

More Multiplication Properties of Exponents (Section 1-2)

* When you raise to a power, you multiply the exponents.

$$\text{ex: } (a^m)^n = a^{m \cdot n}$$

$$\text{ex: } (p^5)^4 = p^{5 \cdot 4}$$
$$= p^{20}$$

$$\text{ex: } (x^{2/5})^{10} = x^{2/5 \cdot 10}$$
$$= x^{20/5}$$
$$= x^4$$

$$\text{ex: } x^2(x^6)^{-4}$$
$$= x^2(x^{-24})$$
$$= x^{2+(-24)}$$
$$= x^{-22}$$

* Order of Operations!

$$\text{ex: } (z^8)^0 z^{1/2}$$
$$= (z^0) \cdot z^{1/2}$$
$$= z^{1/2}$$

* When raising a product to a power, raise each factor & multiply.

$$\text{ex: } (a \cdot b)^n = a^n \cdot b^n$$

$$\text{ex: } (7m^9)^3 = 7^3 \cdot m^{9 \cdot 3}$$
$$= 343m^{27}$$

$$\text{ex: } (3g^4)^{-2} = 3^{-2} \cdot g^{4 \cdot (-2)}$$
$$= \frac{1}{9} g^{-8} \text{ or } \frac{1}{9g^8}$$

$$\text{ex: } (x^{-2})^2 (3xy^5)^4$$
$$= x^{-4} \cdot 3^4 \cdot x^4 \cdot y^{5 \cdot 4}$$
$$= 81x^0 y^{20}$$
$$= 81y^{20}$$

$$\text{ex: } 4j^2k^6 (2j^3)^3 k^5$$
$$= 4j^2k^6 \cdot 2^3j^{3 \cdot 3}k^5$$
$$= 32j^{35}k^{11}$$

* Same rules apply for scientific notation.

$$\text{ex: } (6.25 \times 10^{-12})^{-2}$$
$$= (6.25)^{-2} \times 10^{24}$$
$$= 0.0256 \times 10^{24} \rightarrow 2.56 \times 10^{22}$$

$$\text{ex: } V = \pi r^2 h$$
$$r = 7.8 \times 10^{-4}$$
$$h = 3.4 \times 10^{-2}$$

$$V = \pi (7.8 \times 10^{-4})^2 (3.4 \times 10^{-2})$$
$$= \pi (60.84 \times 10^{-8}) (3.4 \times 10^{-2})$$
$$= \pi (206.856 \times 10^{-10})$$
$$= 2.06856 \times 10^{-8} \pi$$
$$\text{or } 6.495 \times 10^{-8}$$