Sets & Steps
Math Practice & Worked Solutions

Algebra 1

Polynomial Operations and Factoring

10-topic bundle | 960 problems | Four activity formats

Included topics

The following pages list all 10 included resources in the suggested order, with a link to each product. Each resource retains its complete preview.

Suggested learning sequence

1. Classify and combine polynomials
2. Multiply expressions
3. Factor and check structure

In every topic

Answer Bank Challenge	24 tasks
Grid Rounds	24 tasks
Match & Move	24 cards
Error Analysis & Strategy	24 tasks
Quick Answer Key and Full Worked Solutions	included
Teacher / Parent Use Guide and Terms of Use	included

Product previews

The following preview pages show the cover, all four activity formats, and worked examples for each included resource, in the listed order.

80 PDFs and 10 READMEs; 622 buyer PDF pages across the 10 products.

Preview pages are not included in the buyer page count. Check the list against resources you already own.

This is a fixed collection of the listed products. Purchase includes the existing individual resource files. To open a product's online preview, follow its title link and select View Preview.

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Sets & Steps
Math Practice & Worked Solutions

Algebra 1

Included topics

10-topic bundle | 960 problems | Four activity formats

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01 **Classifying Polynomials**

View individual product and its full preview

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08 **Factoring Trinomials**

View individual product and its full preview

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View individual product and its full preview

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View individual product and its full preview

10 included resources | Complete resource previews follow this guide.

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Sets & Steps
Math Practice & Worked Solutions

Algebra 1

Classifying Polynomials

Classifying Polynomials | A1-U08-P01

96 problems · Four activity formats

Topic focus

This topic is a focused set of 96 practice tasks on Classifying Polynomials.

8 PDFs and a README; 64 buyer pages.

The following pages use the same questions, given data, and notation as the final files. Question/card serial numbers and internal IDs are omitted in this preview only. Table values and matching responses are retained. Full answer keys are not included.

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Algebra 1

Classifying Polynomials

Name: _____ **Date:** _____ **Class:** _____

Answer each question and record the matching bank letter. Give exact values. Give the whole requested response, including any reasoning the question asks for.

List the signed terms, then classify the polynomial by its number of nonzero terms. Use all originally requested signed terms/classification or degree/leading-coefficient information as the matching response, including the simplified polynomial when requested. Retain the original explanation. Work with the variable x. Consider $5x^3 - 2x + 7$. Bank label: _____	Give both coefficients, including the implicit one, and name the term-count class. Use all originally requested signed terms/classification or degree/leading-coefficient information as the matching response, including the simplified polynomial when requested. Retain the original explanation. Work with the variable y. Consider $-y^4 + 6$. Bank label: _____
Identify the sole term and classify the whole polynomial. Use all originally requested signed terms/classification or degree/leading-coefficient information as the matching response, including the simplified polynomial when requested. Retain the original explanation. Work with the variable m. Consider $9m^2$. Bank label: _____	How many nonzero terms are present, and what are their coefficients in descending-power order? Use all originally requested signed terms/classification or degree/leading-coefficient information as the matching response, including the simplified polynomial when requested. Retain the original explanation. Work with the variable p. Consider $3p^5 - p^2 + 4p - 8$. Bank label: _____

Algebra 1

Classifying Polynomials

Name: _____ **Date:** _____ **Class:** _____

Answer each question and show your reasoning in the workspace. Give exact values rather than decimals unless the question supplies a decimal. Give the whole requested response, including any reasoning the question asks for.

Is the displayed expression a polynomial in x? Support the decision with its exponent structure. Work with the variable x. Consider $7x^4 - 3x^2 + x - 9$.	Classify the expression as a polynomial or a nonexample in t, and identify the decisive term. Work with the variable t. Consider $5t^3 - 2t^{-1}$.
Does this formula define a polynomial in z on the real numbers? Explain the role of the denominator. Work with the variable z. Consider $z^2 + \frac{6}{z}$.	A classmate rejects this expression because $\sqrt{2}$ is irrational. Decide whether the classmate is correct. Work with the variable x. Consider $\sqrt{2}x^3 - 4x + 1$.
When q is the stated variable, is -13 a polynomial? State the exponent interpretation that applies.	Determine whether fractional coefficients prevent this from being a polynomial in m. Work with the variable m. Consider $(\frac{3}{5})m^5 - (\frac{7}{2})m^2 + 8$.

Algebra 1

Classifying Polynomials

Name: _____ **Date:** _____ **Class:** _____

Begin at START. Answer the card, then find the matching final answer at the top of another card. Use the recording sheet for your reasoning. Visit each card once and continue to FINISH.

Incoming: It is the nonzero constant 3, so its degree is 0 and leading coefficient is 3.

Cancel the top-degree pair and combine the next degree before stating the leading information. Use all originally requested signed terms/classification or degree/leading-coefficient information as the matching response, including the simplified polynomial when requested. Retain the original explanation.

Work with the variable d.

Consider $4d^9 + 2d^4 - 6d - 4d^9 + 3d^4$.

Your response: _____

Incoming: The polynomial is $(\frac{1}{3})t^9 - 2t^4 + 1000$; degree 9, leading coefficient $\frac{1}{3}$.

Give the degree and leading coefficient, then write the complete coefficient vector down through the constant term. Use all originally requested signed terms/classification or degree/leading-coefficient information as the matching response, including the simplified polynomial when requested. Retain the original explanation.

Work with the variable w.

Consider $-4w^7 + 3w^4$-$w + 6$.

Your response: _____

Incoming: The leading coefficient is -2 and the degree is 8.

State the degree and leading coefficient, and identify the tempting but irrelevant large coefficient. Use all originally requested signed terms/classification or degree/leading-coefficient information as the matching response, including the simplified polynomial when requested. Retain the original explanation.

Work with the variable x.

Consider $x^{10} - 1000x^9 + 2$.

Your response: _____

Incoming: Degree 7, leading coefficient -4; vector $[-4, 0, 0, 3, 0, 0, -1, 6]$.

Use the nonzero-coefficient specification to write the leading term and determine the degree and leading coefficient.

Work with the variable n.

All other coefficients: 0

Power	Given coefficient
12	-2
5	700
0	-1

Your response: _____

Algebra 1

Classifying Polynomials

Name: _____ **Date:** _____ **Class:** _____

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.

Combine like powers before determining the degree and leading coefficient. Choose a simplification method before naming the degree: collect coefficients in a descending-power list/table, or combine visible like-power groups directly. Explain your choice for this expression, use it, and then determine the requested degree and leading coefficient from the surviving terms.

Work with the variable x.

Consider $5x^4 - 3x^2 + 7x - 5x^4$.

Which term becomes leading after simplification, and what degree follows? Choose a simplification method before naming the degree: collect coefficients in a descending-power list/table, or combine visible like-power groups directly. Explain your choice for this expression, use it, and then determine the requested degree and leading coefficient from the surviving terms.

Work with the variable y.

Consider $2y^6 + y^3 - 4 - 2y^6 + 7y$.

Classifying Polynomials

Full Worked Solutions - excerpt

Worked example

Problem. When q is the stated variable, is -13 a polynomial? State the exponent interpretation that applies.

Answer. Yes. It is the constant polynomial $-13q^0$.

Explanation and check.

A nonzero constant is a polynomial of degree 0 because it can be viewed as a coefficient times q^0.

Worked example

Problem. Is the displayed expression a polynomial in x? Support the decision with its exponent structure.

Work with the variable x.

Consider $7x^4 - 3x^2 + x - 9$.

Answer. Yes. Every exponent of x is a nonnegative integer.

Explanation and check.

The powers are $4, 2, 1$, and 0, so the expression meets the polynomial exponent condition.

Sets & Steps
Math Practice & Worked Solutions

Algebra 1

Adding and Subtracting Polynomials

Adding and Subtracting Polynomials | A1-U08-P02

96 problems · Four activity formats

Topic focus

This topic is a focused set of 96 practice tasks on Adding and Subtracting Polynomials.

8 PDFs and a README; 78 buyer pages.

The following pages use the same questions, given data, and notation as the final files. Question/card serial numbers and internal IDs are omitted in this preview only. Table values and matching responses are retained. Full answer keys are not included.

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Algebra 1

Adding and Subtracting Polynomials

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.

Verify the three upper-degree cancellations and give the lower-degree sum. Use the complete simplified polynomial as the matching response and retain the original work and sign requirements.

Variable	w
Addends	$w^{11} + 2w^{7}$-w, $-4w^{11} + w^{4} + 3$, $3w^{11} - 2w^{7}$-$w^{4} + 5w$

Bank label: _____

Create signed totals from power 9 down to power 0 and simplify the four-polynomial sum. Use the complete simplified polynomial as the matching response and retain the original work and sign requirements.

