3.3 Exponent Laws!!!

LAW #1

When **MULTIPLYING** powers with the **same** base,

- Keep the base the same
- add the exponents

Write each as a single power

a) $2^3 \times 2^4$ b) $\left(\frac{1}{3}\right)^2 \times \left(\frac{1}{3}\right)^5$ c) $b^2 \times b^5$ d) $m^2n^{-2} \times mn^5$

LAW #2

When **DIVIDING** powers with the **same** base,

- Keep the base the same
- Subtract the exponents

Write each as a single power

a) $5^4 \div 5^2$ b) $\frac{8^3}{8^{-6}}$ c) $\frac{x^5y^6}{x^3y^{-2}}$ d) $\frac{a^6b^2c^3}{a^4b^{-2}c}$

LAW #3

To simplify a **POWER of a POWER**,

- Keep the base the same
- **Multiply** the exponents

Write each as a single power

a) $(2^3)^2$ b) $(4^3)^{-4}$ c) $\left(\frac{a^2}{b^4}\right)^3$ d) $\left(\frac{1^{10}}{2^3}\right)^2$

Simplify

a) $(x^3y^4)(x^2y^{-6})$

b) $\dfrac{x^7y^4}{x^3y^{-2}}$

c) $(2^3)(2^4)$

d) $(2x^2y^3z)^2$

e) $\dfrac{(8^4)(8^3)}{(8^5)}$

f) $\left(\dfrac{a}{b^3}\right)^2\left(\dfrac{a^3}{b}\right)^3$

g) $-\left(\dfrac{-3}{4}\right)^2$

h) $\dfrac{(m^2n)(m^{-4}n^3)}{m^4n^{-1}}$

HW. p. 126 #1-10, 12, 20

OPTIONAL: MORE EXPONENT LAWS!!!

Fill in the following and observe the pattern:

$2^4 =$

$2^3 =$

$2^2 =$

$2^1 =$

Based on the pattern above, fill in the following:

$2^0 =$

$2^{-1} =$

$2^{-2} =$ OR $\left(\frac{1}{2}\right)^2$

LAW #4

Any base to the **EXPONENT ZERO** is equal to ONE

a) 5^0 b) 512^0 c) $\left(\frac{4}{5}\right)^0$ d) $\left(\frac{a}{b}\right)^5 \times \frac{b^7}{a^5}$

LAW #5

NEGATIVE EXPONENTS can be converted to POSITIVE exponents IF you take the RECIPROCAL of the base

a) 2^{-1} b) $\left(\frac{1}{3}\right)^{-2}$ c) $\left(\frac{-2}{3}\right)^{-4}$ d) $\left(\frac{a}{b}\right)^{-2}$

ANSWERS

#4 a) 1 b) 1 c) 1 d) b^2 *#5 a) ½ b) 9 c) 81/16 d)* $\frac{b^2}{a^2}$