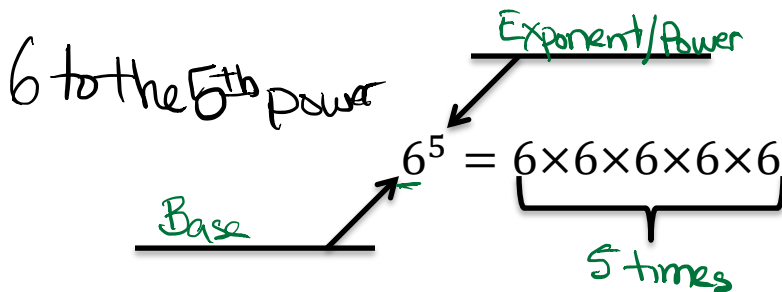


**LEARNING OBJECTIVE:** We will write expressions using correct exponential notation. (G8M1L1)

**CONCEPT DEVELOPMENT:**

**Exponential notation** is an easier way to write repeated multiplication.



EXAMPLE: Neg base  $\rightarrow$  neg. #

**Fractional or Negative Bases NEED parentheses**

Examples:

$$\left(\frac{9}{7}\right)^4 = \underbrace{\frac{9}{7} \times \frac{9}{7} \times \frac{9}{7} \times \frac{9}{7}}_{4 \text{ times}}$$

$$(-2)^4 = \underbrace{(-2) \times (-2) \times (-2) \times (-2)}_{4 \text{ times} = 16}$$

Non-examples:

$$\frac{9^4}{7} = \frac{9 \times 9 \times 9 \times 9}{7}$$

$$-2^4 = -(2 \times 2 \times 2 \times 2)$$

When a **negative** base is raised to an **odd** power, the result is **negative**.  
When a **negative** base is raised to an **even** power, the result is **positive**.

**GUIDED PRACTICE:**

**Steps for Writing in Exponential Form**

1. Identify the base, and count how many times it is being multiplied.
2. Make sure that you are using parentheses appropriately.

$\underbrace{3 \times 3 \times 3 \times 3 \times 3 \times 3 \times 3 \times 3}_{8 \text{ times}} \quad 3^8$	$\underbrace{(-6) \times (-6) \times (-6) \times (-6) \times (-6)}_{5 \text{ times}} \quad (-6)^5$
$\underbrace{(-6.7) \times (-6.7) \times (-6.7) \times (-6.7)}_{4 \text{ times}} \quad (-6.7)^4$	whiteboard. $\underbrace{\frac{5}{4} \times \frac{5}{4} \times \frac{5}{4}}_{3 \text{ times}} \quad \left(\frac{5}{4}\right)^3$
$\underbrace{d \times d \times d \times d}_{4 \text{ times}} \quad d^4$	$\underbrace{12c \times 12c \times 12c \times 12c}_{4 \text{ times}} \quad (12c)^4$

$12c^4 \leftarrow (12c)^4$   $12 \cdot c \cdot 12 \cdot c \cdot 12 \cdot c \cdot 12 \cdot c$   
 $12^4 \cdot c^4$

NAME: \_\_\_\_\_

Math \_\_\_\_\_, Period \_\_\_\_\_

Mr. Rogove

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

**INDEPENDENT PRACTICE:**

**Steps for Writing in Exponential Form**

1. Identify the base, and count how many times it is being multiplied.
2. Make sure that you are using parentheses appropriately.

$1.5 \times 1.5 \times 1.5$	$(-1)(-1)(-1)(-1)(-1)(-1)$
$(-2x)(-2x)(-2x)(-2x)$	$(-\frac{8}{3})(-\frac{8}{3})(-\frac{8}{3})(-\frac{8}{3})(-\frac{8}{3})(-\frac{8}{3})$
<p>What value of <math>n</math> will make the number <u>positive</u>?</p> <p style="text-align: center;"><math>(-\frac{2}{9})^n</math></p> <p style="text-align: center;"><math>(-\frac{2}{9})^4</math></p>	<p>What value of <math>n</math> will make the number <u>negative</u>?</p> <p style="text-align: center;"><math>(-123)^n</math></p> <p style="text-align: center;"><math>(-123)^{1357}</math></p>
<p>Write an expression with <math>(-\frac{6}{5})</math> as its base that will produce a positive product.</p>	<p>Write an expression with <math>(-68)</math> as its base that will produce a negative product.</p>
<p>Rewrite each number in exponential form using 2 as the base:</p> <p style="text-align: center;"><math>8 = 2^3</math>      <math>16 = 2^4</math></p> <p style="text-align: center;"><math>32 = 2^5</math>      <math>64 = 2^6</math></p> <p style="text-align: center;"><math>128 = 2^7</math>      <math>256 = 2^8</math></p>	<p>Could <math>(-2)</math> be used to rewrite 32? Why or why not?</p> <p style="text-align: center;"><math>(-2)^5</math> ?!?</p> <p style="text-align: center;">No!! <math>(-2)^5 = -32</math></p> <p style="text-align: center;"><math>-2^5 = -32</math></p>

NAME: \_\_\_\_\_

Math \_\_\_\_\_, Period \_\_\_\_\_

Mr. Rogove

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

### ACTIVATING PRIOR KNOWLEDGE:

We know that multiplication is the same as repeated addition.

$2 + 2 + 2 + 2 + 2 + 2 + 2$	$(-3) + (-3) + (-3) + (-3)$
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### CLOSURE:

1. Amy and Beth were both trying to rewrite the following expression using exponential notation:

$$3s \times 3s \times 3s \times 3s \times 3s$$

Amy said correct notation would be to rewrite this expression as  $3s^5$  while Beth said it was  $(3s)^5$ . Who is correct? Justify your answer.

*parentheses*  $3s^5 \neq (3s)^5$

2. Explain why  $-3^2$  is different than  $(-3)^2$ .

### TEACHER NOTES:

Do number talk— $29 + 38$ , then  $239 + 398$ .

Give Engage NY exit ticket.