Vision 6.1 (day one)

The laws of exponents allow us to perform operations involving expressions written in exponential notation.

$a^m \cdot a^n = a^{m+n}$

The product of exponents with identical base can be written as a single base by adding exponents

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

The quotient of exponents with identical bases can be written as a single base by subtracting exponents

$(a^m)^n = a^{mn}$

An exponent raised to an exponent can be written as a single base by multiplying the exponents

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

A fraction raised to an exponent can be simplfied by distributing (sharing) the exponent to the numerater and denominator

$\sqrt{a} = a^{1/2}$ ie $\sqrt{8} = 8^{1/2}$

$\sqrt[3]{a} = a^{1/3}$

$a^{-m} = \frac{1}{a^m}$ ie $7^{-3} = \frac{1}{7^3}$

ie $\frac{7^{-3}}{4^{-2}} = \frac{4^2}{7^3}$

$$\sqrt[3]{64^2 - 8} \quad \therefore \sqrt[3]{(8^2)^2 - 8}$$

$$\therefore \sqrt[3]{8^4 - 8}$$

$$= \sqrt[3]{8^3}$$

$$= (8^3)^{1/3}$$

$$= 8^1 \text{ or } 8$$

$$\frac{(7^{-3} \; 7^{-1})^4}{343^2}$$

$$= \frac{(7^{-3} \; 7^{-1})^4}{(7^3)^2}$$

$$= \frac{(7^{-4})^4}{(7^3)^2}$$

$$= \frac{7^{-16}}{7^6}$$

$$= 7^{-16-6}$$

$$= 7^{-22}$$

$$= \frac{1}{7^{22}}$$

$16 = 4^{2}$ $27 = 3^{3}$ $49 = 7^{2}$

Example Write the following as a single base to a single exponent "simplify

$$\sqrt{2^6} = (2^6)^{1/2}$$

$$= 2^3$$

② $$\sqrt[3]{2^6 \cdot 2^3} = (2^6 \cdot 2^3)^{1/3}$$

$$= (2^9)^{1/3}$$

$$= 2^3$$

Practice Problems

Textbook Volume 2 - pg. 84

Questions 4, 5, 7, 8