**Investigation: Exponent Rules**

Complete the following table, using what you know about exponents and the example provided.

**RULE 1 – MULTIPLICATION OF POWERS WITH THE SAME BASE**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Question** | **Repeated Multiplication** | **Answer in Exponential Form** | **Exponent of Answer** | **Exponents in Original Question** |
|  |  |  | 8 | 3, 5 |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |
| Compare the exponents in the answer and in the original question.  To multiply powers, you \_\_\_\_\_\_\_\_\_\_\_\_\_ the exponents, if the base is the same. | | | | |
| **RULE 2 – DIVISION OF POWERS WITH THE SAME BASE** | | | | |
| **Question** | **Repeated Multiplication** | **Answer in Exponential Form** | **Exponent of Answer** | **Exponents in Original Question** |
|  |  |  | 2 | 5, 3 |
|  |  |  |  |  |
|  |  |  |  |  |
| Compare the exponents in the answer and in the original question.  To divide powers, you \_\_\_\_\_\_\_\_\_\_\_\_\_ the exponents, if the base is the same. | | | | |

**Simplify using the exponent rules.**

|  |  |  |  |
| --- | --- | --- | --- |
| Example 1:  22 x 25 | Example 2:’ | Example 3: | Example 4: |

**RULE 3 – POWER OF A POWER**

Complete the following table, using what you know about exponents, the multiplication rule, and the example provided.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Question** | **Repeated Multiplication** | **Answer in Exponential Form** | **Exponent of Answer** | **Exponents in Original Question** |
|  |  | (from multiplication rule) | 12 | 3, 4 |
|  |  |  |  |  |
|  |  |  |  |  |
| Compare the exponents in the answer and in the original question.  To raise a power to a power, you \_\_\_\_\_\_\_\_\_\_\_\_\_ the exponents, if the base is the same. | | | | |

|  |  |
| --- | --- |
| Example 1: | Example 2: |
| Example 3: | Example 4: |

**Practice: Exponent Rules**

Simplify, but do not evaluate

|  |  |  |  |
| --- | --- | --- | --- |
| a. | b. | c. | d. |
| e. | f. | g. | h. |
| i. | j. | k. | l. |
| **Find the missing exponent:** | | | |
| m. | n. | o. | p. |
| ANSWERS: a) 89, b) y8, c) (-6)6, d) 28x43, e)59, f) 82, g) (3/2)7, h) 2x32, i) 56, j) a6b2, k) a2b4, l) m4n2 ,  m) x = 4, n) x = 5, o) x = 4, p) x = 7 | | | |