Review of Exponent Rules

Multiplying Numbers with the Same Base

$2^2 2^5 =$ $\quad$ $n^4 n^4 =$ $\quad$ $(-2)^2(-2)^{-5} =$

$3^0 3^8 =$ $\quad$ $x^3 x^2 =$ $\quad$ $2^2 2^{-2} =$

Dividing Numbers with the Same Base

$\frac{2^2}{2^5} =$ $\quad$ $\frac{(-2)^2}{(-2)^2} =$ $\quad$ $\frac{x^2}{x^5} =$

$\frac{3^2}{3^{-2}} =$ $\quad$ $\frac{2^{-2}}{2^{-5}} =$ $\quad$ $\frac{n^2}{n^0} =$

Exponents of Exponents

$(2^2)^5 =$ $\quad$ $((-4)^2)^5 =$ $\quad$ $(s^2)^3 =$

$(x^2)^{-5} =$ $\quad$ $(2^0)^5 =$ $\quad$ $(x^{-3})^{-4} =$

Combinations of Exponent Laws

$\frac{2^2 2^3}{2^5 2^4} =$ $\quad$ $\frac{(3^2)^3}{3^5 3^4} =$ $\quad$ $\frac{(n^2)^{-3}}{(n^5)^{-4}} =$

$\frac{(n^2 n^3)^{-3}}{(\frac{n^8}{n^{-4}})^2} =$

Negative Exponents

Rewrite each of these with only positive exponents.

$x^{-1} =$ $\quad$ $y^{-3} =$ $\quad$ $(s^2)^{-7} =$

$(\frac{1}{m^2})^{-1} =$ $\quad$ $(\frac{1}{2})^{-3} =$ $\quad$ $(\frac{a^2}{b^3})^{-2} =$

$\frac{a^{-3} b^7}{c^9 d^{-6}} =$

Rational (Fraction) Exponents

The n[th] root is the opposite operation of the exponent n: $x^{\frac{1}{n}} = \sqrt[n]{x}$

- the exponent "2" represents "squared" - the exponent "1/2" represents "square root"
- the exponent "3" represents "cubed" - the exponent "1/3" represents "cube root"

a) Solve for x where $x^2 = 81$

b) Solve for x where $x^3 = -27$

Evaluate each root. Write your answers as integers or fractions.

a) $81^{\frac{1}{2}}$ b) $125^{\frac{1}{3}}$ c) $\sqrt[5]{-32}$ d) $\sqrt[3]{-\frac{27}{1000}}$

How is $8^{\frac{1}{3}}$ different from 8^{-3} ?

The rational exponent involves a numerator and a denominator: $x^{\frac{m}{n}} = \sqrt[n]{x^m}$ or $x^{\frac{m}{n}} = \left(\sqrt[n]{x}\right)^m$

- the numerator represents the "normal" exponent - "to the exponent m "
- the denominator represents the "root" exponent - "the n[th] root"

Homework:

Evaluate each expression. Show at least one step of algebraic reasoning.

a) $8^{\frac{5}{3}}$ b) $125^{\frac{2}{3}}$ c) $27^{-\frac{1}{3}}$ d) $\left(\frac{64}{125}\right)^{-\frac{2}{3}}$

Also, Page 175 # 1, 2, 3, 4, 7.