Variable	x
Addends	$3x^{9} - 2x^{6} + x^{2}$, $-5x^{9} + x^{7} + 4x^{6}$, $2x^{9}$-$x^{7} - 2x^{6} + 3x$, -$x^{2} + 8$

Bank label: _____

Use sixths to test both high-degree columns, then finish the lower-degree sum. Use the complete simplified polynomial as the matching response and retain the original work and sign requirements.

Variable	y
Addends	$(\frac{5}{6})y^{8} - (\frac{2}{3})y^{5} + y$, -$(\frac{1}{3})y^{8} + (\frac{7}{6})y^{5} - 2$, -$(\frac{1}{2})y^{8} - (\frac{1}{2})y^{5} - 3y + 5$

Bank label: _____

Interpret the three coefficient maps, combine matching powers, and write the polynomial they sum to. Use the complete simplified polynomial as the matching response and retain the original work and sign requirements.

Variable	z
Addends	(**Power 7** 4; **Power 3** −2; **Power 0** 1), (**Power 7** −1; **Power 5** 6; **Power 3** 5), (**Power 7** −3; **Power 5** −6; **Power 1** 2; **Power 0** −4)

Bank label: _____

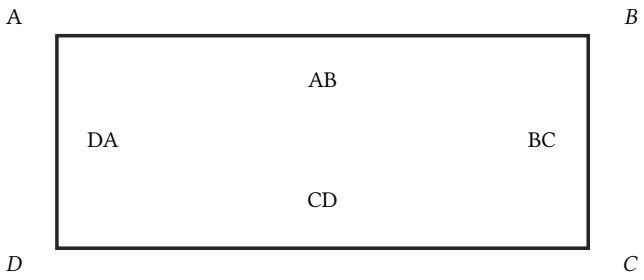
Algebra 1

Adding and Subtracting Polynomials

Name: _____ **Date:** _____ **Class:** _____

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.

The diagram lists every side of rectangle ABCD. Combine the four labels to express its perimeter.



Boundary order only; not drawn to scale. Exact labels are in the table.

Shape	rectangle ABCD
Boundary order	AB, BC, CD, DA
Segment labels	AB: $3x + 2$; BC: $x + 5$; CD: $3x + 2$; DA: $x + 5$
Included segments	AB, BC, CD, DA
Units	meters

Algebra 1

Adding and Subtracting Polynomials

Name: _____ **Date:** _____ **Class:** _____

Begin at START. Answer the card, then find the matching final answer at the top of another card. Use the recording sheet for your reasoning. Visit each card once and continue to FINISH.

Incoming: $-d + 6$.

Simplify the high powers and state the final standard form. Use the complete simplified polynomial as the matching response and retain the original work and sign requirements.

Variable	u
Addends	$u^6 - 2u^3 + u$, $4u^3 - 5$, $-u^6 - 2u^3 + 3u + 1$

Your response: _____

Incoming: $5m^2+2m+5$.

Add without inserting unnecessary zero terms in the final standard form. Use the complete simplified polynomial as the matching response and retain the original work and sign requirements.

Variable	p
Addends	$p^{10} + p$, $-4p^7 + 2$, $3p^7 - 5p + 6$

Your response: _____

Incoming: $3v^6 - 2v^2 + 7$.

Align the missing columns and write the total in standard form. Use the complete simplified polynomial as the matching response and retain the original work and sign requirements.

Variable	x
Addends	$x^3 - 4x + 9$, $-2x^2 + 7x - 1$, $5x^2 - 3$

Your response: _____

Incoming: 2s-7.

Add the decimal coefficient pairs and express whole-number totals simply. Use the complete simplified polynomial as the matching response and retain the original work and sign requirements.

Variable	t
Addends	$0.75t^4 - 0.5t + 2$, $0.25t^4 + 1.5t - 6$

Your response: _____

START

Combine the rational cubic coefficients and simplify every other column. Use the complete simplified polynomial as the matching response and retain the original work and sign requirements.

Variable	z
Addends	$(\frac{1}{2})z^3 - 2z$, $(\frac{3}{4})z^3 + 5z - 1$

Your response: _____

Incoming: $(\frac{1}{2})r^5$-$r^2 + 5$.

Simplify the seventh-, fifth-, first-, and zero-power columns in turn. Use the complete simplified polynomial as the matching response and retain the original work and sign requirements.

Variable	s
Addends	$s^7 - 3s+2$, $-2s^7+s^5 + s$, s^7-$s^5 + 4s$-9

Your response: _____

Algebra 1

Adding and Subtracting Polynomials

Name: _____ **Date:** _____ **Class:** _____

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.

Add the two polynomials by matching equal powers. Choose an organization method: align equal powers in coefficient columns, or collect matching signed terms horizontally. Explain why your choice fits these polynomials, use it, and keep every missing-power position and sign correct.

Variable	x
Addends	$3x^2 + 2x - 5$, $4x^2$-$x + 7$

Find the standard-form sum of the displayed binomials. Choose an organization method: align equal powers in coefficient columns, or collect matching signed terms horizontally. Explain why your choice fits these polynomials, use it, and keep every missing-power position and sign correct.

Variable	y
Addends	$5y^3 - 2$, $-2y^3 + 6$

Adding and Subtracting Polynomials

Full Worked Solutions - excerpt

Worked example

Problem. Verify the three upper-degree cancellations and give the lower-degree sum. Use the complete simplified polynomial as the matching response and retain the original work and sign requirements.

Variable	w
Addends	$w^{11} + 2w^{7}\text{-}w$, $-4w^{11} + w^{4} + 3$, $3w^{11} - 2w^{7}\text{-}w^{4} + 5w$

Answer. $4w + 3$.

Explanation and check.

Powers $11, 7$, and 4 all total zero; $\text{-}\,w + 5w = 4w$ and the constant is 3.

Worked example

Problem. Add each represented degree and report the sparse remainder. Use the complete simplified polynomial as the matching response and retain the original work and sign requirements.

Variable	d
Addends	$5d^{8}\text{-}d^{5} + 2d^{2}$, $-2d^{8} + 4d^{5}\text{-}d$, $-3d^{8} - 3d^{5} - 2d^{2} + 6$

Answer. $\text{-}\,d + 6$.

Explanation and check.

Powers $8, 5$, and 2 each total zero; the unmatched lower terms are $\text{-}\,d$ and 6.

Sets & Steps
Math Practice & Worked Solutions

Algebra 1

Multiplying Monomials

Multiplying Monomials | A1-U08-P03

96 problems · Four activity formats

Topic focus

This topic is a focused set of 96 practice tasks on Multiplying Monomials.

8 PDFs and a README; 79 buyer pages.

The following pages use the same questions, given data, and notation as the final files. Question/card serial numbers and internal IDs are omitted in this preview only. Table values and matching responses are retained. Full answer keys are not included.

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Algebra 1

Multiplying Monomials

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.

Resolve the zero exponent and the two coefficient signs before combining powers. Use the complete simplified monomial as the matching response and retain the original coefficient, sign and exponent justification.

Factors	$-6m^2n^0p^3$, $-5mn^4p$

Bank label: _____

Determine the sign and simplify the three exponent sums. Use the complete simplified monomial as the matching response and retain the original coefficient, sign and exponent justification.

Factors	$9q^2r^5s$, $-(\frac{1}{3})q^3rs^2$

Bank label: _____

Use the decimal coefficient exactly and merge the shared variable factors. Use the complete simplified monomial as the matching response and retain the original coefficient, sign and exponent justification.

Factors	$-12x^4y$, $-0.25x^2y^2$

Bank label: _____

Reduce the signed rational coefficient and simplify both powers. Use the complete simplified monomial as the matching response and retain the original coefficient, sign and exponent justification.

Factors	$(\frac{5}{8})a^3b^4$, $-(\frac{16}{15})ab^2$

Bank label: _____

Keep the coefficient in decimal form and combine the variables. Use the complete simplified monomial as the matching response and retain the original coefficient, sign and exponent justification.

Factors	$0.6c^2d^3$, $-1.5c^5d$

Bank label: _____

Combine the repeated bases and retain the new w factor. Use the complete simplified monomial as the matching response and retain the original coefficient, sign and exponent justification.

Factors	$7uv^6$, $-2u^3v^2w^4$

Bank label: _____

Reduce the coefficient before reporting the three-variable product. Use the complete simplified monomial as the matching response and retain the original coefficient, sign and exponent justification.

Factors	$-10g^2h^3k$, $(\frac{3}{5})gh^2k^4$

Bank label: _____

Show the rational reduction and high-power consolidation in the product. Use the complete simplified monomial as the matching response and retain the original coefficient, sign and exponent justification.

Factors	$-(\frac{3}{8})x^7y^2$, $-(\frac{16}{9})x^3y^5$

Bank label: _____

Algebra 1

Multiplying Monomials

Name: _____ **Date:** _____ **Class:** _____

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.

Decide whether exponent work is needed before giving the product.

Factors	$0z^{7}w^{2}$, $-3zw$

Find the product and state why adding the displayed exponents does not give its degree.

Factors	$0m^{6}n$, $-17m^{2}n^{8}$

Compute the exact monomial product and its total degree.

