

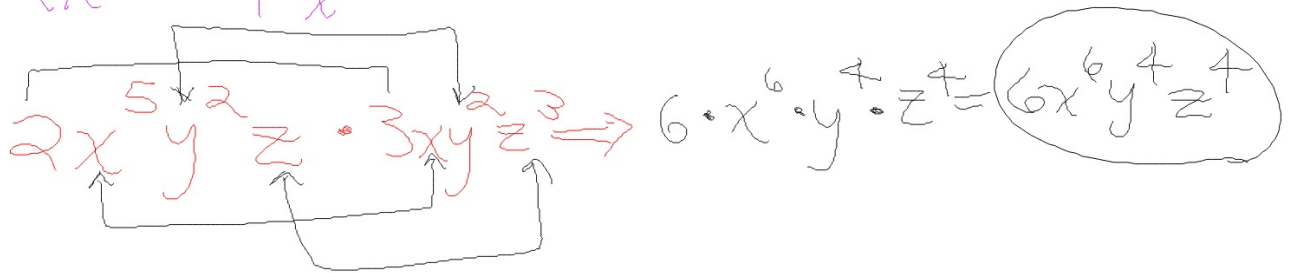
Exponent Rules

Product of Like Bases

$$x \cdot x \cdot x \cdot x \Rightarrow x^1 \cdot x^1 \cdot x^1 \cdot x^1 = x^{1+1+1+1} = x^4$$

$$y^2 \cdot y^4 \cdot y \Rightarrow y^2 \cdot y^4 \cdot y^1 = y^{2+4+1} = y^7$$

$$2x^3 \cdot 4x^4 \Rightarrow 2 \cdot 4 \cdot x^3 \cdot x^4 = 8 \cdot x^{3+4} = 8x^7$$

$$2x^5y^2z \cdot 3xy^4z^3 \Rightarrow 6 \cdot x^6 \cdot y^4 \cdot z^4 = 6x^6y^4z^4$$


Quotient of Like Bases

$$\frac{x^9}{x^5} = x^{9-5} = x^4$$

$$\frac{y^6}{y^2} = y^{6-2} = y^4$$

$$\frac{10x^8}{5x^4} = 2x^{8-4} = 2x^4$$

$$\frac{10}{5} = 2 \leftarrow \text{Remember?!}$$

$$\frac{16x^7y^4z^9}{4x^4yz^6} = 4x^3y^3z^3$$

Power to a Power

Rule:

$$(x^m)^n = x^{m \cdot n}$$

$$(x^2)^4 = x^{2 \cdot 4} = x^8$$

$$(y^3)^6 = y^{3 \cdot 6} = y^{18}$$

Product to a power

Rule:

$$(xy)^m = x^m \cdot y^m = x^m y^m$$

$$(x^2 y^3)^2 = x^{2 \cdot 2} \cdot y^{3 \cdot 2} = x^4 y^6$$

$$(3^1 x^3 y^4)^4 = 3^4 x^{12} y^{16} = 81 x^{12} y^{16}$$

Zero Exponent

$$\boxed{N^0 = 1}$$

$$5^0 = 1$$

$$18^0 = 1$$

$$x^0 = 1$$

$$(2^2 x^3 y^4 z)^0 = 1$$

$$10^0 = 1$$

$$10^1 = 10$$

$$10^2 = 100$$

$$10^3 = 1000$$

$$10^4 = 10000$$

Negative Exponents



Rule:

$$x^{-n} = \frac{1}{x^n}$$

Eg.

$$2 = \frac{2}{1}$$

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$$\frac{x^6}{x^4} = x^2 \text{ because } x^{6-4} = x^2$$

$$\frac{x^4}{x^6} = \frac{1}{x^2}$$

- Subtract the numbers
- Look at the Larger Exponent (six is larger than 4)
- My answer goes to the larger Exponent

$$\frac{x^4}{x^6} = \frac{\cancel{x \cdot x \cdot x \cdot x}}{\cancel{x \cdot x \cdot x \cdot x} \cdot x \cdot x} = \frac{1}{x^2}$$

$$\frac{x^4}{x^6} = x^{4-2} = x^{-2} = \frac{1}{x^2}$$