**Name:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Per: \_\_\_\_\_\_**

**U11 CW #3** *Exponents pt. 3 – Multiply and Divide with Exponents*

**Directions**: Complete the table below. First write the expanded notation, then the simplified exponential notation.

|  |  |  |
| --- | --- | --- |
| **Product** | **Factors** | **Simplified Exponential Notation**  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |

**Discovery:** Do you notice a pattern that you might use as a general rule for multiplying two powers that have the same base?

|  |
| --- |
| **Exponent Rule:** In general, if x is any number and m, n are positive integers, then:  because m times n times m+n times **Checklist to Multiply the Same Base in Exponential Form:** 1. \_\_\_\_\_\_\_\_\_\_\_ the \_\_\_\_\_\_\_\_\_\_\_\_\_\_. 2. \_\_\_\_\_\_\_\_\_\_\_ the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.**Examples:**  or $x^{6}•x^{5}=x^{6+5}=x^{11}$ |

Always remember: If in doubt, expand it out!!!!

**1.Directions:** Expand out and simplify each expression. Write your answer in exponential notation.

|  |  |
| --- | --- |
| a.  | b.  |
| c.   | d.  |
| e.  | f. •4-2 |
| g. • a0 | h.  |
| i. **Find and Fix the Mistake:**

|  |
| --- |
| **X**  |

 | j. Is  equal to 45? Explain why or why not.  |

**Division of Numbers or Variables in Exponential Form**

**Directions**: Complete the table below. First write the expanded notation, then the simplified exponential notation.

|  |  |  |
| --- | --- | --- |
| **Quotient** | **Factors** | **Simplified Exponential Notation** |
|  |  |  |
| $$\frac{7^{3}}{7^{9}}$$ |  |  |
|  |  |  |
|  |  |  |
| $$\frac{n^{6}}{n^{4}}$$ |  |  |

**Discovery:** Do you notice a pattern that you might use as a general rule for multiplying two powers that have the same base?

|  |
| --- |
| **Exponent Rule:** In general, if x is any number and m, n are positive integers, then: m times   because $\frac{x^{m}}{x^{n}}= \frac{xx…x}{xx…x}=x^{m-n}$  n times m-n times **Checklist to Divide the Same Base in Exponential Form:** 1. \_\_\_\_\_\_\_\_\_\_\_ the \_\_\_\_\_\_\_\_\_\_\_\_\_\_. 2. \_\_\_\_\_\_\_\_\_\_\_ the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.**Examples:**  or $\frac{x^{6}}{x^{5}}= x^{6-5}=x^{11}$  |

Always remember: If in doubt, expand it out!!!!

**2. Directions:** Expand out and simplify each expression. Write your answer in exponential notation.

|  |  |
| --- | --- |
| a.   | b. $\frac{(-7)^{6}}{(-7)^{3}}$ |
| c. $\frac{x^{-3}}{x^{10}}$ | d.  |
| e.   | f. $\frac{x^{4}•y^{5}}{x^{-2}y}$ |
| g.  | h. $\frac{b^{3}c^{4}}{a^{3}b^{6}c^{2}}$ |
| i. Find and Fix the Mistake:

|  |
| --- |
| **X**  $\frac{4^{4}}{4^{2}}=\left(\frac{4}{4}\right)^{4-2}=1^{2}$ |

 | j. Is $\frac{8^{6}}{2^{3}}$ equal to 22 ? Why or why not? |

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