

Name _____

Date _____

Mr. Tallman

Do Now

Convert the following into exponential form.

1) $5 \cdot 5 \cdot 5$	2) $x \cdot x \cdot x$	3) $(-9) \cdot (-9)$	4) $1 \cdot 1 \cdot 1 \cdot 1$
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Write the following exponents in expanded form.

5) 6^3	7) y^5	8) $(-2)^3$	9) 8^1
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Lesson #43 – Rules of Exponents (Part 1)

Parts of a number in Exponential Form:



The **BASE** is _____

The **EXPONENT** is _____

Example 1) Identify the base and the exponent in the following numbers:

A) 6^3	B) 8^{26}	C) x^3	D) $4x^2$
Base _____	Base _____	Base _____	Base _____
Exponent: _____	Exponent: _____	Exponent: _____	Exponent: _____

Consider the following example:

Evaluate $3^2 \cdot 3^4$. Write your answer in exponential form.

- Are the **bases** the same? _____ What is the base? _____
- Let's write each exponent in expanded form.

$$3^2 = \underline{\hspace{2cm}} \qquad 3^4 = \underline{\hspace{2cm}}$$

Therefore, the expanded form of $3^2 \cdot 3^4$ is _____.

- How many "threes" are being multiplied in the expanded form? _____
- So, in exponential form, $3^2 \cdot 3^4 = \underline{\hspace{2cm}}$.
- What do you notice about the exponents in the original expression and the exponents in the new expression?

Rule #1: When multiplying powers with the **same base**, _____

Ex: Number base:

$$2^5 \bullet 2 \bullet 2^3 =$$

Variable base:

$$x^2 \bullet y^2 \bullet y^4 \bullet x^5 =$$

Directions: Write an equivalent expression for the following problems.

1) $8^2 \bullet 8^4 =$

2) $14^3 \bullet 14^{-7} =$

3) $x \bullet x^6 =$

4) $3^7 \bullet 9 =$

5) $2^{-3} \bullet 2^{-4} =$

6) $(2x^3)(7x^7) =$

7) Fill in the box with the missing number: $b^{\square} \bullet b^2 = b^8$

8) Simplify: $2^3 \bullet 5^2 =$

9) Are these expressions the same? _____

$x + x = \underline{\hspace{2cm}}$ **vs** $x \bullet x = \underline{\hspace{2cm}}$

II. **DIVIDING POWERS WITH THE SAME BASE**

$$\frac{5}{5}$$

$$\frac{5^2}{5}$$

$$\frac{5^5}{5^3}$$

$$\frac{5^9}{5^4}$$

Rule #2: When dividing powers with the **same base**, _____

Ex: Number base:

Variable base:

Directions: Use properties of exponents to write an equivalent expression. Leave answers in exponential form.

1) $\frac{12^8}{12^2} =$

2) $\frac{x^5}{x^2} =$

3) $\frac{3^{-4}}{3^2} =$

4) $\frac{9^{10}}{9^{-8}} =$

5) $\frac{3^4}{3^6} =$

6) $\frac{x^4 \cdot x^6}{x^2} =$

7) Fill in the box with the missing number: $\frac{b^{\square}}{b^3} = b^{11}$

8) $\frac{x^6 y^{14}}{x y^9} =$

9.) Simplify: $\frac{2^4}{4^2} =$

10.) Simplify: $\frac{5}{x^3} (3x^8) =$

