

Unit 4: Radical Expressions & Equations

4.0 Review: Exponents

Part I: Exponent Laws

Exponent laws are used to **simplify** operations involving powers of the **same base**.

1. Multiplying Powers

Rule: $b^m \cdot b^n =$

Ex. Simplify:

a) $3^4 \cdot 3^8$

b) $(-2)^9 \times (-2)^3$

c) $(2x)(-3x^2)(x^3)$

2. Dividing Powers

Rule: $\frac{b^m}{b^n} =$

Ex. Simplify:

a) $5^{11} \div 5^7$

b) $\frac{(-6)^{10}}{(-6)^5}$

c) $\frac{10x^{20}}{5x}$

3. Zero Exponent

Rule: $b^0 =$

Ex. Simplify:

a) $999,999,999^0$

b) -3^0

c) $(-3)^0$

4. Power of a Product

Rule: $(ab)^n =$

Ex. Simplify:

a) $(5 \times 4)^6$

b) $(xyz)^4$

5. Power of a Quotient

Rule: $\left(\frac{a}{b}\right)^n =$

Ex. Simplify: $\left(\frac{c}{a}\right)^7$

6. Power of a Power

Rule: $(b^m)^n =$

Ex. Simplify:

a) $(3^4)^5$

b) $((q^2)^3)^4$

c) $(2x^5)^3$

Combinations:

Ex. Simplify, then evaluate:

a) $\frac{(2^3)^2 \times 2^5}{2^4 \times 2}$

b) $\frac{(x^3y)^4(x^2)}{y}$

Part II: Negative Exponents

Continue the pattern:

$$2^4 = 16$$

$$2^3 = 8$$

$$2^2 = 4$$

$$2^1 =$$

$$2^0 =$$

$$2^{-1} =$$

$$2^{-2} =$$

$$2^{-3} =$$

$$2^{-4} =$$

Summary:

$$a^{-n} =$$

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

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

Ex. Write each expression with positive exponents.

$$5^{-2}$$

$$\frac{1}{6^{-3}}$$

$$4y^{-3}$$

$$x^{-5}$$

$$\frac{1}{z^{-5}}$$

$$(xy)^{-2}$$

$$\left(\frac{4}{5}\right)^{-3}$$

$$(4y)^{-3}$$

$$x^3y^{-1}z^{-7}$$

Practice: Worksheet (Exponent Laws I – answer using only positive exponents)



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