

Adding Numbers in Scientific Notation

Day 2

When adding with scientific notation, remember that the exponents must be the same in order to complete the problem.

Example 1:

$$(3.4 \times 10^{-5}) + (6.2 \times 10^{-5}) = (3.4 + 6.2) \times 10^{-5} = 9.6 \times 10^{-5}$$

*Reminder: When the powers are the same: 1. Add the numbers (3.4 + 6.2).

2. The power of ten stays the same (10^{-5}).

Example 2:

$$\begin{aligned}(5.7 \times 10^4) + (8.1 \times 10^7) &= (5.7 \times 10^4) + (8100 \times 10^4) \\ &= (5.7 + 8100) \times 10^4 \\ &= 8,105.7 \times 10^4 \\ &= 8.1057 \times 10^7\end{aligned}$$

*Reminder: When the powers are different: 1. Rewrite one of the numbers so the power of 10 is the same.

2. Add the numbers (5.7 + 8,100).

3. Be sure the answer is written in scientific notation.

Find the solution to the following problems.

1. $(2.3 \times 10^3) + (6.9 \times 10^3)$

$$\begin{array}{r} \diagdown \quad \diagup \\ 9.2 \times 10^3 \end{array}$$

2. $(4.4 \times 10^{-6}) + (8.8 \times 10^{-6})$

$$\begin{array}{r} \diagdown \quad \diagup \\ 13.2 \times 10^{-6} = 1.32 \times 10^{-5} \end{array}$$

3. $(4.81 \times 10^3) + (7.913 \times 10^5)$

$$\begin{array}{r} \downarrow \\ .0481 \times 10^5 + 7.913 \times 10^5 \\ 7.9611 \times 10^5 \end{array}$$

4. $(3.6 \times 10^{-2}) + (4.0 \times 10^{-1})$

$$\begin{array}{r} \downarrow \\ (.36 \times 10^{-1}) + (4 \times 10^{-1}) \\ 4.36 \times 10^{-1} \end{array}$$

5. $(2.154 \times 10^{-2}) + (3.5 \times 10^2)$

$$\begin{array}{r} \downarrow \\ .0002154 \times 10^2 \\ + 3.5 \quad \times 10^2 \\ \hline 3.5002154 \times 10^2 \end{array}$$

6. $(7.5 \times 10^4) + (5.9 \times 10^6)$

$$\begin{array}{r} \downarrow \\ (7.5 \times 10^4) + (590 \times 10^4) \\ 597.5 \times 10^4 \\ 5.975 \times 10^6 \end{array}$$

Subtracting Numbers in Scientific Notation

Day 2

Example 1:

$$(3.2 \times 10^3) - (1.7 \times 10^3) = (3.2 - 1.7) \times 10^3 = 1.5 \times 10^3$$

*Reminder: When the powers are the same: 1. Subtract the numbers (3.2 - 1.7).
2. The power of ten stays the same (10^3).

Example 2:

$$\begin{aligned}(4.23 \times 10^5) - (3.5 \times 10^3) &= (423 \times 10^3) - (3.5 \times 10^3) \\ &= (423 - 3.5) \times 10^3 \\ &= 419.5 \times 10^3 \\ &= 4.195 \times 10^5\end{aligned}$$

*Reminder: When the powers are different: 1. Rewrite one of the numbers so the power of 10 is the same.
2. Subtract the numbers (423 - 3.5).
3. Be sure the answer is written in scientific notation.

Solve the following problems. All answers are to be written in scientific notation.

