Sets & Steps
Math Practice & Worked Solutions

Algebra 1

Polynomial & Quadratic Core Practice | Algebra 1 | 25-Topic Bundle

25-topic bundle | 2,400 problems | Four activity formats

Included topics

The following pages list all 25 included resources in the suggested order, with a link to each product. Each resource retains its complete preview.

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.

200 PDFs and 25 READMEs; 2,040 buyer PDF pages across the 25 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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25 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: _______

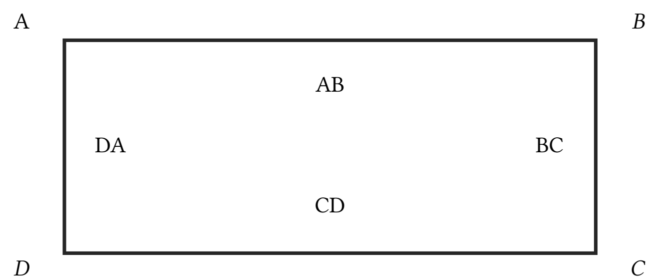
Algebra 1

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.

<table>
<tr><td>Shape</td><td>rectangle ABCD</td></tr>
<tr><td>Boundary order</td><td>AB, BC, CD, DA</td></tr>
<tr><td>Segment labels</td><td><table><tr><td>AB</td><td>$3x + 2$</td></tr><tr><td>BC</td><td>$x + 5$</td></tr><tr><td>CD</td><td>$3x + 2$</td></tr><tr><td>DA</td><td>$x + 5$</td></tr></table></td></tr>
<tr><td>Included segments</td><td>AB, BC, CD, DA</td></tr>
<tr><td>Units</td><td>meters</td></tr>
</table>

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

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

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

Compute the exact monomial product and its total degree.

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

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

Factors	$-3x^4y$, $2x^2y^3$
Evaluation	x: -1; y: 2

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

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

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

Factors	$2x^2y$, $-3xy^2$, $(\frac{1}{2})z^3$, $-4xz$, 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 $-8r^2s$ 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	$-7mn^2(-2m^3+3mn - 5n^2 + 1)$

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.

$\times$	$2x^2$	-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?

$\times$	$3a$	-4	b
$-2a^2$	$-6a^3$	$8a^2$	______

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

$\times$	$2\mathrm{m}^2$	**?**	4
5m	$10\mathrm{m}^3$	$-15\mathrm{m}^2$	20m

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

$\times$	$2p$	-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: $-5x^6 + 2x^4 - x^3 + 9x^2$.

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: $6m^7 - 12m^5 + 3m^3 - 18m^2$.

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	$2t(t^2 - t + 3) + 3t(-t^2 + 2t - 1) - t(t^2 + 4)$

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: $-2t^3 + 4t^2 - t$.

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	$4c(c^2 - d) + 2c(-2c^2 + 3d)$

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: $8m^2$-10m-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: $3m^3$+$5m^2$-2m.

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: $14\ \mathrm{m}^2,\ 21\ \mathrm{m}$

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: $(25m^4-n)(25m^4+n)$.

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 $25a^2-b^2$. 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.

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 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

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.

Sets & Steps
Math Practice & Worked Solutions

Algebra 1

Quadratic Function Classification and Range

Quadratic Function Classification and Range | A1-U09-P01

96 problems · Four activity formats

Topic focus

Across 96 tasks this topic asks for decision and justification preserving the original requested quantities.

8 PDFs and a README; 122 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.

Published by Tusils LLC.