Factors	$(\frac{7}{12})s^{4}t^{3}$, $-(\frac{18}{35})s^{2}t^{5}u$

First simplify the monomial product; then evaluate it at $x = -1$ and $y = 2$.

Factors	$-3x^{4}y$, $2x^{2}y^{3}$
Evaluation	x = -1 y = 2

After applying the given parameter value, decide which part of the four-factor product controls the result.

Factors	$-5z^{2}w$, cz^{3}, $7w^{5}$, $-z$
Parameter value	c = 0

Simplify the five factors and report the total degree of the resulting monomial.

Factors	$2x^{2}y$, $-3xy^{2}$, $(\frac{1}{2})z^{3}$, $-4xz$, y

Algebra 1

Multiplying Monomials

Name: _____ **Date:** _____ **Class:** _____

Begin at START. Answer the card, then find the matching final answer at the top of another card. Use the recording sheet for your reasoning. Visit each card once and continue to FINISH.

Incoming: $-14r^4s^4$.

Interpret the unit coefficient and zero power, then simplify the product. Use the complete simplified monomial as the matching response and retain the original coefficient, sign and exponent justification.

Factors	$-x^5y^2$, $6x^0y^3$

Your response: _____

Incoming: $6c^7d^3$.

Cancel within the numerical product, then combine the literal factors. Use the complete simplified monomial as the matching response and retain the original coefficient, sign and exponent justification.

Factors	$14k^2l$, $(\frac{3}{7})kl^4$

Your response: _____

Incoming: $-15a^3b^5c^4$.

Determine the positive product created by the two signed factors. Use the complete simplified monomial as the matching response and retain the original coefficient, sign and exponent justification.

Factors	$-4mn^3p^2$, $-2m^4np$

Your response: _____

Incoming: $2p^3q^6$.

Give the exact product without a decimal coefficient. Use the complete simplified monomial as the matching response and retain the original coefficient, sign and exponent justification.

Factors	$-(\frac{2}{3})r^3s^2$, $9rs$

Your response: _____

START

Multiply the two monomials and write one simplified term. Use the complete simplified monomial as the matching response and retain the original coefficient, sign and exponent justification.

Factors	$3x$, $4y$

Your response: _____

Incoming: $10cd^2$.

Multiply and combine each repeated variable base. Use the complete simplified monomial as the matching response and retain the original coefficient, sign and exponent justification.

Factors	$4x^2y$, $3xy^3$

Your response: _____

Algebra 1

Multiplying Monomials

Name: _____ **Date:** _____ **Class:** _____

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.

Multiply the three factors and collect matching variables. Choose an organization route: multiply the signed coefficients and collect each variable group separately, or multiply the monomial factors successively. Explain why the route is useful for these factors, use it, and preserve every exponent and sign.

Factors	$2x$, $3y$, $4xy$

Use the number of negative factors to determine the sign, then simplify. Choose an organization route: multiply the signed coefficients and collect each variable group separately, or multiply the monomial factors successively. Explain why the route is useful for these factors, use it, and preserve every exponent and sign.

Factors	$-a^2$, $5ab$, $-2b^3$

Group coefficient, m, and n factors before multiplying. Choose an organization route: multiply the signed coefficients and collect each variable group separately, or multiply the monomial factors successively. Explain why the route is useful for these factors, use it, and preserve every exponent and sign.

Factors	$3m^2n$, $-2mn^3$, 5m

Simplify and explain why the final sign is negative. Choose an organization route: multiply the signed coefficients and collect each variable group separately, or multiply the monomial factors successively. Explain why the route is useful for these factors, use it, and preserve every exponent and sign.

Factors	$-4p$, $-q^2$, $-3pq$

Multiplying Monomials

Full Worked Solutions - excerpt

Worked example

Problem. Decide whether exponent work is needed before giving the product.

Factors	$0z^7w^2$, $-3zw$

Answer. The product is zero.

Explanation and check.

A coefficient of zero makes the first factor zero. The zero-product property settles the result before any exponents are combined.

Worked example

Problem. Write the signed product as a single monomial.

Factors	$7pq$, $-q$

Answer. $-7pq^2$.

Explanation and check.

The coefficient becomes -7. The two q factors combine to q^2, while p appears once.

Sets & Steps
Math Practice & Worked Solutions

Algebra 1

Monomial Times Polynomial

Monomial Times Polynomial | A1-U08-P04

96 problems · Four activity formats

Topic focus

This topic is a focused set of 96 practice tasks on Monomial Times Polynomial.

8 PDFs and a README; 68 buyer pages.

The following pages use the same questions, given data, and notation as the final files. Question/card serial numbers and internal IDs are omitted in this preview only. Table values and matching responses are retained. Full answer keys are not included.

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Algebra 1

Monomial Times Polynomial

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.

Form three exact products while keeping c and d exponent sums separate. Use the complete expanded and simplified polynomial as the matching response, retaining the original distribution order and sign requirements.

Expression	$7c^2d(-2c^3 + 3cd\text{-}d^2)$

Bank label: _____

Apply the same r^2s^3 factor to every inside term. Use the complete expanded and simplified polynomial as the matching response, retaining the original distribution order and sign requirements.

Expression	$3r^2s^3(2rs - 5s^2 + 4)$

Bank label: _____

Expand, taking special care with the negative middle term. Use the complete expanded and simplified polynomial as the matching response, retaining the original distribution order and sign requirements.

Expression	$-2x^2y(3xy^2 - 4x^2 + y^3)$

Bank label: _____

Multiply the outside monomial by the two variable terms and the constant. Use the complete expanded and simplified polynomial as the matching response, retaining the original distribution order and sign requirements.

Expression	$4ab^3(-a^2b + 2ab^2 - 3)$

Bank label: _____

Distribute $-8r^2$s and simplify both fractional coefficient products. Use the complete expanded and simplified polynomial as the matching response, retaining the original distribution order and sign requirements.

Expression	$-8r^2s((\frac{1}{4})r^3s^2 - (\frac{1}{2})rs + 3)$

Bank label: _____

Multiply each decimal coefficient and preserve the c-d exponent pattern. Use the complete expanded and simplified polynomial as the matching response, retaining the original distribution order and sign requirements.

Expression	$2.5cd^2(4c^2 - 1.2cd + 0.8d^2)$

Bank label: _____

Track four sign interactions produced by the negative outside factor. Use the complete expanded and simplified polynomial as the matching response, retaining the original distribution order and sign requirements.

Expression	$-7mn^2(-2\text{m}^3+3mn - 5n^2 + 1)$

Bank label: _____

Produce one exact product for each of the four sparse terms. Use the complete expanded and simplified polynomial as the matching response, retaining the original distribution order and sign requirements.

Expression	$2p^2q^3(3p^4 - 2p^2q + q^2 - 6)$

Bank label: _____

Algebra 1

Monomial Times Polynomial

Name: _____ **Date:** _____ **Class:** _____

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.

A one-row product table has row factor $3x$. Fill the missing cell under the column term $-x$.

×	$2x^2$	$-x$	4
$3x$	$6x^3$	_____	$12x$

The diagram sends the common factor $-2a^2$ to each of three column terms. What belongs in the branch ending at b?

×	$3a$	-4	b
$-2a^2$	$-6a^3$	$8a^2$	_____

Use the labeled row factor and the middle product cell to recover the missing column term.

×	2m^2	?	4
5m	10m^3	-15m^2	20m

Exactly one cell in the row does not equal its row factor times column term. Identify and repair it.

×	$2p$	-3	q
$4p^2$	$8p^3$	$-12p$	$4p^2q$

Algebra 1

Monomial Times Polynomial

Name: _____ **Date:** _____ **Class:** _____

Begin at START. Answer the card, then find the matching final answer at the top of another card. Use the recording sheet for your reasoning. Visit each card once and continue to FINISH.

Incoming: $-6t^5 - 2.4t^3 + 12t$.

Reduce the denominator 5 against each coefficient and combine powers. Use the complete expanded and simplified polynomial as the matching response, retaining the original distribution order and sign requirements.

Expression	$(\frac{3}{5})p^2q(10p^3 - 5pq^2 + 15q)$

Your response: _____

Incoming: $-5x^6 + 2x^4\text{-}x^3 + 9x^2$.

Scale the three coefficients by 1.5 and combine matching bases. Use the complete expanded and simplified polynomial as the matching response, retaining the original distribution order and sign requirements.

Expression	$1.5pq^2(2p^3 - 4pq + 6q^2)$

Your response: _____

Incoming: $6\text{m}^7\text{-}12\text{m}^5\text{+}3\text{m}^3\text{-}18\text{m}^2$.

State the expanded result and explain what happens to the four distinct terms. Use the complete expanded and simplified polynomial as the matching response, retaining the original distribution order and sign requirements.

Expression	$0(7x^6 - 3x^2y + 5y^4 - 11)$

Your response: _____

Incoming: $-1.5y^2 + y$.

