



Worksheet 6 Exponents

Scientific Notation

Real numbers expressed in **scientific notation** have the form

$$a \times 10^n$$

where n is an integer and $1 \leq a < 10$. This form is particularly useful when the numbers are very large or very small.

For example,

$$9,460,000,000,000,000 \text{ m} = 9.46 \times 10^{15} \text{ m} \quad \textit{One light year}$$

$$0.000000000025 \text{ m} = 2.5 \times 10^{-11} \text{ m} \quad \textit{Radius of a hydrogen atom}$$

Rewrite this numbers in standard form (decimal form).

1) $563.4 \times 10^5 = \dots\dots\dots$

2) $0.054 \times 10^6 = \dots\dots\dots$

3) $0.00634 \times 10^5 = \dots\dots\dots$

Rewrite this numbers in scientific notation.

1) 2,500 = $\dots\dots\dots \times 10^{\dots\dots\dots}$

2) 38,720 = $\dots\dots\dots \times 10^{\dots\dots\dots}$

3) 82,400 = $\dots\dots\dots \times 10^{\dots\dots\dots}$

4) 396,000 = $\dots\dots\dots \times 10^{\dots\dots\dots}$

5) 12,680,000 = $\dots\dots\dots \times 10^{\dots\dots\dots}$

6) 510,000,000 = $\dots\dots\dots \times 10^{\dots\dots\dots}$

7) 0.05 = $\dots\dots\dots \times 10^{\dots\dots\dots}$

8) 0.00064 = $\dots\dots\dots \times 10^{\dots\dots\dots}$

9) 0.00000234 = $\dots\dots\dots \times 10^{\dots\dots\dots}$

10) 0.000000745 = $\dots\dots\dots \times 10^{\dots\dots\dots}$

11) 0.000000846 = $\dots\dots\dots \times 10^{\dots\dots\dots}$

12) 0.00000000932 = $\dots\dots\dots \times 10^{\dots\dots\dots}$



Example 1: Multiply: $(4.2 \times 10^{-5})(0.3 \times 10^{12})$.

Answer $\times 10$ —

Example 2: Divide: $(3.24 \times 10^8) \div (9.0 \times 10^{-3})$.

Answer $\times 10$ —

Example 3: The speed of light is approximately 6.7×10^8 miles per hour. Express this speed in miles per second.

Answer $\times 10$ —

Evaluate the expression. Write the result in scientific notation.

1) $(3 \times 10^8) \times (7 \times 10^9)$ = $\times 10$ —

2) $(2.2 \times 10^{-8}) \times (3.6 \times 10^{23})$ = $\times 10$ —

3) $(4 \times 10^{-4}) \times (1.2 \times 10^{15})$ = $\times 10$ —

4) $(2.5 \times 10^{-7}) \times (2.5 \times 10^{22})$ = $\times 10$ —

5) $(0.4 \times 10^{-11}) (-22 \times 10^{12}) (0.3 \times 10^{25})$ = $\times 10$ —

6) $(a \times 10^{-13}) (b \times 10^{-29}) (c \times 10^{35})$ = $\times 10$ —

7) $\frac{(8 \times 10^{-9})}{(4 \times 10^{-7})}$ = $\times 10$ —



$$8) \frac{3.6 \times 10^{-5}}{0.6 \times 10^{-2}} = \dots \times 10 \text{---}$$

$$9) \frac{(4 \times 10^{-8})(5.5 \times 10^{-6})}{(1.1 \times 10^{-12})} = \dots \times 10 \text{---}$$

$$10) \frac{(2.4 \times 10^{-4})(4 \times 10^{-7})}{8 \times 10^{-11}} = \dots \times 10 \text{---}$$

$$11) \frac{2.5 \times 10^7}{0.5 \times 10^{-11}} = \dots \times 10 \text{---}$$

$$12) \frac{0.000062}{0.002} = \dots \times 10 \text{---}$$

$$13) \frac{0.00000056 \times 10^{-4}}{0.0008 \times 10^{-5}} = \dots \times 10 \text{---}$$

$$14) \frac{(0.01 \times 10^{-11})(5.5 \times 10^{18})}{(1.1 \times 10^{-7})} = \dots \times 10 \text{---}$$

$$15) \frac{(3.4 \times 10^{14}) \div (0.2 \times 10^{-5})}{(1.7 \times 10^{-5})} = \dots \times 10 \text{---}$$

$$16) \frac{(12.5 \times 10^6) \times (3.9 \times 10^{15})}{6.5 \times 10^{13}} = \dots \times 10 \text{---}$$

$$17) \frac{0.016 \times 0.0028}{0.0064} = \dots \times 10 \text{---}$$

Solve the problem.

1. The mass of earth is 5.97×10^{24} kilograms and the mass of the moon is 7.35×10^{22} kilograms. By what factor is the mass of earth greater than the mass of the moon?

Answer $\dots \times 10 \text{---}$