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**Exponents and Powers****Exponents or Powers:**

If "a" is an integer, then

$$a \times a \times a \times \dots (n \text{ times}) = a^n$$

a is called the base and n is called the exponent.

**Powers of Rational Numbers:**

a/b is a rational number and n is a positive integer,

$$(a/b)^n = a^n/b^n$$

**Example: Solve  $(2/3)^3$** 

$$= 2^3/3^3$$

$$= 8/27$$

**Reciprocal of a Rational number:**

If a/b is a rational number, then reciprocal of a/b is b/a

**Example:** Reciprocal of 9/8 is 8/9.

**Laws of Exponents:**

**Law 1:** If a is any non zero rational numbers and m and n are any two natural numbers

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

**Example:**  $6^2 \times 6^5 = 6^{2+5}$

$$= 6^7$$

**Law 2:** If "a" is any non zero rational number and m and n are any two natural numbers

$$a^m / a^n = a^{m-n}$$

**Example:**  $9^5/9^3$

Solution:

$$9^{5-3}$$

$$= 9^2$$

$$= 81$$

**Law 3:** If "a" is any non zero rational number and m and n are any two rational numbers

$$(a^m)^n = a^{m \times n}$$

**Example:**  $\{(7/5)^4\}^2$

Solution:  $(7/5)^{4 \times 2}$

$$= (7/5)^8$$

**Law 4:** If a and b are any two non zero rational numbers and n is any natural number,

$$a^n \times b^n = (a \times b)^n$$

**Example:**  $(\frac{3}{4})^5 \times (\frac{2}{3})^5$

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

$$=(\frac{1}{2})^5$$