Pre-Algebra Workbook

Scientific notation

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POWERS OF 10

■ 1. If we multiply a number by a power of 10, e can count the number of zeroes to know how many spaces to move the _____ to the _____.

■ 2. Find the product.

$$450 \cdot 10^0$$

■ 3. Find the quotient.

$$6.4 \div 100$$

■ 4. Find the product.

$$3.5 \times 10^4$$

■ 5. Find the product.

$$1.8 \times 10^{-2}$$

6. Find the quotient.

$$420 \div 10^3$$

SCIENTIFIC NOTATION

■ 1. Scientific notation has 2 parts. The first part is the decimal number and the second part is the _____.

■ 2. The decimal number of a number written in scientific notation must be between 1 and _____.

■ 3. Write the number in scientific notation.

0.000000056

■ 4. Write the number in scientific notation.

0.000000000000012

■ 5. Write number in expanded form.

7.2×10^{12}

■ 6. Write number in expanded form.

4.9×10^{-7}

MULTIPLYING SCIENTIFIC NOTATION

■ 1. Write the product $(3.1 \times 10^5)(5.5 \times 10^{-7})$ in scientific notation.

■ 2. Write the product $(1.8 \times 10^4)(5.9 \times 10^6)$ in scientific notation.

■ 3. Write the product $(8.8 \times 10^{-2})(7.85 \times 10^{-5})$ in scientific notation.

■ 4. Write the product $(1.3 \times 10^3)(2.6 \times 10^{-4})$ in scientific notation.

■ 5. If we're given 3.6×10^{-2} in scientific notation, will we get a smaller or larger number when we multiply it by a positive power of 10?

■ 6. Yvonne is asked to find the product of two numbers written in scientific notation:

$$(2.8 \times 10^4)(4.46 \times 10^{-6})$$

She solves the problem in three steps.

Step 1 $\quad 2.8 \times 4.46 = 12.488$

Step 2 $4 + (-6) = -2$

Step 3 12.488×10^{-2}

In what step did she make her mistake? What is the correct answer?

DIVIDING SCIENTIFIC NOTATION

■ 1. When we divide two numbers that have the same base, we _____ the exponents.

■ 2. Find the value of $(1.5 \times 10^{8}) \div (2.0 \times 10^{-3})$.

■ 3. Find the value of $(6.75 \times 10^{3}) \div (1.5 \times 10^{9})$.

■ 4. Find the value of $(2.75 \times 10^{10}) \div (8.0 \times 10^{8})$.

■ 5. Find the value of $(7.5 \times 10^{4}) \div (1.5 \times 10^{-4})$.

■ 6. If we're given 5.75×10^{6} in scientific notation and we divide it by a negative power of 10, will we get a larger or smaller result?

MULTIPLYING AND DIVIDING SCIENTIFIC NOTATION

■ 1. Simplify the expression.

$$\frac{(4.5 \times 10^{3})(1.4 \times 10^{-5})}{2.8 \times 10^{-1}}$$

■ 2. Simplify the expression.

$$\frac{(7.6 \times 10^{5})(1.1 \times 10^{-7})}{5.1 \times 10^{-3}}$$

■ 3. Simplify the expression.

$$\frac{(1.7 \times 10^{-3})(3.4 \times 10^{-4})}{(6.3 \times 10^{-3})(7.3 \times 10^{-2})}$$

■ 4. Simplify the expression.

$$\frac{(4.9 \times 10^{4})(6.4 \times 10^{-4})}{(8.2 \times 10^{-3})(2 \times 10^{3})}$$

■ 5. Simplify the expression.

$$\frac{(6.1 \times 10^{6})(6.8 \times 10^{-4})}{(1.1 \times 10^{-5})(1.8 \times 10^{5})}$$

■ 6. Danny and Deacon are working on finding the quotient below. Danny decides to multiply out the numerator and gets $10{,}000$ for the powers of 10 portion. Then he divides it by 0.00061 to get $16{,}393{,}442.6$ or 1.63934426×10^{7}. Deacon decides he wants to divide, so he divides each number by 0.00061 and gets $819{,}672{,}131$ and 32.78689852. Then he multiplies those numbers to get 2.68745×10^{10}. Why are the answers different? Who is correct?

$$\frac{(5 \times 10^{5})(2 \times 10^{-2})}{6.1 \times 10^{-4}}$$

ESTIMATING SCIENTIFIC NOTATION

1. Estimate the value of 3.65×10^{-5}.

2. Use scientific notation to estimate the value $(5.75 \times 10^{6})(2.34 \times 10^{-1})$.

3. Use scientific notation to estimate the value of $(2.456 \times 10^{3})(1.67 \times 10^{-7})$.

4. Use scientific notation to estimate the value of the expression.

$$\frac{7.152 \times 10^{2}}{2.91 \times 10^{2}}$$

5. Use scientific notation to estimate the value of the expression.

$$\frac{(6.2 \times 10^{6})(6.4 \times 10^{-3})}{(4.25 \times 10^{-2})(2.9 \times 10^{-3})}$$

6. Use scientific notation to estimate the value of the expression.

$$\frac{(1.7 \times 10^{-5})(2.6 \times 10^{2})}{(3.334 \times 10^{-3})(2.5 \times 10^{-1})}$$

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