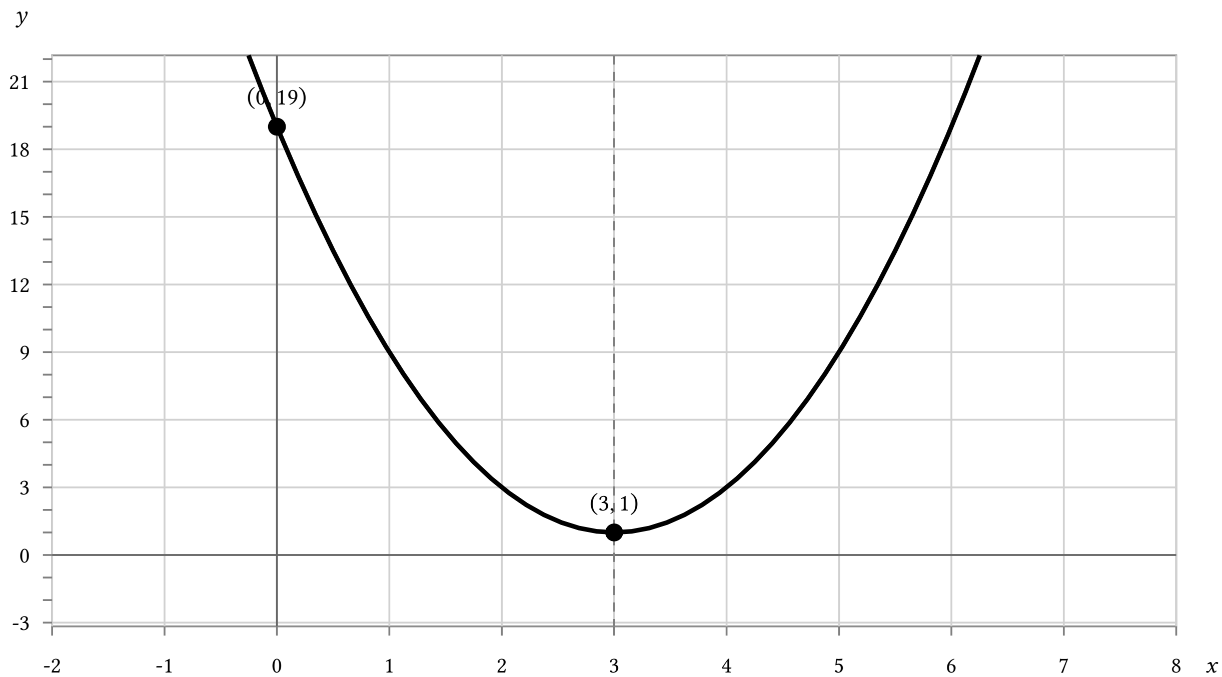
Algebra 1

Quadratic Function Classification and Range

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.

Explain the intercept status using the extremum, and give end behavior. For the answer bank, record the minimum point as (x, y). Complete and justify every part of the original task in your work.



Bank label: ______

Algebra 1

Quadratic Function Classification and Range

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.

Use finite differences to decide whether the table is compatible with a quadratic model.

Model assumption: values come from a polynomial of degree at most 2

Input	Output
-2	7
-1	2
0	1
1	4
2	11

Predict the opening and extremum type without locating the vertex. Rule: $g(x) = 5x^2 - 7x + 1$ Leading coefficient: 5

Compute the second differences and interpret their sign.

Model assumption: polynomial degree at most 2

Input	Output
-1	2
0	5
1	4
2	-1
3	-10

State the opening, extremum type, and end behavior. Rule: $q(x) = -x^2 + 12x + 8$ Leading coefficient: -1

Algebra 1

Quadratic Function Classification and Range

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: $[-5, 16)$

Determine the function family for every real a. Rule: $q\_a(x) = a(x+1)^2$-$ax^2 + 3x^2$ Parameter: a

Your response: ______________

Incoming: constant, not quadratic

Find the missing output so all second differences equal 2, then state the evidence.

Model assumption: quadratic polynomial

Input	Output
-2	8
-1	3
0	0
1	____
2	0

Your response: ______________

Algebra 1

Quadratic Function Classification and Range

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.

Explain why ordinary consecutive second differences are not valid evidence here and what must be addressed.

Declared family: unspecified

Input	Output
0	1
1	4
3	16
6	49

Choose between classifying by the largest displayed exponent and combining like terms first. Use the chosen method to determine the actual degree and justify it. Rule: $s(x) = x(x^2 + 2x - 1) - x^3 + 4$

Quadratic Function Classification and Range

Full Worked Solutions - excerpt

Worked example

Problem. Classify h and identify its leading coefficient. Rule: $h(x) = x(x+1) + (x-2)^2$

Answer. quadratic with leading coefficient 2

Explanation and check.

The rule becomes $x^2 + x + x^2 - 4x + 4 = 2x^2 - 3x + 4$.

Worked example

Problem. Classify h by its actual degree after simplification. Rule: $h(x) = 3(x^2 + 2x) - 3x^2 + 4$ Domain: all real x

Answer. linear, not quadratic

Explanation and check.

The x^2 terms cancel, leaving $h(x) = 6x + 4$, which has degree 1.

Sets & Steps
Math Practice & Worked Solutions

Algebra 1

Quadratic Vertex, Axis, and Intercepts

Quadratic Vertex, Axis, and Intercepts | A1-U09-P02

96 problems · Four activity formats

Topic focus

This topic is a focused set of 96 practice tasks on Quadratic Vertex, Axis, and Intercepts.

8 PDFs and a README; 61 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

Quadratic Vertex, Axis, and Intercepts

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.

