



## Pre-Algebra: Scientific Notation Operations

### Adding and Subtracting with Scientific Notation

The following are populations for the United States, Mexico and Canada. Find the total population of North America which includes these three countries.

United States       $3.1 \times 10^8$                   Mexico       $1.1 \times 10^8$                   Canada       $3.3 \times 10^7$

**Method 1:**

First write each population with the same power of 10. This may mean writing the first part of the notation so it is not in proper form.

United States        $\times 10^{\text{_____}}$

Mexico                        $\times 10^{\text{_____}}$

Canada                        $\times 10^{\text{_____}}$

Add the multipliers for each population.                   $3.1 + \text{_____} = \text{_____}$

Write the final answer in scientific notation. \_\_\_\_\_.

**Method 2:**

First write each number in standard notation.

United States                      \_\_\_\_\_

Mexico                                  \_\_\_\_\_

Canada                                  \_\_\_\_\_

Find the sum in standard notation

$310,000,000 + \text{_____} + \text{_____} = \text{_____}$

Write the final answer in scientific notation. \_\_\_\_\_.

**REVIEW:**

Using the population in scientific notation, how many more people live in the United States that in Mexico?

\_\_\_\_\_ times

## Multiplying and Dividing with Scientific Notation

When the sun makes an orbit around the center of the Milky Way, it travels  $2.025 \times 10^{14}$  kilometers. The orbit takes 225 million years. At what rate does the Sun travel around the Milky Way? Write your answer in scientific notation.

- A. Set up a division problem to represent the situation.

$$\text{Rate} = \frac{\text{Distance}}{\text{Time}} \qquad \text{Rate} = \frac{\text{[redacted]} \text{ kilometers}}{\text{[redacted]} \text{ years}}$$

- B. Write 225 million years in scientific notation. \_\_\_\_\_

- C. Write the expression for rate with years in scientific notation.

$$\text{Rate} = \frac{\text{[redacted]} \text{ kilometers}}{\text{[redacted]} \text{ years}}$$

- D. Find the quotient by dividing the multipliers.

$$2.025 \div \text{[redacted]} = \text{[redacted]}$$

- E. Use the rules of exponents to divide the powers of 10.

$$\frac{10^{14}}{10^8} = 10^{\text{[redacted]}}$$

- F. Combine the answers from D and E to write the rate in scientific notation.

\_\_\_\_\_

Light from the Sun travels at a speed of  $1.86 \times 10^5$  miles per second. It takes sunlight about  $4.8 \times 10^3$  seconds to reach Saturn. Find the approximate distance from the Sun to Saturn. Write your answer in scientific notation.

$$d = rt \qquad d = (\text{[redacted]} \times 10^5)(\text{[redacted]} \times 10^3)$$

$$\text{Commutative} \quad d = (\text{[redacted]}) (4.8) \times (\text{[redacted]}) (10^3) = \text{[redacted]} \times 10^{\text{[redacted]}} \text{ miles}$$

### Scientific Notation on the calculator.

Instead of using an "x" and 10, the calculator uses only an E.

EXAMPLE:  $4.1 \times 10^9$  shows as **4.1E9** on the calculator.