

Algebra 1
Operations with Scientific Notation

Operations with Scientific Notation | A1-U07-P07

96 problems · Four activity formats

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Topic focus
Across 96 tasks this topic asks for exact normalized scientific notation with any required units or explicit final rounding, decision with exact calculation and justification, missing normalized quotient with a substitution check, exact quotient and order-of-magnitude confirmation, sign justification and normalized quotient and exact normalized quotient and power-of-ten scale check.
8 PDFs and a README; 52 buyer pages.

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Name: _____ Date: _____ Class: _____

Answer each question and record the matching bank letter. Give exact values. A value without its unit is not a complete answer.

Multiply $-1.2 \cdot 10^3$ by $-8.3 \cdot 10^2$. Keep the calculation exact, add the powers of ten, and normalize the final coefficient. _____ Bank label: _____	Multiply $-7.7 \cdot 10^8$ by $-1.3 \cdot 10^0$. Keep the calculation exact, add the powers of ten, and normalize the final coefficient. _____ Bank label: _____
Multiply $2.01 \cdot 10^{-4}$ by $3.02 \cdot 10^{-5}$. Keep the calculation exact, add the powers of ten, and normalize the final coefficient. _____ Bank label: _____	Multiply $3.125 \cdot 10^3$ by $3.2 \cdot 10^2$. Keep the calculation exact, add the powers of ten, and normalize the final coefficient. _____ Bank label: _____
Multiply $-2.005 \cdot 10^8$ by $4.9 \cdot 10^0$. Keep the calculation exact, add the powers of ten, and normalize the final coefficient. _____ Bank label: _____	Multiply $9.999 \cdot 10^{12}$ by $9.999 \cdot 10^{-12}$. Keep the calculation exact, add the powers of ten, and normalize the final coefficient. _____ Bank label: _____
Multiply $9.05 \cdot 10^{-6}$ by $-1.12 \cdot 10^9$. Keep the calculation exact, add the powers of ten, and normalize the final coefficient. _____ Bank label: _____	Multiply $-3.333 \cdot 10^7$ by $3.003 \cdot 10^{-7}$. Keep the calculation exact, add the powers of ten, and normalize the final coefficient. _____ Bank label: _____

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Answer each question and show your reasoning in the workspace. Give exact values rather than decimals unless the question supplies a decimal. A value without its unit is not a complete answer.

Divide $9 \cdot 10^{-2}$ by $3 \cdot 10^{-5}$. Keep any nonterminating coefficient as an exact fraction, subtract the denominator exponent, and normalize. _____ _____	Divide $4.8 \cdot 10^4$ by $-1.2 \cdot 10^0$. Keep any nonterminating coefficient as an exact fraction, subtract the denominator exponent, and normalize. _____ _____
For $\frac{-6.3 \cdot 10^7}{-3.5 \cdot 10^{-3}}$, determine the sign before doing any magnitude arithmetic. Then calculate the exact quotient. _____ _____	Evaluate $\frac{-9.05 \cdot 10^{10}}{2.5 \cdot 10^{-7}}$. Track the sign independently from the exponent subtraction so neither is lost. _____ _____
The direct coefficient in $\frac{1.02 \cdot 10^{-8}}{-5.1 \cdot 10^6}$ is -0.2. Carry the negative sign through the normalization step and state the final result. _____ _____	In $\frac{2.02 \cdot 10^{-2}}{4.04 \cdot 10^3}$, the denominator coefficient is twice the numerator coefficient. Use that relation to get the coefficient quotient, then handle the powers. _____ _____

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Evaluate the supplied statement or method. Say whether it is correct, repair it if it is not, and verify the result exactly. Not every prompt contains an error.

A proposed quotient for $\frac{9.1 \cdot 10^{-2}}{1.3 \cdot 10^3}$ is $7 \cdot 10^{-5}$. Verify it by multiplication and report the exact result.

Compare converting 0.0042 to scientific notation first with multiplying the decimals first. Choose a valid exact route for $0.0042(3.5 \cdot 10^6)$, explain why it works, and normalize the result.

A device reports $(-3.5 \cdot 10^6)$. To divide this by $-7 \cdot 10^2$, should you interpret $E6$ as times 10^6 or as times 6? Choose, justify the sign and exponent operations, and compute exactly.

For $\frac{[1250000(1.6 \cdot 10^{-5})]}{4 \cdot 10^2}$, choose between grouping the numerator product before dividing and multiplying all three quantities. Explain which respects the expression and compute exactly.

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Full Worked Solutions - excerpt

Worked example

Problem. Multiply $2 \cdot 10^2$ by $3 \cdot 10^4$. Keep the calculation exact, add the powers of ten, and normalize the final coefficient.

Answer. $6 \cdot 10^6$

Explanation and check.

Multiply coefficients to get 6 and add exponents to get 6. Thus the direct product is $6 \cdot 10^6$; normalizing it gives $6 \cdot 10^6$.

Worked example

Problem. Multiply $1.5 \cdot 10^3$ by $4 \cdot 10^2$. Keep the calculation exact, add the powers of ten, and normalize the final coefficient.

Answer. $6 \cdot 10^5$

Explanation and check.

Multiply coefficients to get 6 and add exponents to get 5. Thus the direct product is $6 \cdot 10^5$; normalizing it gives $6 \cdot 10^5$.