Expand the three groups separately and then total each degree column. Use the complete expanded and simplified polynomial as the matching response, retaining the original distribution order and sign requirements.

Expression	$2t(t^2\text{-}t + 3) + 3t(-t^2 + 2t - 1) - t(t^2 + 4)$

Your response: _____

Incoming: $3y^5 - 2y^3 + 4y^2$.

Multiply the decimal factor across the sparse polynomial. Use the complete expanded and simplified polynomial as the matching response, retaining the original distribution order and sign requirements.

Expression	$-1.2t(5t^4 + 2t^2 - 10)$

Your response: _____

Incoming: $-2t^3 + 4t^2\text{-}t$.

After distributing, determine the single term left by cancellation. Use the complete expanded and simplified polynomial as the matching response, retaining the original distribution order and sign requirements.

Expression	$4c(c^2\text{-}d) + 2c(-2c^2 + 3d)$

Your response: _____

Algebra 1

Monomial Times Polynomial

Name: _____ **Date:** _____ **Class:** _____

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.

Distribute the monomial to both terms. Choose a distribution organization: use a one-row partial-product table, or connect the outside monomial to each signed term directly in order. Explain your choice, use it, and retain every original sign and requested term order.

Expression	$2x(x + 3)$

Apply the outside factor to the variable term and the constant. Choose a distribution organization: use a one-row partial-product table, or connect the outside monomial to each signed term directly in order. Explain your choice, use it, and retain every original sign and requested term order.

Expression	$3a(a - 4)$

Track the negative multiplier across the entire binomial. Choose a distribution organization: use a one-row partial-product table, or connect the outside monomial to each signed term directly in order. Explain your choice, use it, and retain every original sign and requested term order.

Expression	$-2m(m + 5)$

Find both partial products and give the expanded polynomial. Choose a distribution organization: use a one-row partial-product table, or connect the outside monomial to each signed term directly in order. Explain your choice, use it, and retain every original sign and requested term order.

Expression	$4p(2p + 1)$

Monomial Times Polynomial

Full Worked Solutions - excerpt

Worked example

Problem. Expand the product and verify whether every resulting term has the same total degree.

Expression	$5a^2b(-2a^3b^2 + 3ab^4 - 4b^5)$

Answer. $-10a^5b^3 + 15a^3b^5 - 20a^2b^6$; every term has total degree 8.

Explanation and check.

Distribution gives the three monomials shown. Their exponent sums are $5 + 3, 3 + 5$, and $2 + 6$, each equal to 8.

Worked example

Problem. State the expanded result and explain what happens to the four distinct terms. Use the complete expanded and simplified polynomial as the matching response, retaining the original distribution order and sign requirements.

Expression	$0(7x^6 - 3x^2y + 5y^4 - 11)$

Answer. 0.

Explanation and check.

Every partial product has factor 0, so all four terms become 0 and their sum is the zero polynomial.

Sets & Steps
Math Practice & Worked Solutions

Algebra 1

Multiplying Binomials and Larger Polynomials

Multiplying Binomials and Larger Polynomials | A1-U08-P05

96 problems · Four activity formats

Topic focus

This topic is a focused set of 96 practice tasks on Multiplying Binomials and Larger Polynomials.

8 PDFs and a README; 56 buyer pages.

The following pages use the same questions, given data, and notation as the final files. Question/card serial numbers and internal IDs are omitted in this preview only. Table values and matching responses are retained. Full answer keys are not included.

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Algebra 1

Multiplying Binomials and Larger Polynomials

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 all four term pairs and keep unlike x-y monomials separate. Use the complete expanded polynomial as the matching response and preserve every originally required partial product and explanation. Expression: $(2x - 1)(x^2 + 3y)$ Bank label: _____	Expand the four products and do not merge terms with different total degrees. Use the complete expanded polynomial as the matching response and preserve every originally required partial product and explanation. Expression: $(3a + 2b^2)(a\text{-}b)$ Bank label: _____
Generate every row-column pairing and order the resulting monomials by total degree. Use the complete expanded polynomial as the matching response and preserve every originally required partial product and explanation. Expression: $(m^2 - 3n)(2m + n^2)$ Bank label: _____	Expand the product, tracking the negative quadratic term through both columns. Use the complete expanded polynomial as the matching response and preserve every originally required partial product and explanation. Expression: $(-2p^2 + q)(p + 4q^2)$ Bank label: _____
Multiply all four term pairs and retain both rs and rs^2 as distinct terms. Use the complete expanded polynomial as the matching response and preserve every originally required partial product and explanation. Expression: $(5r - 2s^2)(-r + 3s)$ Bank label: _____	Create the complete four-product expansion for the two high-degree binomials. Use the complete expanded polynomial as the matching response and preserve every originally required partial product and explanation. Expression: $(x^3 + 2y)(2x^2 - 3y^2)$ Bank label: _____
Expand the product and explain which two partial products create the quadratic coefficient. Use the complete expanded polynomial as the matching response and preserve every originally required partial product and explanation. Expression: $(-3x^2 + 2x)(4x - 5)$ Bank label: _____	Expand and order the four monomials by total degree, breaking ties by the exponent of a. Use the complete expanded polynomial as the matching response and preserve every originally required partial product and explanation. Expression: $(2a^3 - 3b)(-a^2 + 4b^2)$ Bank label: _____

Algebra 1

Multiplying Binomials and Larger Polynomials

Name: _____ **Date:** _____ **Class:** _____

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.

Expand the product and report how the two *mn* contributions determine the final mixed coefficient.

Expression: $(3m + 2n)(2m - 3n)$

Expand the product first, then evaluate the resulting polynomial at $r = -2$.

Expression: $(2r^2 - 3)(r + 4)$ Evaluation: $r = -2$

Write the four-term expansion, then use it to find the value at $x = 1$ and $y = -1$.

Expression: $(x^2 - 2y)(3x + 4y^2)$ Evaluation: $x = 1$; $y = -1$

Fill the lower-right product cell, then add all four cells to form the final polynomial.

×	x	3
x	x^2	$3x$
2	$2x$	_____

Complete the branch from row term $2a$ to column term 4, then combine the grid.

×	**a**	4
$2a$	$2a^2$	_____
-1	-a	-4

Use both cells in the first row to recover its term label, then write the collected product.

×	m	2
_____	m^2	2m
-3	-3m	-6

Algebra 1

Multiplying Binomials and Larger Polynomials

Name: _____ **Date:** _____ **Class:** _____

Begin at START. Answer the card, then find the matching final answer at the top of another card. Use the recording sheet for your reasoning. Visit each card once and continue to FINISH.

Incoming: $3x^2 + 5xy - 2y^2$.

Expand and group terms by a^2, ab, and b^2. Use the complete expanded polynomial as the matching response and preserve every originally required partial product and explanation.

Expression: $(2a\text{-}b)(a + 4b)$

Your response: _____

Incoming: $2r^3 - 7r^2 - 15r$.

Multiply all x-y term pairs and combine the xy products. Use the complete expanded polynomial as the matching response and preserve every originally required partial product and explanation.

Expression: $(x + 2y)(3x\text{-}y)$

Your response: _____

Incoming: $8\text{m}^2\text{-}10\text{m}\text{-}3$.

Track the negative leading coefficient through both terms of the second factor. Use the complete expanded polynomial as the matching response and preserve every originally required partial product and explanation.

Expression: $(-2r + 3)(r + 7)$

Your response: _____

Incoming: $3\text{m}^3\text{+}5\text{m}^2\text{-}2\text{m}$.

Create the four products and combine the two quadratic terms. Use the complete expanded polynomial as the matching response and preserve every originally required partial product and explanation.

Expression: $(2r^2 + 3r)(r - 5)$

Your response: _____

Incoming: $3a^3 + a^2b - 6ab - 2b^2$.

Keep the linear coefficient exact while combining the two cross products. Use the complete expanded polynomial as the matching response and preserve every originally required partial product and explanation.

Expression: $((\frac{1}{2})x + 3)(4x - 5)$

Your response: _____

Incoming: $2x^2 + 13x + 15$.

Multiply all term pairs and collect the linear contributions. Use the complete expanded polynomial as the matching response and preserve every originally required partial product and explanation.

Expression: $(4m + 1)(2m - 3)$

Your response: _____

Algebra 1

Multiplying Binomials and Larger Polynomials

Name: _____ **Date:** _____ **Class:** _____

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.

Expand exactly and verify that the quadratic contributions cancel despite unequal coefficients.

Expression: $(3a - 4)(2a^2 + (\frac{8}{3})a - 5)$

Expand the product, then verify from the standard form that $x = 1$ makes its value zero.

Expression: $(x + 1)(2x^2 - 5x + 3)$ Check Value: $x = 1$

Choose a so the expanded product has no x^2 term, then give the complete resulting polynomial.

Expression: $(2x + a)(3x^2 - 4x + 5)$

Choose an initial pair, record its quadratic product, and then expand by the remaining factor. Explain why your chosen initial pair is useful for keeping the intermediate terms organized, then retain the original requirement to record that intermediate product and multiply by the remaining factor.

