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Algebra Notes / Exponents

$$2^4 = 2 \cdot 2 \cdot 2 \cdot 2 = 16 \quad | \quad x^5 = x \cdot x \cdot x \cdot x \cdot x$$

$$x^5 \cdot x^4 = x^9 \quad | \quad x \cdot x \cdot x \cdot x \cdot x \cdot x \cdot x \cdot x \cdot x = x^9$$

$5+4=9$

$$\frac{x^{11}}{x^7} = x^4 \quad | \quad \begin{array}{cccccccccccc} x & x & x & x & x & x & x & x & x & x & x \\ \cancel{x} & \cancel{x} & \cancel{x} & \cancel{x} & \cancel{x} & \cancel{x} & \cancel{x} & \cancel{x} & \cancel{x} & \cancel{x} & \cancel{x} \end{array}$$

$11-7=4$

$$(x^3)^2 = x^6 \quad | \quad (x^3)(x^3)(x^3) = x^6$$

$2 \cdot 3 = 6$

$$(x^5 y^3)^2 = x^{10} y^6 \quad | \quad (3x^2 y^3)^2 = 3^2 x^4 y^6 = 9x^4 y^6$$

$$\begin{array}{l} 3^4 = 81 \\ 3^3 = 27 \\ 3^2 = 9 \\ 3^1 = 3 \\ 3^0 = 1 \\ 3^{-1} = \frac{1}{3} \end{array}$$

Anything to zero power = 1

$$(x^5)^0 = 1 \quad (2x^3 y^5)^0 = 1$$
$$6^0 = 1$$

ALWAYS use exponents to practice

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

$$3^{-3} = \frac{1}{3^3} = \frac{1}{27}$$

$$x^{-5} y^7 = \frac{y^7}{x^5}$$

$$\frac{x^2}{x^5} = x^{-3} = \frac{1}{x^3} \quad \begin{array}{l} \cancel{x} \cancel{x} \\ \cancel{x} \cancel{x} \cancel{x} \end{array}$$

$2-5=-3$

$$\frac{9x^5 y^6}{3x^2 y^7}$$

$$\frac{3x^3}{y^1}$$

$x: 5-2=3$ top
 $y: 6-7=-1$ bottom

$$\frac{x^3}{x^8} = x^{-5}$$

$$x^3 x^8 = x^{11}$$

$x: 3-(-8)=11$ top

(X)

$$\left(\frac{3x^2y^3}{5y^2}\right)^3 = \left(\frac{3^3x^6y^9}{5^3y^6}\right)^3 = \frac{3^3x^6y^9}{5^3} = \frac{27x^6y^9}{125}$$

Simpler

$$\left(\frac{2x^5}{3y^2}\right)^{-2} = \frac{2^{-2}x^{-10}}{3^{-2}y^{-4}} = \frac{3^2x^{10}}{2^2y^4} = \frac{9x^{10}}{4y^4}$$

$$\left(-5y^3z^2\right)^3 = (-5)^3 y^{12} z^6$$
$$(-5)(-5)(-5) = -125$$
$$(-5y^3z^2)(-5y^3z^2)(-5y^3z^2) = -125y^{12}z^6$$