

Name: \_\_\_\_\_

Date: \_\_\_\_\_

**Math 9 Chapter 2.3 to 2.5 Review****Multiplication Rule:**

$$a^m \times a^n = a^{m+n}$$

When **multiplying powers** with the same base, you **ADD** the exponents

**Division Rule:**

$$a^m \div a^n = a^{m-n}$$

When **dividing powers** with the same base, you **SUBTRACT** the exponents

**Power to another Power Rule:**

$$(a^m)^n = a^{m \times n}$$

When **taking powers to another exponent**, you **MULTIPLY** them

1. Evaluate each of the following expressions:

|                                   |                                   |                                  |
|-----------------------------------|-----------------------------------|----------------------------------|
| a) $8 \times 3 - 5 + 6^2$         | b) $2 \div 8 \times 4 \div 2 + 6$ | c) $8 - 2^2 + 5 - 4 - 6$         |
| d) $2 \times 3^3 + 4^2 - 5^2$     | e) $2 \times 4 - (5 - 8)^2$       | f) $6^3 \times (-3)^2 + 12$      |
| g) $9 - 2 \times [2 - (7 - 4)]^2$ | h) $20 - 3(-6 + 12)^2$            | i) $[9 + (5 - (6 + 2))^3] - 2^3$ |

2. Simplify each of the following expressions into a single power:

|                          |                                       |
|--------------------------|---------------------------------------|
| a) $7^4 \times 7^3$      | b) $2^1 \times 2^2 \times 2^3$        |
| c) $4^8 \div 4^4$        | d) $(3^4)(3^{-2}) \div 3^{-3}$        |
| e) $(7^2)^5 \div 7^{11}$ | f) $(5^3)^2 \times 5^{-2} \times 5^3$ |

3. Evaluate each of the following expressions using BEDMAS:

|  |  |
|--|--|
| a) $(-6)^7 \div (-6)^5 - (-6)^4 \div (-6)^3$   | b) $3^4 (3^{12} \div 3^8) - 3^4$   |
| c) $\frac{12^8 \times 12^4}{12^{10}}$          | d) $(8^3 \times 8^5)^2 - (8^{12} \div 8^8)^4$                                      |
| e) $\frac{(64)^3 \times 16}{8^{12}} - 2^2 + 2$ | f) $\left[ (-3)^4 \times (-3)^3 \right]^2 + \left[ (-3)^4 \times (-3)^3 \right]^2$ |

4. Find the value of  $\blacklozenge$  in each expression:

$$a) (-3)^4 \times (-3)^{\blacklozenge} = (-3)^5 \quad \blacklozenge = \underline{\hspace{2cm}} \qquad b) (-2)^{15} \div (-2)^{10} = (-2)^{\blacklozenge} \quad \blacklozenge = \underline{\hspace{2cm}}$$

$$c) 7^8 \times 7^7 \div 7^{\blacklozenge} = 7^4 \quad \blacklozenge = \underline{\hspace{2cm}} \qquad d) 2^{\blacklozenge} \div 2^6 \times 2^{-4} = 2^{11} \quad \blacklozenge = \underline{\hspace{2cm}}$$

$$e) (6^4)^4 = 6^{\blacklozenge} \quad \blacklozenge = \underline{\hspace{2cm}} \qquad f) (3^4)^3 \div 3^{\blacklozenge} = 3^5 \quad \blacklozenge = \underline{\hspace{2cm}}$$

5. Given that "a" and "b" are integers greater than zero, what is the value of "a" and "b"?

|  |                                      |
|--|--------------------------------------|
| a) $(a \times b^2)^4 = 81 \times 256$  | b) $(25 \times 64)^3 = a \times 2^b$ |
| c) $(49^2 \times 11)^3 = 7^a \times b$ | d) $(24)^6 = 2^a \times 3^b$         |