

R1.2.

Properties of Exponents

$$3 \cdot 3 \cdot 3 \cdot 3$$

$$3^4$$

$$3^4 \cdot 3^2$$

$$3^6$$

$$\frac{3^6}{3^2}$$

$$3^4$$

$$3^{6-2}$$

$$\frac{\cancel{3} \cdot \cancel{3} \cdot 3 \cdot 3 \cdot 3 \cdot 3}{\cancel{3} \cdot \cancel{3}}$$

Product of Powers

$$a^m \cdot a^n$$

$$a^{m+n}$$

$$\frac{a^m}{a^n}$$

$$a^{m-n}$$

Quotient of Powers

Power of a product

$$(ab)^m$$

$$a^m b^m$$

$$(3x)^2$$

$$3^2 x^2$$

$$9x^2$$

$$(4x^3y)^2$$

$$16x^6y^2$$

$$(2a^3b)^2 (3a^4b^5)^2$$

Multiply exponents

$$(4a^6b^2) (9a^8b^{10})$$

Add exponents

$$36a^{14}b^{12}$$

$$\left(\frac{x}{4}\right)^2$$

$$\frac{x^2}{16}$$

$$\left(\frac{x}{4}\right)\left(\frac{x}{4}\right)$$

$$\left(\frac{a}{b}\right)^m$$

$$\frac{a^m}{b^m}$$

Power of
a Quotient

Power of a Power

$$(3^2)^3$$

$$3^2 \cdot 3^2 \cdot 3^2$$

$$(9)^3$$

$$3^6$$

$$\frac{81}{9}$$

$$729$$

Multiply
exponents

$$(a^m)^n$$

$$a^{mn}$$

Power of a
Power

$$a^{-n}$$

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

Negative Exponents

$$2^{-3}$$

$$\frac{1}{2^3}$$

$$\frac{1}{8}$$

$$a^0 = 1$$

$$a \neq 0$$

$$10^{-1} = \frac{1}{10} = .1$$

$$10^0 = 1$$

$$10^1 = 10$$

$$10^2 = 100$$

0^0 undefined

$$a^{-1} \quad \frac{1}{a}$$

 x^{-1}

$$4 \quad 4^{-1}$$

Reciprocal

$$\frac{1}{4}$$

$$\frac{1}{4}$$

$$\left(\frac{2}{3}\right)^{-1} \quad \left(\frac{a}{b}\right)^{-1}$$

$$\frac{1}{\frac{2}{3}} \quad \left(\frac{b}{a}\right)^1$$

$$1 \cdot \frac{3}{2}$$

$$\frac{3}{2}$$

$$|a^2| = |a|^2$$

$$|-3^2| = |3|^2$$

$$|9| = 3^2$$

$$9 = 9$$

$$|-2^3| = |-2|^3$$

$$|-8| = 2^3$$

$$8 = 8$$

$$(-1)^2 = 1$$

$$(-1)^3 = -1$$

$$(-4)^2$$

16

$$-4^2$$

-16

Square 4
Make it negative

Scientific Notation

$$2.4 \times 10^5$$

$$2.4 \underbrace{0000}_{} \\ 240,000$$

$$\underbrace{240,000}_{} \\ 2.4 \times 10^5$$

$$- \underbrace{.000379}_{} \\ - 3.79 \times 10^{-4}$$

$$- 3.79 \times 10^{-4}$$

$$8.1 \times 10^{-6}$$

$$\underbrace{.0000081}_{} \\ .0000081$$

Compound Interest

$$A = P \left(1 + \frac{r}{n} \right)^{nt}$$

A ending amount

P Principal

r rate as a decimal

t time in years

n number compounding periods
in 1 year

Annual $n=1$

Semiannual $n=2$

Quarterly $n=4$

Monthly $n=12$

\$ 3000 at 2%

for 10 years

Compounded quarterly

$$A = P \left(1 + \frac{r}{n} \right)^{nt}$$

$$A = 3000 \left(1 + \frac{.02}{4} \right)^{4(10)}$$

$$A = \$3662.38$$

$$\frac{(8x^4)(2x^2)}{16x^6}$$

$$\frac{(8x^4)(2y^2)}{16x^4y^2}$$

$$\frac{20a^5}{4a^2}$$

$$5a^3$$

$$\left. \begin{array}{l} x^{2n} \cdot x^n \\ x^{3n} \end{array} \right\} \begin{array}{l} x^6 \cdot x^2 \\ x^8 \end{array}$$

$$\begin{array}{l} (-3)^4 \\ 81 \end{array} \quad \begin{array}{l} -3^4 \\ -81 \end{array}$$

$$\begin{array}{l} (-3)^3 \\ -27 \end{array} \quad \begin{array}{l} -3^3 \\ -27 \end{array}$$