

MATH HANDBOOK TRANSPARENCY MASTER **2**

Operations with Scientific Notation

Use with Appendix B,
Operations with
Scientific Notation

Addition and Subtraction

Before numbers in scientific notation can be added or subtracted, the exponents must be equal.

$$\begin{array}{c}
 \text{Not equal} \quad \quad \quad \text{Equal} \\
 \swarrow \quad \quad \quad \searrow \quad \quad \quad \swarrow \quad \quad \quad \searrow \\
 (3.4 \times 10^2) + (4.57 \times 10^3) = (0.34 \times 10^3) + (4.57 \times 10^3) \\
 \uparrow \quad \quad \quad \quad \quad \quad \quad \uparrow \\
 \text{The decimal is moved} \\
 \text{to the left to increase} \\
 \text{the exponent.} \\
 = (0.34 + 4.57) \times 10^3 \\
 = 4.91 \times 10^3
 \end{array}$$

Multiplication

When numbers in scientific notation are multiplied, only the number is multiplied. The exponents are added.

$$\begin{array}{c}
 \swarrow \quad \quad \quad \searrow \\
 (2.00 \times 10^3)(4.00 \times 10^4) = (2.00)(4.00) \times 10^{3+4} \\
 \uparrow \quad \quad \quad \quad \quad \quad \quad \uparrow \\
 = 8.00 \times 10^7
 \end{array}$$

Division

When numbers in scientific notation are divided, only the number is divided. The exponents are subtracted.

$$\begin{array}{c}
 \swarrow \quad \quad \quad \searrow \\
 \frac{9.60 \times 10^7}{1.60 \times 10^4} = \frac{9.60}{1.60} \times 10^{7-4} \\
 \uparrow \quad \quad \quad \quad \quad \quad \quad \uparrow \\
 = 6.00 \times 10^3
 \end{array}$$

MATH HANDBOOK TRANSPARENCY WORKSHEET

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Operations with Scientific Notation

Use with Appendix B,
Operations with
Scientific Notation

1. Perform the following operations and express the answers in scientific notation.

a. $(1.2 \times 10^5) + (5.35 \times 10^6)$

b. $(6.91 \times 10^{-2}) + (2.4 \times 10^{-3})$

c. $(9.70 \times 10^6) + (8.3 \times 10^5)$

d. $(3.67 \times 10^2) - (1.6 \times 10^1)$

e. $(8.41 \times 10^{-5}) - (7.9 \times 10^{-6})$

f. $(1.33 \times 10^5) - (4.9 \times 10^4)$

2. Perform the following operations and express the answers in scientific notation.

a. $(4.3 \times 10^8) \times (2.0 \times 10^6)$

b. $(6.0 \times 10^3) \times (1.5 \times 10^{-2})$

c. $(1.5 \times 10^{-2}) \times (8.0 \times 10^{-1})$

d. $\frac{7.8 \times 10^3}{1.2 \times 10^4}$

e. $\frac{8.1 \times 10^{-2}}{9.0 \times 10^2}$

f. $\frac{6.48 \times 10^5}{(2.4 \times 10^4)(1.8 \times 10^{-2})}$