Expression: $(x + 1)(x + 2)(x + 3)$

Multiplying Binomials and Larger Polynomials

Full Worked Solutions - excerpt

Worked example

Problem. Form the linear-pair quadratic, multiply by the sparse third factor, and order by descending x exponent.

Expression: $(x - y)(x + 2y)(x^2 + y^2)$

Answer. $x^4 + x^3y - x^2y^2 + xy^3 - 2y^4$.

Explanation and check.

The linear pair is $x^2 + xy - 2y^2$. Multiplication by $x^2 + y^2$ yields the five-term result after the x^2y^2 contributions combine.

Worked example

Problem. Multiply two bivariate factors, then distribute the third and collect degree-three exponent pairs.

Expression: $(x + y)(x + 2y)(2x - y)$

Answer. $2x^3 + 5x^2y + xy^2 - 2y^3$.

Explanation and check.

The first pair is $x^2 + 3xy + 2y^2$. Multiplying by $2x - y$ and collecting gives the homogeneous cubic.

Sets & Steps
Math Practice & Worked Solutions

Algebra 1

Special Binomial Products

Special Binomial Products | A1-U08-P06

96 problems · Four activity formats

Topic focus

This topic is a focused set of 96 practice tasks on Special Binomial Products.

8 PDFs and a README; 50 buyer pages.

The following pages use the same questions, given data, and notation as the final files. Question/card serial numbers and internal IDs are omitted in this preview only. Table values and matching responses are retained. Full answer keys are not included.

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Algebra 1

Special Binomial Products

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.

Determine the square when both degree-three monomial terms are negative. Use the complete expanded polynomial as the matching response and retain the original identity explanation, including any cross term or cancellation. Expression: $(-2a^2b - 3bc^2)^2$ Bank label: _____	Square each bivariate monomial and calculate their cross term. Use the complete expanded polynomial as the matching response and retain the original identity explanation, including any cross term or cancellation. Expression: $(m^2n + 2mn^2)^2$ Bank label: _____
Square the two full monomial terms and combine their exponents correctly. Use the complete expanded polynomial as the matching response and retain the original identity explanation, including any cross term or cancellation. Expression: $(2p^2q - 5pq^2)^2$ Bank label: _____	Expand the square of the bilinear monomial and constant. Use the complete expanded polynomial as the matching response and retain the original identity explanation, including any cross term or cancellation. Expression: $(4mn + 5)^2$ Bank label: _____
Turn the given square into a collected polynomial. Use the complete expanded polynomial as the matching response and retain the original identity explanation, including any cross term or cancellation. Expression: $(7a^2b - 2)^2$ Bank label: _____	Expand without factoring away the requested square structure. Use the complete expanded polynomial as the matching response and retain the original identity explanation, including any cross term or cancellation. Expression: $(5uv^2 + 2u^2)^2$ Bank label: _____
Expand the square before distributing the negative outer multiplier. Use the complete expanded polynomial as the matching response and retain the original identity explanation, including any cross term or cancellation. Expression: $-2(2y + 3)^2$ Bank label: _____	Treat $y - 2$ as the second whole term, apply the square identity, and then remove the remaining parentheses. Use the complete expanded polynomial as the matching response and retain the original identity explanation, including any cross term or cancellation. Expression: $(x + (y - 2))^2$ Bank label: _____

Algebra 1

Special Binomial Products

Name: _____ **Date:** _____ **Class:** _____

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.

Expand the square and verify that every resulting term has the same total degree. Expression: $(x^2 + 2xy)^2$	Give the exact product of the fractional conjugates. Expression: $((\frac{1}{2})x + 4)((\frac{1}{2})x - 4)$
Simplify the product with rational leading coefficient. Expression: $((\frac{2}{3})y - 3)((\frac{2}{3})y + 3)$	Treat ab as the common monomial and calculate the product. Expression: $(ab + 5)(ab - 5)$
Find the two monomials that survive this three-variable product. Expression: $(2xy - 3z)(2xy + 3z)$	Apply the identity to the two full bivariate monomials. Expression: $(m^2n + 2mn^2)(m^2n - 2mn^2)$

Algebra 1

Special Binomial Products

Name: _____ **Date:** _____ **Class:** _____

Begin at START. Answer the card, then find the matching final answer at the top of another card. Use the recording sheet for your reasoning. Visit each card once and continue to FINISH.

Incoming: $9y^4 - 6y^2z^3 + z^6$.

Find the exact difference of monomial squares in this product.

Expression: $(a^2b^3 + bc)(a^2b^3 - bc)$

Your response: _____

START

Expand the square and include its doubled cross term. Use the complete expanded polynomial as the matching response and retain the original identity explanation, including any cross term or cancellation.

Expression: $(x + 3)^2$

Your response: _____

Incoming: $x^2 + 6x + 9$.

Write this squared difference as a trinomial. Use the complete expanded polynomial as the matching response and retain the original identity explanation, including any cross term or cancellation.

Expression: $(y - 5)^2$

Your response: _____

Incoming: $25a^2 + 10ab + b^2$.

Convert the square into a homogeneous quadratic in m and n. Use the complete expanded polynomial as the matching response and retain the original identity explanation, including any cross term or cancellation.

Expression: $(2m - 7n)^2$

Your response: _____

Incoming: $m^2 + 8mn + 16n^2$.

Find the exact coefficients in the bivariate trinomial. Use the complete expanded polynomial as the matching response and retain the original identity explanation, including any cross term or cancellation.

Expression: $(\frac{1}{4})x - 2y)^2$

Your response: _____

Incoming: $36a^2 + 4ab + (\frac{1}{9})b^2$.

Expand and order the result by descending degree in x. Use the complete expanded polynomial as the matching response and retain the original identity explanation, including any cross term or cancellation.

Expression: $(2 - x^2)^2$

Your response: _____

Algebra 1

Special Binomial Products

Name: _____ **Date:** _____ **Class:** _____

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.

Which listed method matches the expression's factor structure?

Expression: $(z + 8)^2$

binomial square

conjugate product

general distribution

Select the special-product pattern shown by these factors.

Expression: $(w + 10)(w - 10)$

binomial square

conjugate product

general distribution

Decide whether a special identity applies or ordinary distribution is required.

Expression: $(a + 2)(a + 5)$

binomial square

conjugate product

general distribution

Explain whether the opposite-looking constants justify a conjugate shortcut.

Expression: $(x + 5)(x - 4)$

Special Binomial Products

Full Worked Solutions - excerpt

Worked example

Problem. Find the exact difference of monomial squares in this product.

Expression: $(a^2b^3 + bc)(a^2b^3 - bc)$

Answer. a^4b^6 - b^2c^2 .

Explanation and check.

Squaring the common term gives a^4b^6 and squaring the opposite term gives b^2c^2 .

Worked example

Problem. Explain whether the opposite-looking constants justify a conjugate shortcut.

Expression: $(x + 5)(x - 4)$

Answer. No; use general distribution.

Explanation and check.

Conjugates require exactly $+V$ and $-V$. Here $+5$ and -4 have different magnitudes, so their cross terms do not cancel.

Sets & Steps
Math Practice & Worked Solutions

Algebra 1

Greatest Common Factor of Polynomials

Greatest Common Factor of Polynomials | A1-U08-P07

96 problems · Four activity formats

Topic focus

This topic is a focused set of 96 practice tasks on Greatest Common Factor of Polynomials.

8 PDFs and a README; 63 buyer pages.

The following pages use the same questions, given data, and notation as the final files. Question/card serial numbers and internal IDs are omitted in this preview only. Table values and matching responses are retained. Full answer keys are not included.

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Algebra 1

Greatest Common Factor of Polynomials

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.

