

5-2 More with Exponents

Raising a power to a power, you must multiply exponents

Ex. $(3^2)^4 = 3^{2 \times 4} = 3^8$

Simplify

$$(5^2)^3 = 5^{2 \times 3} = 5^6$$

$$(4^5)^6 = 4^{5 \times 6} = 4^{30}$$

$$(x^4)^7 = x^{28}$$

$$(t^2)^5 = t^{10}$$

Key Question:

Does $(2x)^3$ mean $2x^3$? No.

$$2^3 x^3$$

You must share the power on the outside with everything on the inside of the parentheses.

Simplify

$$(5x)^3 = 5^{1 \times 3} x^{1 \times 3} = 5^3 x^3$$

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

$$(2a^3)^5 = 2^{5 \times 1} a^{3 \times 5} = 2^5 a^{15}$$

$$(4x^5y^2)^3 = 4^3 x^{5 \times 3} y^{2 \times 3} = 4^3 x^{15} y^6$$

$$(-2x^5y^2)^7 = -2^7 x^{5 \times 7} y^{2 \times 7} = -2^7 x^{35} y^{14}$$

$$\left(\frac{b^3}{5}\right)^2 = \frac{b^{3 \times 2}}{5^2} = \frac{b^6}{5^2}$$

$$\left(\frac{x^5}{y^3}\right)^4 = \frac{x^{5 \times 4}}{y^{3 \times 4}}$$

$$\left(\frac{-8}{x^4 y^3}\right)^5 = \frac{-8^5}{x^{20} y^{15}}$$

$$\frac{x^{20}}{y^{12}}$$