Skills You'll Need

A number in *scientific notation* has the first factor great than or equal to 1 and less than 10, and the second factor a power of 10.

$-1.67 \times 10^3 = -1(1.67 \times 10^3)$

Write each expression in scientific notation.

14,500,000

1.45×10^7

0.034

3.4×10^{-2}

511

5.11×10^2

0.0004

$4. \times 10^{-4}$

8th Grade

Lesson 6-5: Dividing with Scientific Notation

Learning Goals:

- I can divide numbers written in scientific notation.
- I can compare numbers written in scientific notation.

What I Know:

What I Learned:

Dividing Numbers in Scientific Notation

$$(6.5 \times 10^6) \div (7.3 \times 10^2)$$

$$\frac{6.5 \times 10^6}{7.3 \times 10^2} = \frac{6.5}{7.3} \times \frac{10^6}{10^2}$$

$$\approx 0.89 \times 10^4$$

$$\approx 8.9 \times 10^{-1} \times 10^4$$

$$\approx 8.9 \times 10^3$$

Quick Check

Simplify. Write each quotient in scientific notation.

$$\frac{7.9 \times 10^5}{2.3 \times 10^3} \qquad \frac{4.8 \times 10^4}{2.95 \times 10^6} \qquad \frac{3.7 \times 10^7}{5.2 \times 10^2}$$

$\approx 3.43 \times 10^2$

$\approx 1.63 \times 10^{-2}$

$\approx 0.71 \times 10^5$

$7.1 \times 10^{-1} \times 10^5$

7.1×10^4

Application

The distance between the sun and a comet is about 2.79×10^8 miles. Light travels about 1.1×10^7 miles per minute. Use the formula below to estimate how many minutes sunlight takes to reach the comet. Write your answer in standard form and round to the nearest tenth.

$$\text{time} = \frac{\text{distance}}{\text{speed}}$$

$$\frac{2.79 \times 10^8 \text{ mi}}{1.1 \times 10^7 \text{ mi/min}}$$

$\approx 2.536 \times 10^1$

≈ 25.36 min.

About 25.4 min.

Quick Check

The distance between the sun and Earth is about 9.3×10^7 miles. Light travels about 1.1×10^7 miles per minute. Estimate how long sunlight takes to reach Earth. Write your answer in standard form and round to the nearest tenth.

$$\text{time} = \frac{\text{distance}}{\text{speed}}$$

$$\frac{9.3 \times 10^7 \text{ mi}}{1.1 \times 10^7 \text{ mi/min}}$$

$\approx 8.45 \times 10^0$

≈ 8.45

8.5 min

about 8.5 min.

Dividing by Numbers in Standard Form

Write each quotient in scientific notation.

$(-7.1 \times 10^3) \div 6.3$

$\frac{-7.1 \times 10^3}{6.3 \times 10^0}$

-1.13×10^3

$4.2 \div (5.5 \times 10^9)$

$\frac{4.2 \times 10^0}{5.5 \times 10^9}$

$\approx 0.76 \times 10^{-9}$

$7.6 \times 10^{-1} \times 10^{-9}$

7.6×10^{-10}

Quick Check

Write each quotient in scientific notation.

$\frac{6.2 \times 10^6}{4.1}$

$\frac{6.2}{4.1} \times \frac{10^6}{10^0}$

1.5×10^6

$\frac{-3.5 \times 10^3}{5}$

$\frac{-3.5}{5} \times \frac{10^3}{10^0}$

-0.7×10^3

$-7 \times 10^{-1} \times 10^3$

-7×10^2

$\frac{17}{1.4 \times 10^8}$

$\frac{17}{1.4} \times \frac{10^0}{10^8}$

12.1×10^{-8}

$1.21 \times 10^1 \times 10^{-8}$

1.21×10^{-7}

Ordering Numbers

Order from least to greatest:

6.2×10^{-4}, 7.5×10^{4}, 6.2×10^{4}, and 6.5×10^{3}

6.2×10^{-4}, 6.5×10^{3}, 7.5×10^{4}, 6.2×10^{4}

6.2×10^{-4}, 6.5×10^{3}, 6.2×10^{4}, 7.5×10^{4}

Quick Check

Order the numbers from least to greatest.

3×10^{6} 3.11×10^{5} 3×10^{-6} 3.8×10^{-5}

3×10^{-6}, 3.8×10^{-5}, 3.11×10^{5}, 3×10^{6}

1.8×10^{-2} 1.5×10^{3} 1.5×10^{4} 1.7×10^{-2}

1.7×10^{-2}, 1.8×10^{-2}, 1.5×10^{3}, 1.5×10^{4}

Comparing Numbers in Scientific Notation

You can use division to find how many times greater one number is than another. Write a fraction with the greater number as a numerator and the lesser number as the denominator. Then divide and simplify.

Estimate how many times greater 4×10^9 is than 9×10^7.

$$\frac{4 \times 10^9}{9 \times 10^7}$$

$$\approx 0.44 \times 10^2$$

44 times

Quick Check

Estimate how many times greater 5.5×10^{18} is than 8×10^{17}. Round to the nearest tenth.

$$\frac{5.5 \times 10^{18}}{8 \times 10^{17}} = \frac{5.5}{8} \times \frac{10^{18}}{10^{17}}$$

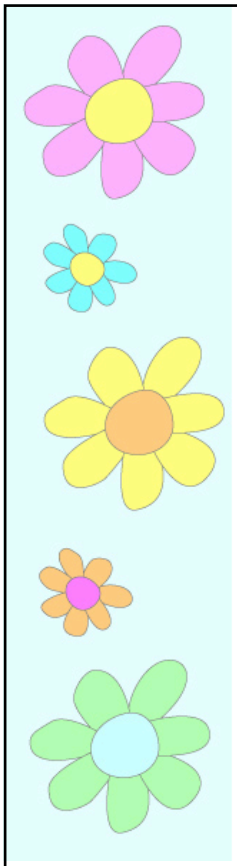
$$\approx 0.69 \times 10^1$$

$$\approx 6.9 \times 10^{-1} \times 10^1$$

$$\approx 6.9 \times 10^0$$

$$\approx 6.9$$

5.5×10^{18} is about 6.9 times greater than 8×10^{17}



Assignment

8th Grade
Lesson 6-5

Pgs. 205-206 #9-25 all
due Wednesday