

Class/#: \_\_\_\_\_

**Operations with Exponents**

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

**Analyzing Patterns #1**

Study the following correct answers. Write down your own example that fits the pattern.

a.  $5^3 \times 5^2 = 5^5$

c.  $4^5 \times 4^2 = 4^7$

b.  $3^5 \times 3^3 = 3^8$

d. \_\_\_\_\_

Explain why each statement is true. Discuss this in your groups and write down one explanation below.

**Analyzing Patterns #2**

Study the following correct answers. Write down your own example that fits the pattern.

a.  $5^3 \times 3^3 = 15^3$

c.  $12^4 \times 3^4 = 36^4$

b.  $7^3 \times 4^3 = 28^3$

d. \_\_\_\_\_

Explain why each statement is true. Discuss this in your groups and write down one explanation below.

Complete the equation to show how you can find the exponent of the product when you multiply two powers with the same base.

Be prepared to explain your reasoning.

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

Complete the equation to show how you can find the exponent of the product when you multiply two powers with the same exponent.

Be prepared to explain your reasoning.

$$a^m \times b^m = \underline{\hspace{2cm}}$$

**Analyzing Patterns #3**

Study the following correct answers. Write down your own example that fits the pattern.

a.  $4^2 = (2^2)^2 = 2^4$

c.  $125^2 = (5^3)^2 = 5^6$

b.  $9^2 = (3^2)^2 = 3^4$

d. \_\_\_\_\_

Explain why each statement is true. Discuss this in your groups and write down one explanation below.

**Analyzing Patterns #4**

Study the following correct answers. Write down your own example that fits the pattern.

a.  $\frac{3^5}{3^2} = 3^3$

c.  $\frac{5^{10}}{5^{10}} = 1$

b.  $\frac{7^6}{7^5} = 7^1$

d. circle choice below

Analyze the patterns and choose the best answer for part d. Be prepared to explain your answer.

$$\frac{4^5}{4^6} = 4^{-1}$$

$$\frac{4^5}{4^6} = \frac{1}{4^1}$$

Complete the equation to show how you can find the base and exponent when a power is raised to a power.

Be prepared to explain your reasoning.

$$(a^m)^n = \underline{\hspace{2cm}}$$

Complete the equation to show how you can find the base and exponent of the quotient when you divide two powers with the same base. (Assume a is not 0.)

Be prepared to explain your reasoning.

$$\frac{a^m}{a^n} = \underline{\hspace{2cm}}$$