Find the axis input first, then evaluate the function there. Match the complete originally requested feature set or point. Include the axis, extremum type, or effective coefficient whenever the original question requires it. The rule is $v(x) = 2x^2 - 6x + 1$ Bank label: ______	Derive the fractional maximum point and axis. Match the complete originally requested feature set or point. Include the axis, extremum type, or effective coefficient whenever the original question requires it. The rule is $E(x) = -4x^2 + 7x + 2$ Bank label: ______
Compute the vertex and verify its height by substitution. Match the complete originally requested feature set or point. Include the axis, extremum type, or effective coefficient whenever the original question requires it. The rule is $H(x) = 9x^2 + 6x - 8$ Bank label: ______	Locate the low point and its axis for the fractional leading coefficient. Match the complete originally requested feature set or point. Include the axis, extremum type, or effective coefficient whenever the original question requires it. The rule is $K(x) = (\frac{1}{3})x^2 - 4x + 5$ Bank label: ______
Read the vertex, axis, and extremum type directly from the formula. Match the complete originally requested feature set or point. Include the axis, extremum type, or effective coefficient whenever the original question requires it. The rule is $f(x) = 2(x - 3)^2 + 1$ Bank label: ______	State the lowest point and symmetry line. Match the complete originally requested feature set or point. Include the axis, extremum type, or effective coefficient whenever the original question requires it. The rule is $p(x) = (x - 1)^2 - 8$ Bank label: ______
Name the turning point, axis, and extremum type. Match the complete originally requested feature set or point. Include the axis, extremum type, or effective coefficient whenever the original question requires it. The rule is $q(x) = -3(x + 2)^2 - 5$ Bank label: ______	Extract the vertex and axis from the displayed form. Match the complete originally requested feature set or point. Include the axis, extremum type, or effective coefficient whenever the original question requires it. The rule is $r(x) = 0.5(x - 7)^2$ Bank label: ______

Algebra 1

Quadratic Vertex, Axis, and Intercepts

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 every x-intercept and the y-intercept as ordered pairs. The rule is $f(x) = (x - 2)(x + 5)$ The domain is all real x	List the coordinates where the graph meets each axis. The rule is $g(x) = -2(x + 1)(x - 4)$
Find the intercept coordinates, noting any point shared by both axes. The rule is $p(x) = x(x - 7)$	Identify the x-axis contact point and the y-intercept. The rule is $q(x) = 3(x + 2)^2$
Determine all real intercepts. The rule is $r(x) = (x - 3)^2 + 4$	Find the single real x-axis contact and the vertical-axis crossing. The rule is $s(x) = -(x + 4)^2$

Algebra 1

Quadratic Vertex, Axis, and Intercepts

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: $(5, \frac{11}{2})$

Derive the vertex in lowest-term fractions. Match the complete originally requested feature set or point. Include the axis, extremum type, or effective coefficient whenever the original question requires it.

The rule is $C(x) = 7x^2 - 3x + 2$

Your response: ____________

Incoming: $(\frac{5}{12}, -\frac{71}{24})$

Find the vertex while keeping compound fractions exact. Match the complete originally requested feature set or point. Include the axis, extremum type, or effective coefficient whenever the original question requires it.

The rule is $E(x) = (\frac{2}{5})x^2 + 3x - 1$

Your response: ____________

Incoming: $(\frac{7}{15}, \frac{41}{90})$

Find the maximum point in the t-coordinate system. Match the complete originally requested feature set or point. Include the axis, extremum type, or effective coefficient whenever the original question requires it.

The rule is $H(t) = -(\frac{2}{3})t^2 + 4t + 1$

Your response: ____________

START

Use the standard-form coefficients to compute the vertex. Match the complete originally requested feature set or point. Include the axis, extremum type, or effective coefficient whenever the original question requires it.

The rule is $q(x) = 3x^2 - 12x + 10$

Your response: ____________

Incoming: axis: $y = -\frac{7}{2}$; vertex: $(-\frac{7}{2}, -11)$

Interpret the negated input inside the square and identify the vertex. Match the complete originally requested feature set or point. Include the axis, extremum type, or effective coefficient whenever the original question requires it.

The rule is $V(x) = -4(0 - x)^2 + 3$

Your response: ____________

Incoming: $(-\frac{1}{5}, \frac{21}{5})$

Compute the maximum point from standard form. Match the complete originally requested feature set or point. Include the axis, extremum type, or effective coefficient whenever the original question requires it.

The rule is $s(x) = -2x^2 + 20x - 41$

Your response: ____________

Algebra 1

Quadratic Vertex, Axis, and Intercepts

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.

Calculate the axis of symmetry and vertex. Choose between using the coefficient axis formula and rewriting as a completed square. Explain which is more convenient for these coefficients, then provide all originally requested features exactly and verify the vertex height.

The rule is $f(x) = x^2 - 6x + 5$

Find the vertex and write its vertical axis. Choose between using the coefficient axis formula and rewriting as a completed square. Explain which is more convenient for these coefficients, then provide all originally requested features exactly and verify the vertex height.

