

## Sec. 7-1 Multiplying Monomials

A monomial is a number, a variable, or a product of a number and one or more variables like  $\frac{1}{20}s^2$ . An expression like  $\frac{x}{2y}$ , which involves the division of variables is not a monomial. Monomials that are real numbers are called constants.

ex. Determine whether each expression is a monomial. Explain your reasoning.

a) -5

e)  $-x + 5$

b)  $x + y$

f)  $23abc^2d$

c)  $x$

g)  $\frac{xyz^3}{2}$

d)  $\frac{ab}{c}$

h)  $\frac{1}{6}xy^2$

Recall that an expression of the form  $x^n$  is called a *power* and represents the product you obtain when x is used as a factor n times. The word *power* is also used to refer to the exponent

itself. The number x is the *base*, and the number n is the *exponent*.

For example:

$$2^3 \cdot 2^5 = 2 \cdot 2 \\ 3 + 5 \text{ or } 8 \text{ factors}$$

### Product of Powers

-To multiply two powers that have the same base, add their exponents.

$$a^4 \cdot a^{12} = a^{4+12} \text{ or } a^{16}$$

Simplify Each Expression

$$\text{ex. } (5x^7)(x^6)$$

$$\text{ex. } (4ab^6)(-7a^2b^3)$$

$$\text{ex. } (3y^4)(7y^5)$$

$$\text{ex. } (-4rs^2t^3)(-6r^5s^2t^3)$$

What does  $(4^2)^5$  represent?      How about  $(x^4)^3$

What would be the property for finding a power of a power?

**Power of a Power:**

-To find the power of a power, multiply the exponents.

ex.  $(k^5)^9 = k^{5 \cdot 9}$  or  $k^{45}$

Simplify  $\left[(x^2y^3)^4\right]^3$

Simplify  $\left[(3^2)^3\right]^2$

Look for patterns in these examples

$$(xy)^4$$

$$(6xy)^3$$

### Power of a Product:

-To find the power of a product, find the power of each factor and multiply.

$$\text{ex. } (-2xy)^3 = (-2)^3 x^3 y^3$$

Ex. Express the area of the square as a monomial



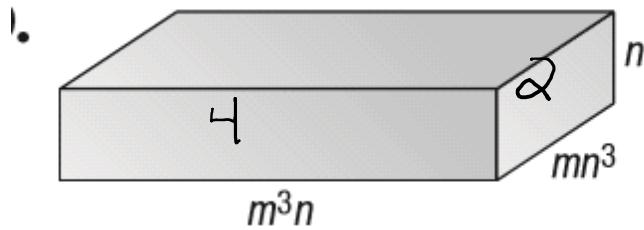
$$4xy$$

ex. Express the area of a square with sides of length  $2x^2y^3$

ex. Simplify  $(3xy^4)^2 [(-2y)^2]^3$

ex. Simplify  $(8y^3)(-3x^2y^2)\left(\frac{3}{8}xy^4\right)$

ex. Express the volume of the solid as a monomial.



ex. An electrician uses the formula  $W = I^2R$ , where  $W$  is the power in watts,  $I$  is the current in amperes, and  $R$  is the resistance in ohms.

Find the power in a household circuit that has 20 amperes of current and 5 ohms of resistance.

If the current is reduced by one half, what happens to the power?

Sec. 7-1 p.361-362 #15-48 m.o.3