1. $(4.61 \times 10^4) - (2.75 \times 10^4)$

$$1.86 \times 10^4$$

2. $(5.2 \times 10^{-3}) - (2.58 \times 10^{-3})$

$$2.62 \times 10^{-3}$$

3. $(6.1 \times 10^4) - (2.43 \times 10^2)$

$$\begin{aligned}(610 \times 10^2) - (2.43 \times 10^2) \\ 607.57 \times 10^2 \\ 6.0757 \times 10^4\end{aligned}$$

4. $(8.32 \times 10^{-3}) - (5.9 \times 10^{-4})$

$$\begin{aligned}(83.2 \times 10^{-4}) - (5.9 \times 10^{-4}) \\ 77.3 \times 10^{-4} \\ 7.73 \times 10^{-3}\end{aligned}$$

5. $(7.61 \times 10^6) - (2.87 \times 10^4)$

$$\begin{aligned}(761 \times 10^4) - (.0287 \times 10^6) \\ 7.5813 \times 10^6\end{aligned}$$

6. $(6.03 \times 10^{-2}) - (3.8 \times 10^{-3})$

$$\begin{aligned}6.03 \times 10^{-2} - .38 \times 10^{-2} \\ 5.65 \times 10^{-2}\end{aligned}$$

Multiplying Numbers in Scientific Notation

Day 3

Reminder: Exponents do not need to be the same when multiplying with scientific notation. You can use the commutative property when multiplying.

1. Multiply the numbers between 1 and 10 together.
2. Multiply the powers of 10 by adding the exponents.
3. Make sure to put the product in scientific notation.

Example 1:

$$(3 \times 10^4)(7.2 \times 10^6) = (3 \times 7.2)(10^4 \times 10^6) = 21.6 \times 10^{10} = 2.16 \times 10^{11}$$

Example 2:

$$(1.7 \times 10^{-6})(3.2 \times 10^{-2}) = (1.7 \times 3.2)(10^{-6} \times 10^{-2}) = 5.44 \times 10^{-8}$$

Solve the problems below. Be sure to show your work.

1. $(2.4 \times 10^3)(1.5 \times 10^5)$

$$36 \times 10^8$$
$$3.6 \times 10^9$$

2. $(5.2 \times 10^{-6})(1.1 \times 10^{-3})$

$$5.72 \times 10^{-9}$$

3. $(6.8 \times 10^4)(4.2 \times 10^4)$

$$28.56 \times 10^8$$
$$2.856 \times 10^9$$

4. $(3.6 \times 10^{-3})(5.5 \times 10^{-5})$

$$19.8 \times 10^{-8}$$
$$1.98 \times 10^{-7}$$

5. $(7.42 \times 10^{12})(1.4 \times 10^{-3})$

$$10.388 \times 10^9$$
$$1.0388 \times 10^{10}$$

6. $(2.13 \times 10^{-6})(9.01 \times 10^{-7})$

$$19.1913 \times 10^{-13}$$
$$1.91913 \times 10^{-12}$$

Dividing Numbers in Scientific Notation

Day 3

Reminder: Exponents do not need to be the same when dividing with scientific notation.

1. Divide the first two numbers.
2. Subtract the second exponent from the first exponent.
3. Be sure the quotient is in scientific notation.

Example:

$$(9.6 \times 10^4) \div (6.4 \times 10^2) = (9.6 \div 6.4) \times (10^4 \div 10^2) = 1.5 \times 10^2$$

Solve the following problems. Be sure to write the answer in scientific notation and show your work.

1. $(4.25 \times 10^6) \div (1.7 \times 10^3)$

$$2.5 \times 10^3$$

2. $(3.6 \times 10^7) \div (1.2 \times 10^3)$

$$3 \times 10^4$$

3. $(8.08 \times 10^{-10}) \div (4.0 \times 10^{-3})$

$$2.02 \times 10^{-7}$$

4. $(5.25 \times 10^8) \div (3.5 \times 10^3)$

$$1.5 \times 10^5$$

5. $(4.5 \times 10^8) \div (9 \times 10^2)$

$$.5 \times 10^6$$

$$5 \times 10^5$$

6. $(5.76 \times 10^{-7}) \div (3 \times 10^{-9})$

$$1.92 \times 10^2$$