 102,235
 2. 0.000000543