

Lesson 4-7

Example 1 Use Positive Exponents

Write each expression using a positive exponent.

a. 5^{-3}

$$5^{-3} = \frac{1}{5^3} \quad \text{Definition of negative exponent}$$

b. w^{-9}

$$w^{-9} = \frac{1}{w^9} \quad \text{Definition of negative exponent}$$

Example 2 Use Negative Exponents

Write $\frac{1}{25}$ as an expression using a negative exponent.

$$\frac{1}{25} = \frac{1}{5 \cdot 5} \quad \text{Find the prime factorization of 25.}$$

$$= \frac{1}{5^2} \quad \text{Definition of exponent}$$

$$= 5^{-2} \quad \text{Definition of negative exponent}$$

Example 3 Use Exponents to a Solve Problem

INSECTS The wings of a small insect measure 0.0001 inch. Write the decimal as a fraction and as a power of 10.

The digit 1 is in the ten-thousandths place.

$$\text{So, } 0.0001 = \frac{1}{10,000} \quad \text{Write the decimal as a fraction.}$$

$$= \frac{1}{10^4} \quad 10,000 = 10^4$$

$$= 10^{-4} \quad \text{Definition of negative exponent}$$

Example 4 Algebraic Expressions with Negative Exponents

Evaluate b^{-4} if $b = 3$.

$$b^{-4} = 3^{-4} \quad \text{Replace } b \text{ with } 3.$$

$$= \frac{1}{3^4} \quad \text{Definition of negative exponent}$$

$$= \frac{1}{81} \quad \text{Find } 3^4.$$