

# EXPONENT WORKSHEET

## **Exponent Operations #1**

### **Multiplication**

**Part 1: Expand each expression then evaluate**

1.)  $2^8 = \underline{\hspace{2cm}} \underline{\hspace{2cm}} \underline{\hspace{2cm}} \underline{\hspace{2cm}} \underline{\hspace{2cm}} \underline{\hspace{2cm}} \underline{\hspace{2cm}} = \underline{\hspace{2cm}}$

2.)  $5^3 = \underline{\hspace{2cm}}$       3.)  $x^5 = \underline{\hspace{2cm}}$

4.)  $10^3 = \underline{\hspace{2cm}}$       5.)  $8^1 \cdot 8^4 = \underline{\hspace{2cm}}$

6.)  $7^2 \cdot 7^3 = \underline{\hspace{2cm}}$       7.)  $x^5 \cdot x^4 = \underline{\hspace{2cm}}$

8.) If two expressions have the same **factor** or **base**, what happens to the exponents when the expressions are **multiplied**?  

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**Example:**  $(7x^2)(2x^3)$

**Part 2: Simplify each expression.**

9.)  $2^3 \cdot 2^4 = \underline{\hspace{2cm}}$       10.)  $8^1 \cdot 8^3 = \underline{\hspace{2cm}}$       11.)  $t^4 \cdot t^4 = \underline{\hspace{2cm}}$

12.)  $x^5 \cdot x^9 = \underline{\hspace{2cm}}$       13.)  $3^4 \cdot x^3 \cdot x^5 = \underline{\hspace{2cm}}$

**Part 3: Find the product of the expressions.**

14.)  $(6x^2)(4x^2) = \underline{\hspace{2cm}}$       15.)  $(3x^3y^2)(-6y^5) = \underline{\hspace{2cm}}$       16.)  $(5p^3)(-m^8p^2) = \underline{\hspace{2cm}}$

17.)  $(10g^3h^8v^6)(11gh^8) = \underline{\hspace{2cm}}$       18.)  $(4f^9h^3)(-5f^6)(-3h^2) = \underline{\hspace{2cm}}$

19.)  $(-2^2x^3y^4)((-3)^2x^4y^4) = \underline{\hspace{2cm}}$       20.) \*Challenge:  $(3x^a y^b z^c)(-y^f z^g) = \underline{\hspace{2cm}}$

**Exponent Operations #2****Power to a Power****Part 1: Expand each expression and write the product.**

1.)  $(2^3)^4 = \underline{\hspace{2cm}} \underline{\hspace{2cm}} \underline{\hspace{2cm}} \underline{\hspace{2cm}} = \underline{\hspace{2cm}}$

2.)  $(p^2)^5 =$

3.)  $(x^m)^2 =$

4.)  $(2^3 x)^2 =$

5.) What is the fast way to simplify when you raise an exponent to another power (or what can you do instead of expanding)?

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**Part 2: Find the product. Expand if it helps you.**

6.)  $(2x)^2$

7.)  $(10^2)^3$

8.)  $(-3^2 x^6)^5$

9.)  $(7j^2)^3$

10.)  $(8n^2 p)^3$

11.)  $2(3a^2)^3$

12.)  $(xy)^2 (x^2 y^2)^2$

**PART 3- EXTRA PRACTICE**

**SIMPLIFY EACH EXPRESSION:**

31)  $(x^2)^3 =$       32)  $(a^7)^5 =$       33)  $(y^{13})^4 =$       34)  $(w^{-21})^{-15} =$

35)  $(5^2)^3 =$       36)  $(23^7)^8 =$       37)  $(-y^5)^4 =$       38)  $(4y^3)^2 =$

39)  $(8c^5)^2 =$       40)  $(-3h^9)^3 =$       41)  $(y^4d^6)^8 =$

41)  $(-c^5h^6)^4 =$       42)  $(-15h^9k^7)^3 =$       43)  $(k^9)^5(k^3)^2 =$

44)  $(3y^6)^2(x^5y^2z) =$       45)  $(4h^3)^2(-2g^3h)^3 =$       46)  $(14a^4b^6)^2(a^6c^3)^7 =$

**SIMPLIFY EACH PRODUCT:**

1)  $10^{12} \bullet 10^{35} =$

2)  $a^7 \bullet a^{12} =$

3)  $c^3 \bullet c^8 =$

4)  $d^7 \bullet d^9 =$

5)  $x^{2e} \bullet x^{8e} =$

6)  $w^{103} \bullet w^{1030} =$

7)  $a^6 \bullet b^5 =$

8)  $10^a \bullet 10^b =$

9)  $g^{12} \bullet g^{19} \bullet g^{11} =$

10)  $2x^4 \cdot x \cdot 3x^4$

11)  $x^3 \cdot x^8 \cdot x$

12)  $7x^3 \cdot 3x^5$

13)  $(-3x^7) \cdot (-3x^5)$

14)  $5^2 \cdot 7^6 \cdot 7^7 \cdot 5^4$

15)  $(2a)(-3a)(5a)$

16)  $n^2 \cdot n^7$

17)  $s \cdot s^3 \cdot s^2$

18)  $4 \cdot 5 \cdot 4$

19)  $2ab^3 \cdot a^6$

20)  $2x^3 \cdot x^6 \cdot 3x$

21)  $x^7 \cdot x^8$

**SIMPLIFY EACH PRODUCT:**

22)  $(2x^2)(4x^3y^2) =$

23)  $(-3a^2b)(6ab^4c) =$

24)  $(7q^5)(12q^3r^5) =$

25)  $(11c^8)(-10c^4d) =$

26)  $(9x^{10}z^2)(-x^5y^3) =$

27)  $(-8f^6g)(-7f^2g^5h) =$

28)  $(1.3a^6b^{11}c^5)(0.5a^2bc^3) =$

29)  $(-2x^2z)(-4y^2z)(-3xyz) =$

30)  $(a^xb^yc^z)(a^rb^sc^t) =$