

## Zero and Negative Exponents

Study the example problems showing how to simplify expressions with zero and negative exponents. Then solve problems 1–12.

### Example

#### Zero Exponent

Simplify:  $217^0$

In general,  $n^0 = 1$ , where  $n \neq 0$ .

So,  $217^0 = 1$ .

#### Negative Exponent

Simplify:  $15^{-2}$

In general,  $n^{-a} = \frac{1}{n^a}$ , where  $n \neq 0$ .

So,  $15^{-2} = \frac{1}{15^2}$ .

- 1 Simplify:  $100^0$  \_\_\_\_\_
- 2 Write  $(-32)^{-2}$  as an expression without a negative exponent. \_\_\_\_\_
- 3 Write  $\frac{1}{7^6}$  as an expression with a negative exponent. \_\_\_\_\_
- 4 Compare  $8^0$  and  $8^{-2}$ . Which is greater? Explain your reasoning.  
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- 5 Simplify  $(12^0)(12^6)$ . Write your answer using an exponent. Explain how you found your answer.  
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- 6 What is the value of  $x$  in the equation  $(-35)^x = 1$ ? Explain.  
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- 7 Write an expression using exponents that is equivalent to each of the following expressions.
  - a.  $5^{-3} =$  \_\_\_\_\_
  - b.  $(-16)^{-2} =$  \_\_\_\_\_
  - c.  $\frac{1}{8^4} =$  \_\_\_\_\_



**Solve.**

8 Simplify the expression  $52^{-5}$ . Then write it as repeated multiplication.

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9 Write an exponential expression that is equivalent to  $(4^{14})^{-2}$ .

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10 Is  $6^{-2}$  positive or negative? Explain.

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11 Write  $9^0$ ,  $9^3$ , and  $9^{-2}$  in order from least to greatest.

**Show your work.**

*Solution:* \_\_\_\_\_

12 Lizbeth says that  $(-12)^{-3}$  equals a positive number because the product of two negative integers is a positive integer. Do you agree? Use what you know about exponential expressions to explain.

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