

# C12 - 7.1 - Exponent Laws Notes

Simplify

$$5^2 \times 5^3 = 5^5 \quad \text{Add Exponents}$$

$$\frac{3^5}{3^2} = 3^3 \quad \text{Subtract Exponents}$$

$$(2^2)^3 = 2^6$$

$$(3 \times 4)^2 = 3^2 \times 4^2$$

$$(2x)^3 = 2^3 x^3 = 8x^3$$

$$\left(\frac{3}{5}\right)^2 = \frac{3^2}{5^2}$$

Multiply/Distribute Exponents

$$5^{-2} = \frac{1}{5^2}$$

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

$$3a^{-2} = \frac{3}{a^2}$$

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

Negative Exponents

$$3^{-1} = \frac{1}{3}$$

$$\frac{1}{3^1} = 3^{-1}$$

$$3^{-3} a^{-2} = \frac{1}{3^3 a^2}$$

$$\left(\frac{5}{3}\right)^{-2} = \frac{3^2}{5^2}$$

$$\frac{1}{25} = \frac{1}{5^2} = 5^{-2}$$

$$9 = 3^2$$

$$25 = 5^2$$

$$4^2 = (2^2)^2 = 2^4$$

$$27^4 = (3^3)^4 = 3^{12} \quad \text{Change Base}$$

$$5^{\frac{3}{4}} = \sqrt[4]{5^3}$$

$$8^{\frac{1}{3}} = \sqrt[3]{8}$$

$$\frac{8^{\frac{2}{3}}}{\sqrt[3]{8^2}} = \frac{2^{\frac{4}{3}}}{2^{\frac{4}{3}}} = 2^0 = 1$$

$$\frac{1}{\sqrt{2}} = \frac{1}{2^{\frac{1}{2}}} = 2^{-\frac{1}{2}}$$

$$\sqrt[4]{\frac{1}{16}} = \frac{\sqrt[4]{1}}{\sqrt[4]{16}} = \frac{1}{2}$$

Radicals

$$\frac{3^4 \times 3^{-3}}{9} = \frac{3^1}{3^2} = 3^{-1} = \frac{1}{3^1} = \frac{1}{3}$$

Add Exponents  
Change Base  
Subtract Exponents  
Negative Exponents  
Simplify

$$\frac{4^2 \times 16^3}{(2^7)^2} = \frac{128^2}{(2^7)^2} = \frac{2^4 \times 2^{12}}{2^{14}} = \frac{2^{16}}{2^{14}} = 2^{(16-14)} = 2^2 = 4$$

Change of base  
Multiply Exponents  
Add Exponents

Subtract Exponents  
Simplify