

**Module #1:****Worksheet 3f:****Exponents: Multiplication & Division Rules**
 **View Tutorial 3f**

➔ **Objective:** Use the rules of exponents in order to simplify an expression.

**Multiplying Monomials**

To multiply monomials, use the following rules for all numbers  $a$  and  $b$  and any integers  $m$ ,  $n$ , and  $p$ .

	<b>Rule</b>	<b>Example</b>
<b>Product of Powers</b>	For any number $a$ and all integers $m$ and $n$ , $a^m \cdot a^n = a^{m+n}$	$a^2 \cdot a^6 = a^{2+6}$ $= a^8$
<b>Power of a Power</b>	For any number $a$ and all integers $m$ and $n$ , $(a^m)^n = a^{mn}$	$(x^2)^6 = x^{2 \cdot 6}$ $= x^{12}$
<b>Power of a Product</b>	For all numbers $a$ and $b$ and any integer $m$ , $(ab)^m = a^m b^m$	$(pq)^4 = p^4 q^4$
<b>Power of a Monomial</b>	For all numbers $a$ and $b$ and any integers $m$ , $n$ , and $p$ , $(a^m b^n)^p = a^{mp} b^{np}$	$(s^4 t)^3 = (s^4 t^1)^3$ $= s^{4 \cdot 3} t^{1 \cdot 3}$ $= s^{12} t^3$
<b>Division of a Monomial</b>	For any number $a$ and all integers $m$ and $n$ , $\frac{a^m}{a^n} = a^{m-n}$	$\frac{r^8}{r^3} = r^{8-3}$ $= r^5$

**Simplify:**

1.  $n^5(n^2)$  \_\_\_\_\_

2.  $b(b^4)$  \_\_\_\_\_

3.  $(-7x^2)(x^4)$  \_\_\_\_\_

4.  $(2a^2)(8a)$  \_\_\_\_\_

5.  $(rs)(rs^3)(s^2)$  \_\_\_\_\_

6.  $(x^2y)(4xy^3)$  \_\_\_\_\_

**Module #1:  
Worksheet 3f:****Exponents: Multiplication & Division Rules**

7.  $\frac{1}{3}(2a^3b)(6b^3)$  \_\_\_\_\_

8.  $(-5nx)(4x^2)(n^4)$  \_\_\_\_\_

9.  $(n^3)^5$  \_\_\_\_\_

10.  $(a^4)^6$  \_\_\_\_\_

11.  $-3(ab^4)^3$  \_\_\_\_\_

12.  $(-3ab^4)^3$  \_\_\_\_\_

13.  $(4x^2b)^3$  \_\_\_\_\_

14.  $(4x)^2(b^3)$  \_\_\_\_\_

15.  $(-2m^5n^6)^2$  \_\_\_\_\_

16.  $-2m^5(n^6)^2$  \_\_\_\_\_

17.  $2(3x)^3$  \_\_\_\_\_

18.  $-3(2x)^5$  \_\_\_\_\_

19.  $\frac{x^{12}}{x^5}$  \_\_\_\_\_

20.  $\frac{b^7}{b^6}$  \_\_\_\_\_

21.  $\frac{y^9}{y^9}$  \_\_\_\_\_

22.  $\frac{x^5y^3}{x^3y}$  \_\_\_\_\_

23.  $\frac{a^2b^6c^4}{b^4c^2}$  \_\_\_\_\_

24.  $\frac{m^8}{m^5}$  \_\_\_\_\_