


Section P.2: Integer Exponents and Scientific Notation

Key Topics: exponents, rules of exponents, scientific notation

Zero and Negative Integer Exponents

For any _____ number a and any _____ integer n ,

$$a^0 = \underline{\quad} \text{ and } a^{-n} = \underline{\quad}.$$

WARNING  _____ exponents indicate the _____ of a number. _____ cannot be used as a base with a negative exponent because zero _____ a reciprocal. Furthermore, 0^0 is _____.

Main Facts about Exponents

$$a^n = \underbrace{a \cdot a \cdot \dots \cdot a}_{n \text{ factors}} \text{ for } a \neq 0, \quad a^0 = 1 \quad \text{and} \quad a^{-n} = \frac{1}{a^n}$$

Product Rule: $a^m \cdot a^n = \underline{\quad}$ **Quotient Rule:** $\frac{a^m}{a^n} = \underline{\quad}$

Power-of-Power Rule: $(a^m)^n = \underline{\quad}$ **Power-of-a-Product Rule:** $(ab)^m = \underline{\quad}$

Power-of-Quotient Rules: $\left(\frac{a}{b}\right)^n = \underline{\quad}$; $\left(\frac{a}{b}\right)^{-n} = \underline{\quad} = \frac{b^n}{a^n}$, _____

Rules for Simplifying Exponential Expressions

An exponential expression is considered **simplified** when

- (i) _____ appears only _____,
- (ii) _____ is a _____ number, and
- (iii) _____ power is raised to a _____.

Converting a Decimal Number to Scientific Notation

1. Count the number, n , of places the decimal point in the given number must be moved to obtain a number c with _____.
2. If the decimal point is moved n places to the _____, the scientific notation is _____. If the decimal point is moved n places to the _____, the scientific notation is _____.
3. If the decimal point does _____ need to be moved, the scientific notation is _____.