Exponent Properties

$3 \cdot 3 \cdot 3 \cdot 3 \cdot 3 = (3)^5$

$a^m \cdot a^n = a^{m+n} \rightarrow 3^4 \cdot 3^2 = 3^6$

$3^4 \rightarrow 3 \cdot 3 \cdot 3 \cdot 3$

$3^2 \rightarrow 3 \cdot 3$

$3 \cdot 3 \cdot 3 \cdot 3 \cdot 3 \cdot 3 = 3^6$

$3 + 2 = 6$

$\frac{a^m}{a^n} = a^{m-n} \rightarrow \frac{3^4}{3^2} = 3^{4-2} = 3^2$

2 Threes

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

$(a^m)^n = a^{m \cdot n} \rightarrow (2^3)^2$

$(2^3)(2^3)$

$(2 \cdot 2 \cdot 2)(2 \cdot 2 \cdot 2) = 2^6$

3 Twos 3 Two's

$(a \cdot b)^m = a^m \cdot b^m \rightarrow (2x)^3 = (2x)(2x)(2x)$

$(2 \cdot 2 \cdot 2)(x \cdot x \cdot x)$

$2^3 \quad x^3$

$= 2^3 x^3$

$$\left(\frac{a}{b}\right)^m = \frac{a^m}{b^m} \rightarrow \left(\frac{2}{x}\right)^3 = \left(\frac{2}{x}\right)\left(\frac{2}{x}\right)\left(\frac{2}{x}\right) = \frac{2^3}{x^3}$$

$$a^{-n} = \frac{a^{-1} \cdot 1}{1} = \frac{1}{a^n} \neq 5^{-1} = \frac{1}{5^1} = \frac{1}{5}$$

$$\frac{5^{-2}}{5^{-4}} = \frac{5^4}{5^2} = 5^{4-2} = 5^2 = \boxed{25}$$

$$5^{1/3} \cdot 5^{2/3} = 5^{\frac{1}{3}+\frac{2}{3}} = 5^{3/3} = 5^1 = \boxed{5}$$

$$\frac{5^{7/3}}{1 \cdot 5^{-2/3}} = \frac{5^{\frac{7}{3}+\frac{2}{3}}}{1} = \frac{5^{9/3}}{1} = \frac{5^3}{1} = \boxed{125}$$

$$\frac{(m^4)^{-3}}{(m^{-2})^4} = \frac{m^{-12}}{m^{-8}} = \frac{m^8}{m^{12}} = m^{8-12} = \frac{m^{-4}}{1} = \boxed{\frac{1}{m^4}}$$

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

$$\frac{3^1}{1} \cdot \frac{1}{x^1} = x^1$$

$$\frac{1}{3} \cdot \frac{-4}{1} = -\frac{4}{3}$$

$$\frac{4}{3} - \frac{2}{3} = \frac{2}{3}$$

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$$\frac{5^{-2}}{5^{-4}} =$$

$$\frac{(x^2)^{-1/3}\ (x^3)^{1/3}}{(x^{4/3})^{-4}}$$

↓

$$\frac{x^{-2/3}\ x^1}{x^{-4/3}} = \frac{x^{-2/3}\ x^{3/3}}{x^{-4/3}}$$

↓

$$\frac{x^{1/3}}{1 \cdot x^{-4/3}} = \frac{x^{1/3}\ x^{4/3}}{1} = \boxed{x^{5/3}}$$