Ignore signs for divisibility, then combine the numerical gcd with the exponent minima. Use the complete requested greatest monomial or GCF factorization as the matching response. Retain any prescribed negative outside factor and the original verification. Terms: $-54p^5q^3, 72p^3q^5, -90p^4q^4, 126p^6q^2$ Convention: positive GCF Bank label: _____	Find the greatest common monomial across all four high-degree terms. Use the complete requested greatest monomial or GCF factorization as the matching response. Retain any prescribed negative outside factor and the original verification. Terms: $64x^6y^2, 96x^4y^5, 160x^5y^3, 224x^7y^4$ Bank label: _____
Determine the GCF and map each variable minimum to its controlling term. Use the complete requested greatest monomial or GCF factorization as the matching response. Retain any prescribed negative outside factor and the original verification. Terms: $81a^5b^4c^2, 108a^3b^6c, 135a^4b^5c^3$ Bank label: _____	Use variable presence as well as exponents to find the GCF. Use the complete requested greatest monomial or GCF factorization as the matching response. Retain any prescribed negative outside factor and the original verification. Terms: $10m^3n^2, 14m^2p^3, 22m^4np$ Bank label: _____
Find the coordinatewise exponent minima rather than following list order. Use the complete requested greatest monomial or GCF factorization as the matching response. Retain any prescribed negative outside factor and the original verification. Terms: $44x^3y^5, 66x^5y^2, 110x^4y^3, 154x^2y^4$ Bank label: _____	Compute the greatest common monomial in r, s, and t. Use the complete requested greatest monomial or GCF factorization as the matching response. Retain any prescribed negative outside factor and the original verification. Terms: $50r^6s^3t^2, 75r^4s^5t, 125r^5s^4t^3$ Bank label: _____
Find the GCF, then mentally check that all three quotients are monomials with no further common factor. Use the complete requested greatest monomial or GCF factorization as the matching response. Retain any prescribed negative outside factor and the original verification. Terms: $72a^4b^2c^3, 120a^3b^5c^2, 168a^6b^3c$ Bank label: _____	Factor out the greatest common factor. Use the complete requested greatest monomial or GCF factorization as the matching response. Retain any prescribed negative outside factor and the original verification. Polynomial: $6x + 12$ Bank label: _____

Algebra 1

Greatest Common Factor of Polynomials

Name: _____ **Date:** _____ **Class:** _____

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.

Find the GCF and identify the term that prevents y from appearing in it. Terms: $26x^2y, 39xy^2, 65x^3$	Determine the GCF and explain the effect of the missing z. Terms: $42m^3n^2z, 70m^2n^4, 98m^5n^3z^2$
Factor completely with respect to the GCF and identify the constant quotient. Polynomial: $28a^2b + 42ab^2 + 70ab$	Extract the positive GCF from four signed terms and test the residual's common factor. Polynomial: $-72x^5y^3 + 96x^3y^5 - 120x^4y^2 + 168x^6y^4$
Factor the polynomial and explain why c cannot enter the GCF. Polynomial: $30a^3b^2c + 42a^2b^4 + 66a^4b^3c^2$	Extract the greatest variable factor even though the coefficients share no larger integer. Polynomial: $35m^4n^3 - 22m^2n^5 + 13m^3n^2$

Algebra 1

Greatest Common Factor of Polynomials

Name: _____ **Date:** _____ **Class:** _____

Begin at START. Answer the card, then find the matching final answer at the top of another card. Use the recording sheet for your reasoning. Visit each card once and continue to FINISH.

Incoming: $15u^3v^2$.

Determine the greatest monomial when separate terms set the c and d minima. Use the complete requested greatest monomial or GCF factorization as the matching response. Retain any prescribed negative outside factor and the original verification.

Terms: $34c^2d^3, 51c^4d, 85c^3d^2$

Your response: _____

Incoming: $27m^2n^2(2m^2n - 3n^3 + 5\text{m})$.

Factor out the GCF and confirm the residual terms have no universal variable. Use the complete requested greatest monomial or GCF factorization as the matching response. Retain any prescribed negative outside factor and the original verification.

Polynomial: $34p^3q^2 + 51p^2q^4 - 85p^4q$

Your response: _____

Incoming: x.

State the GCF, treating the absent y as exponent zero. Use the complete requested greatest monomial or GCF factorization as the matching response. Retain any prescribed negative outside factor and the original verification.

Terms: $12x^2y, 18x^3, 30x$

Your response: _____

Incoming: a^2b^2.

Extract the greatest monomial and preserve the displayed term order. Use the complete requested greatest monomial or GCF factorization as the matching response. Retain any prescribed negative outside factor and the original verification.

Polynomial: $33a^5 + 55a^3 - 77a^4$

Your response: _____

START

Determine the GCF when different terms control the a and b minima. Use the complete requested greatest monomial or GCF factorization as the matching response. Retain any prescribed negative outside factor and the original verification.

Terms: $20a^2b, 30ab^2$

Your response: _____

Incoming: $12p^2$.

Identify which term controls each variable exponent and give the GCF. Use the complete requested greatest monomial or GCF factorization as the matching response. Retain any prescribed negative outside factor and the original verification.

Terms: $25a^3b^2, 35a^2b^3, 45a^4b$

Your response: _____

Algebra 1

Greatest Common Factor of Polynomials

Name: _____ **Date:** _____ **Class:** _____

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.

Find the greatest common monomial factor of the two terms. Choose a coefficient method: compare common divisors directly, or use prime factorizations. Explain why the chosen method fits these coefficients, then combine that result with the smallest shared exponent of each variable to give the greatest common monomial.

Terms: $6x$, 9

Determine the largest monomial dividing both entries. Choose a coefficient method: compare common divisors directly, or use prime factorizations. Explain why the chosen method fits these coefficients, then combine that result with the smallest shared exponent of each variable to give the greatest common monomial.

Terms: $8y$, 12

Give the numerical and variable parts of the GCF together. Choose a coefficient method: compare common divisors directly, or use prime factorizations. Explain why the chosen method fits these coefficients, then combine that result with the smallest shared exponent of each variable to give the greatest common monomial.

Terms: $10a$, $15a$

Find the GCF, using the smaller exponent on m. Choose a coefficient method: compare common divisors directly, or use prime factorizations. Explain why the chosen method fits these coefficients, then combine that result with the smallest shared exponent of each variable to give the greatest common monomial.

Terms: $14\ \text{m}^2$, $21\ \text{m}$

Greatest Common Factor of Polynomials

Full Worked Solutions - excerpt

Worked example

Problem. Explain why the work is not finished and give the GCF form.

Student work to audit: $12x^2 + 18x = 3x(4x + 6)$

Answer. The residual still shares 2; the complete form is $6x(2x + 3)$.

Explanation and check.

The proposed equality is valid, but moving the residual factor 2 outside changes $3x$ to the greatest factor $6x$.

Worked example

Problem. Identify the invalid outside exponent and factor the polynomial correctly.

Student work to audit: $20a^3b + 30a^2b^2 = 10a^3b(2 + 3b)$

Answer. Use the smaller a exponent; the correct form is $10a^2b(2a + 3b)$.

Explanation and check.

The second term contains only a^2, so a^3 cannot divide it. Subtracting exponent 2 gives quotients $2a$ and $3b$.

Sets & Steps
Math Practice & Worked Solutions

Algebra 1

Factoring Trinomials

Factoring Trinomials | A1-U08-P08

96 problems · Four activity formats

Topic focus

This topic is a focused set of 96 practice tasks on Factoring Trinomials.

8 PDFs and a README; 64 buyer pages.

The following pages use the same questions, given data, and notation as the final files. Question/card serial numbers and internal IDs are omitted in this preview only. Table values and matching responses are retained. Full answer keys are not included.

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Algebra 1

Factoring Trinomials

Name: _____ **Date:** _____ **Class:** _____

Answer each question and record the matching bank letter. Give exact values. Give the whole requested response, including any reasoning the question asks for.

Factor into binomials whose leading coefficients are both greater than one. Match the complete requested integer factorization, including any repeated-factor form; keep the original verification. An expanded trinomial alone is not the requested response.

Expression	$6x^2 + 17x + 5$
Coefficient domain	integers

Bank label: _____

Test the possible constant placements and report the one that matches the middle term. Match the complete requested integer factorization, including any repeated-factor form; keep the original verification. An expanded trinomial alone is not the requested response.

Expression	$6x^2 + 5x - 4$
Coefficient domain	integers

Bank label: _____

Factor the trinomial whose middle coefficient is negative one. Match the complete requested integer factorization, including any repeated-factor form; keep the original verification. An expanded trinomial alone is not the requested response.

Expression	$6x^2$-$x - 15$
Coefficient domain	integers

Bank label: _____

Among the possible leading-coefficient splits, find one that also matches the linear term. Match the complete requested integer factorization, including any repeated-factor form; keep the original verification. An expanded trinomial alone is not the requested response.

Expression	$12x^2 + 11x + 2$
Coefficient domain	integers

Bank label: _____

Algebra 1

Factoring Trinomials

Name: _____ **Date:** _____ **Class:** _____

Answer each question and show your reasoning in the workspace. Give exact values rather than decimals unless the question supplies a decimal. Give the whole requested response, including any reasoning the question asks for.

State the signed pair you use and the resulting factorization.

Expression	$x^2 + 4x - 45$
Coefficient domain	integers

Factor over the integers if possible; otherwise state that no such factorization exists.

Expression	$x^2 + 6x + 11$
Coefficient domain	integers

Decide whether the trinomial has integer binomial factors and support the decision with a pair check.

Expression	$x^2 - 5x + 8$
Coefficient domain	integers

Test the integer-pair condition and report the resulting factored form or its absence.

Expression	$x^2 + 7x + 13$
Coefficient domain	integers

Check whether the negative prime constant permits the required integer factorization.

Expression	$x^2 - 2x - 17$
Coefficient domain	integers

Select the one listed pair that meets the linear-coefficient condition and write the factors.

Expression	$x^2 - 19x + 84$
Coefficient domain	integers
Candidate pairs	$-1, -84$, $-2, -42$, $-3, -28$, $-4, -21$, $-6, -14$, $-7, -12$

Algebra 1

Factoring Trinomials

Name: _____ **Date:** _____ **Class:** _____

Begin at START. Answer the card, then find the matching final answer at the top of another card. Use the recording sheet for your reasoning. Visit each card once and continue to FINISH.

START

Factor the displayed monic trinomial over the integers. Match the complete requested integer factorization, including any repeated-factor form; keep the original verification. An expanded trinomial alone is not the requested response.

Expression	$x^2 + 5x + 6$
Coefficient domain	integers

Your response: _____

Incoming: $(x - 2)(x - 7)$.

Factor, paying attention to the signs forced by the constant term. Match the complete requested integer factorization, including any repeated-factor form; keep the original verification. An expanded trinomial alone is not the requested response.

Expression	$x^2 + 2x - 15$
Coefficient domain	integers

Your response: _____

Incoming: $(x + 4)(x + 9)$.

Factor the expression with a positive constant and a negative linear coefficient. Match the complete requested integer factorization, including any repeated-factor form; keep the original verification. An expanded trinomial alone is not the requested response.

Expression	$x^2 - 13x + 36$
Coefficient domain	integers

Your response: _____

Incoming: $(x - 9)(x + 4)$.

Identify which pair for the constant also matches the x-coefficient, then factor. Match the complete requested integer factorization, including any repeated-factor form; keep the original verification. An expanded trinomial alone is not the requested response.

Expression	$x^2 + 15x + 44$
Coefficient domain	integers

Your response: _____

Incoming: $(x - 4)(x - 11)$.

Match an integer pair to the two required conditions and give the product form. Match the complete requested integer factorization, including any repeated-factor form; keep the original verification. An expanded trinomial alone is not the requested response.

Expression	$x^2 + 6x - 55$
Coefficient domain	integers

Your response: _____

Incoming: $(x + 5)(x - 3)$.

Find an integer factorization and check its middle term. Match the complete requested integer factorization, including any repeated-factor form; keep the original verification. An expanded trinomial alone is not the requested response.

Expression	$x^2 - 4x - 21$
Coefficient domain	integers

Your response: _____

Algebra 1

Factoring Trinomials

Name: _____ **Date:** _____ **Class:** _____

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.

Factor the primitive trinomial over the integers. Choose a method before factoring: split the middle term using a product-sum pair, or test integer binomial factors directly. Explain which structure makes your choice efficient, then carry out the original factorization and verify all coefficients.

Expression	$2x^2 + 7x + 3$
Coefficient domain	integers

Write the displayed expression as two integer binomial factors. Choose a method before factoring: split the middle term using a product-sum pair, or test integer binomial factors directly. Explain which structure makes your choice efficient, then carry out the original factorization and verify all coefficients.

Expression	$3x^2 + 14x + 8$
Coefficient domain	integers

Find factors whose mixed-sign cross terms give the required middle coefficient. Choose a method before factoring: split the middle term using a product-sum pair, or test integer binomial factors directly. Explain which structure makes your choice efficient, then carry out the original factorization and verify all coefficients.

Expression	$2x^2 + 7x - 15$
Coefficient domain	integers

Match the cross terms and give the complete integer factorization. Choose a method before factoring: split the middle term using a product-sum pair, or test integer binomial factors directly. Explain which structure makes your choice efficient, then carry out the original factorization and verify all coefficients.

Expression	$2x^2 - 5x - 12$
Coefficient domain	integers

Factoring Trinomials

Full Worked Solutions - excerpt

Worked example

Problem. Test the integer-pair condition and report the resulting factored form or its absence.

Expression	$x^2 + 7x + 13$
Coefficient domain	integers

Answer. No integer factorization is available.

Explanation and check.

Since 13 is prime, only 1 and 13 can be positive factor constants, and their sum 14 does not match 7.

Worked example

Problem. Factor over the integers if possible; otherwise state that no such factorization exists.

Expression	$x^2 + 6x + 11$
Coefficient domain	integers

Answer. No factorization into monic integer binomials exists.

Explanation and check.

The positive pairs for 11 are $1, 11$, with sum 12; changing both signs gives -12. Neither sum is 6.

Sets & Steps
Math Practice & Worked Solutions

Algebra 1

Difference of Squares

Difference of Squares | A1-U08-P09

96 problems · Four activity formats

Topic focus

This topic is a focused set of 96 practice tasks on Difference of Squares.

8 PDFs and a README; 49 buyer pages.

The following pages use the same questions, given data, and notation as the final files. Question/card serial numbers and internal IDs are omitted in this preview only. Table values and matching responses are retained. Full answer keys are not included.

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Algebra 1

Difference of Squares

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.

Factor the two high-power terms without changing their variable bases. Match the complete factorization using the stated coefficient domain, and verify as requested. An expanded polynomial alone is not the requested response. Use the expression $225x^{8}$-y^{10}. Use integer coefficients. Bank label: _____	Extract each even-power root and write the factorization. Match the complete factorization using the stated coefficient domain, and verify as requested. An expanded polynomial alone is not the requested response. Use the expression $49a^4 - 36b^6$. Use integer coefficients. Bank label: _____
Write the conjugate pair after finding both multivariable roots. Match the complete factorization using the stated coefficient domain, and verify as requested. An expanded polynomial alone is not the requested response. Use the expression $169c^2d^4 - 64e^6$. Use integer coefficients. Bank label: _____	Factor despite the different degrees carried by the two variables. Match the complete factorization using the stated coefficient domain, and verify as requested. An expanded polynomial alone is not the requested response. Use the expression $196x^{10} - 225y^2$. Use integer coefficients. Bank label: _____
Take the integer roots of both composite square coefficients and factor. Match the complete factorization using the stated coefficient domain, and verify as requested. An expanded polynomial alone is not the requested response. Use the expression $289p^4 - 324q^8$. Use integer coefficients. Bank label: _____	Use the consecutive coefficient roots to produce the factors. Match the complete factorization using the stated coefficient domain, and verify as requested. An expanded polynomial alone is not the requested response. Use the expression $400a^2b^6 - 441c^4$. Use integer coefficients. Bank label: _____
Write conjugates using the correct power of each variable. Match the complete factorization using the stated coefficient domain, and verify as requested. An expanded polynomial alone is not the requested response. Use the expression $x^6 - 100y^4$. Use integer coefficients. Bank label: _____	Factor after taking the square root of each even-exponent monomial. Match the complete factorization using the stated coefficient domain, and verify as requested. An expanded polynomial alone is not the requested response. Use the expression $36x^8 - 49y^6$. Use integer coefficients. Bank label: _____

Algebra 1

Difference of Squares

Name: _____ **Date:** _____ **Class:** _____

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.

Decide whether the difference-of-squares identity applies, and name the two square bases. Use the expression $x^2 - 25$. Use integer coefficients.	Identify whether the expression is eligible for conjugate factoring and give its term roots. Use the expression $9x^2 - 16$. Use integer coefficients.
Check both terms and state whether this is a difference of squares. Use the expression $y^2 - 49$. Use integer coefficients.	State the square-base pair if the identity applies. Use the expression $4a^2 - 81$. Use integer coefficients.
Determine whether the real difference-of-squares identity can be used as written. Use the expression $x^2 + 36$. Use real coefficients.	Recover c from the stated conjugate factors. Use the expression x^2-c. The stated factors are $(x - 7)(x + 7)$. Use integer coefficients.

Algebra 1

Difference of Squares

Name: _____ **Date:** _____ **Class:** _____

Begin at START. Answer the card, then find the matching final answer at the top of another card. Use the recording sheet for your reasoning. Visit each card once and continue to FINISH.

Incoming: $(25m^4\text{-}n)(25m^4 + n)$.

Factor with the unit square as the first base. Match the complete factorization using the stated coefficient domain, and verify as requested. An expanded polynomial alone is not the requested response. Use the expression $1 - 81x^2$. Use integer coefficients.

Your response: _____

Incoming: $(3y - 1)(3y + 1)$.

Factor the two-variable square difference. Match the complete factorization using the stated coefficient domain, and verify as requested. An expanded polynomial alone is not the requested response. Use the expression $25a^2\text{-}b^2$. Use integer coefficients.

Your response: _____

Incoming: $(9a - 10b)(9a + 10b)$.

Apply the difference-of-squares identity exactly once. Match the complete factorization using the stated coefficient domain, and verify as requested. An expanded polynomial alone is not the requested response. Use the expression $16x^4 - 25$. Use integer coefficients. Apply the difference-of-squares identity exactly once.

Your response: _____

Incoming: $(x - 11)(x + 11)$.

Preserve the term order when forming the conjugate factors. Match the complete factorization using the stated coefficient domain, and verify as requested. An expanded polynomial alone is not the requested response. Use the expression $100 - 9x^2$. Use integer coefficients.

Your response: _____

Incoming: $(3\frac{m}{4} - 5n)(3\frac{m}{4} + 5n)$.

Factor the monomial square minus one. Match the complete factorization using the stated coefficient domain, and verify as requested. An expanded polynomial alone is not the requested response. Use the expression $100u^6v^2 - 1$. Use integer coefficients.

Your response: _____

Incoming: $(2x - 5)(2x + 5)$.

Supply the integer conjugate factors. Match the complete factorization using the stated coefficient domain, and verify as requested. An expanded polynomial alone is not the requested response. Use the expression $9y^2 - 1$. Use integer coefficients.

Your response: _____

Algebra 1

Difference of Squares

Name: _____ **Date:** _____ **Class:** _____

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.

Treat the shifted expression as one square base, then simplify both resulting factors. Choose whether to preserve the displayed composite expressions as square bases or expand and collect first. Justify which route exposes the two squares more efficiently for this expression, then give the original requested factorization. Use the expression $(x + 3)^2 - 25$. Use integer coefficients.

Factor the shifted square difference and combine constants inside each factor. Choose whether to preserve the displayed composite expressions as square bases or expand and collect first. Justify which route exposes the two squares more efficiently for this expression, then give the original requested factorization. Use the expression $(x - 4)^2 - 9$. Use integer coefficients.

Form conjugates of the complete group and reduce their constants. Choose whether to preserve the displayed composite expressions as square bases or expand and collect first. Justify which route exposes the two squares more efficiently for this expression, then give the original requested factorization. Use the expression $(2x + 1)^2 - 16$. Use integer coefficients.

Factor using the scaled shifted group as a single base. Choose whether to preserve the displayed composite expressions as square bases or expand and collect first. Justify which route exposes the two squares more efficiently for this expression, then give the original requested factorization. Use the expression $(3x - 2)^2 - 36$. Use integer coefficients.

Difference of Squares

Full Worked Solutions - excerpt

Worked example

Problem. State the square-base pair if the identity applies. Use the expression $4a^2 - 81$. Use integer coefficients.

Answer. The pair is $2a$ and 9; the identity applies.

Explanation and check.

Squaring $2a$ gives $4a^2$ and squaring 9 gives 81, with the needed difference sign.

Worked example

Problem. Use the specified factor to recover the missing square term T and the conjugate partner. Use the expression $(x + 4)^2 - T$. One required factor is $x - 3$. Use integer coefficients.

Answer. T = 49 and the partner is $x + 11$.

Explanation and check.

The difference factor $(x + 4) - B = x - 3$ forces $B = 7$. Thus $T = B^2 = 49$, and the sum factor is $x + 4 + 7 = x + 11$.

Sets & Steps
Math Practice & Worked Solutions

Algebra 1

Factoring Polynomials Completely

Factoring Polynomials Completely | A1-U08-P10

96 problems · Four activity formats

Topic focus

This topic is a focused set of 96 practice tasks on Factoring Polynomials Completely.

8 PDFs and a README; 51 buyer pages.

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Algebra 1

Factoring Polynomials Completely

Name: _____ **Date:** _____ **Class:** _____

Answer each question and record the matching bank letter. Give exact values. Give the whole requested response, including any reasoning the question asks for.

Remove the multivariable GCF and resolve the nonmonic binary quadratic that remains. Match the complete requested factorization, with all original domain and verification requirements. An expanded polynomial alone is not the requested response. Expression: $12a^4b + 42a^3b^2 - 24a^2b^3$ Bank label: _____	Select a signed multivariable GCF and continue until the residual splits into binomials. Match the complete requested factorization, with all original domain and verification requirements. An expanded polynomial alone is not the requested response. Expression: $-12p^4q + 12p^3q^2 + 45p^2q^3$ Bank label: _____
Write the expression as its maximal monomial GCF times primitive binomials. Match the complete requested factorization, with all original domain and verification requirements. An expanded polynomial alone is not the requested response. Expression: $54r^4s - 9r^3s^2 - 18r^2s^3$ Bank label: _____	Resolve the common monomial and the remaining homogeneous trinomial. Match the complete requested factorization, with all original domain and verification requirements. An expanded polynomial alone is not the requested response. Expression: $12u^3v - 30u^2v^2 - 72uv^3$ Bank label: _____
Pull out the signed z-containing GCF and completely factor the x expression. Match the complete requested factorization, with all original domain and verification requirements. An expanded polynomial alone is not the requested response. Expression: $-108x^2z^2 - 99xz^2 - 18z^2$ Bank label: _____	Factor the homogeneous remainder into two linear forms after removing its common monomial. Match the complete requested factorization, with all original domain and verification requirements. An expanded polynomial alone is not the requested response. Expression: $4a^3b^2 - 4a^2b^3 - 48ab^4$ Bank label: _____

Algebra 1

Factoring Polynomials Completely

Name: _____ **Date:** _____ **Class:** _____

Answer each question and show your reasoning in the workspace. Give exact values rather than decimals unless the question supplies a decimal. Give the whole requested response, including any reasoning the question asks for.

Select the GCF sign that makes the square-difference pattern immediate. Expression: $-45m^4 + 5m^2$	After removing the greatest shared monomial, identify both scaled square bases. Expression: $32p^3q - 98pq^3$
Extract all common powers, then express the remainder as conjugate binary forms. Expression: $75x^5y^2 - 12x^3y^4$	Preserve the odd shared power of b in the GCF and factor the residual identity. Expression: $98a^4b^3 - 18a^2b^5$
Use the maximal numerical content before applying the special product. Expression: $108m^3n^4 - 48mn^6$	Normalize the negative leading term through the GCF and finish with conjugates. Expression: $-200p^5q + 72p^3q^3$

Algebra 1

Factoring Polynomials Completely

Name: _____ **Date:** _____ **Class:** _____

Begin at START. Answer the card, then find the matching final answer at the top of another card. Use the recording sheet for your reasoning. Visit each card once and continue to FINISH.

Incoming: $15x^3(x+7)^2$

Treat y as part of the GCF and factor the x-quadratic that remains. Match the complete requested factorization, with all original domain and verification requirements. An expanded polynomial alone is not the requested response.

Expression: $70x^2y - 49xy - 84y$

Your response: _____

Incoming: $8p^2(p-2)(p-7)$

Factor until every nonconstant factor is linear over the integers. Match the complete requested factorization, with all original domain and verification requirements. An expanded polynomial alone is not the requested response.

Expression: $9y^3 + 18y^2 - 135y$

Your response: _____

Incoming: $4x(x+3)^2$

Give the complete factorization and identify the multiplicity of its binomial factor. Match the complete requested factorization, with all original domain and verification requirements. An expanded polynomial alone is not the requested response.

Expression: $7a^4 - 70a^3 + 175a^2$

Your response: _____

Incoming: $3x(2x+1)(x+3)$

State the two decisive factoring steps and the final product. Match the complete requested factorization, with all original domain and verification requirements. An expanded polynomial alone is not the requested response.

Expression: $12x^3 - 40x^2 + 12x$

Your response: _____

START

Factor completely, showing the common-factor decision before the quadratic step. Match the complete requested factorization, with all original domain and verification requirements. An expanded polynomial alone is not the requested response.

Expression: $2x^3 + 10x^2 + 12x$

Your response: _____

Incoming: $18c^2(c+4)(c+9)$

Extract the full GCF and split the resulting nonmonic trinomial. Match the complete requested factorization, with all original domain and verification requirements. An expanded polynomial alone is not the requested response.

Expression: $6x^3 + 21x^2 + 9x$

Your response: _____

Algebra 1

Factoring Polynomials Completely

Name: _____ **Date:** _____ **Class:** _____

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.

Choose the productive first method, justify it from the visible structure, and finish factoring.

Expression: $6x^3 + 30x^2 + 36x$

Available methods: GCF trinomial grouping

Select the method sequence that reaches an integer endpoint rather than stopping after one split.

Expression: $x^4 - 81$

Available methods: GCF difference of squares trinomial

Which method should be tried first, and what complete product does it produce? Explain using the term arrangement.

Expression: $2a^2 + 8a + 3a + 12$

Given structural clue: four terms with matching local quotients

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Explain why a GCF should precede the special-product test, then factor completely.

Expression: $12a^4 - 108a^2$

Suggested approach to consider: compare the original terms as squares

Factoring Polynomials Completely

Full Worked Solutions - excerpt

Worked example

Problem. Select the GCF sign that makes the square-difference pattern immediate.

Expression: $-45m^4 + 5m^2$

Answer. $-5m^2(3m - 1)(3m + 1)$

Explanation and check.

Extract $-5m^2$ to leave $9m^2 - 1$, then use bases $3m$ and 1.

Worked example

Problem. Preserve the odd shared power of b in the GCF and factor the residual identity.

Expression: $98a^4b^3 - 18a^2b^5$

Answer. $2a^2b^3(7a - 3b)(7a + 3b)$

Explanation and check.

The GCF $2a^2b^3$ leaves $49a^2 - 9b^2$, a square difference.