The rule is $g(x) = 2x^2 + 8x - 1$

Determine the vertex, axis, and whether the vertex is a maximum or minimum. Choose between using the coefficient axis formula and rewriting as a completed square. Explain which is more convenient for these coefficients, then provide all originally requested features exactly and verify the vertex height.

The rule is $p(x) = -x^2 + 4x + 7$

State the axis equation and the exact vertex. Choose between using the coefficient axis formula and rewriting as a completed square. Explain which is more convenient for these coefficients, then provide all originally requested features exactly and verify the vertex height.

The rule is $r(x) = x^2 + 10x + 21$

Quadratic Vertex, Axis, and Intercepts

Full Worked Solutions - excerpt

Worked example

Problem. Find the intercept coordinates; keep the scale factor in the y-intercept calculation.

The rule is $C(x) = (\frac{1}{2})(x + 6)(x - 2)$

Answer. x-intercepts: $(-6, 0), (2, 0)$; y-intercept: $(0, -6)$

Explanation and check.

The roots come from the factors. At $x = 0$, one half of $6(-2)$ is -6.

Worked example

Problem. Identify the x-axis contact point and the y-intercept.

The rule is $q(x) = 3(x + 2)^2$

Answer. multiplicity: 2; x-intercepts: $(-2, 0)$; y-intercept: $(0, 12)$

Explanation and check.

The squared factor is zero only at $x = -2$ and has multiplicity 2. At $x = 0$ the output is 12.

Sets & Steps
Math Practice & Worked Solutions

Algebra 1

Quadratic Function Transformations

Quadratic Function Transformations | A1-U09-P03

96 problems · Four activity formats

Topic focus

This topic is a focused set of 96 practice tasks on Quadratic Function Transformations.

8 PDFs and a README; 66 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

Quadratic Function Transformations

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.

Write the final equation and identify the peak location. Match the complete original rule, ordered point list, or parameter set, with any required justification. Preserve the original input variable and coordinate scale.

Parent	$f(x) = x^2$
Operations	shift left 2, reflect across x-axis, shift up 6

Bank label: ______

Write the rule for the specified order. Match the complete original rule, ordered point list, or parameter set, with any required justification. Preserve the original input variable and coordinate scale.

Parent	$f(x) = x^2$
Operations	multiply outputs by $-\frac{1}{3}$, shift down 3

Bank label: ______

Write the final vertex form. Match the complete original rule, ordered point list, or parameter set, with any required justification. Preserve the original input variable and coordinate scale.

Parent	$f(x) = x^2$
Operations	shift right 4, double outputs, shift up 5

Bank label: ______

Write the exact final equation. Match the complete original rule, ordered point list, or parameter set, with any required justification. Preserve the original input variable and coordinate scale.

Parent	$f(x) = x^2$
Operations	shift left $\frac{1}{2}$, shift down $\frac{3}{2}$, multiply current outputs by 4

Bank label: ______

Algebra 1

Quadratic Function Transformations

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.

Predict the target vertex and axis.

Reference	Rule: $f(x) = x^2$ Vertex: 0, 0
Target relation	$g(x) = f(x - 3) + 2$

Map the reference vertex and classify the target extremum.

Reference vertex	2, −1
Reference opening	up
Transformation	h: 0 a: 3 k: 4

Predict the target x-intercepts.

Reference roots	−2, 2
Target relation	$g(x) = f(x - 3)$

Predict the new x-intercepts.

Reference	$f(x) = x^2$
Target relation	$g(x) = f(x) - 4$

Predict the target vertex and extremum type.

Reference vertex	−1, −3
Reference extremum	minimum
Target relation	$g(x) = -f(x) + 2$

Predict the target vertex and x-intercepts using the supplied old level.

Reference vertex	0, −5
Reference level points	y: −2 Points: −3, −2, 3, −2
Target relation	$g(x) = f(x) + 2$

Algebra 1

Quadratic Function Transformations

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: $g(x) = 2x^2 + 6$

Write the final rule and preserve the operation order. Match the complete original rule, ordered point list, or parameter set, with any required justification. Preserve the original input variable and coordinate scale.

Parent	$f(x) = x^2$
Operations	multiply outputs by 2, shift the resulting graph up 3

Your response: ______________

Incoming: $g(x) = 5x^2 - 2$

Write and simplify the final rule. Match the complete original rule, ordered point list, or parameter set, with any required justification. Preserve the original input variable and coordinate scale.

Parent	$f(x) = x^2$
Operations	shift up 3, multiply all current outputs by 2

Your response: ______________

Incoming: a: 2; h: 2; k: 1

Recover the complete parameter triple. Match the complete original rule, ordered point list, or parameter set, with any required justification. Preserve the original input variable and coordinate scale.

Target vertex	2, −3
Target point	4, 5
Model	g(x)=a(x-h)^2+k

Your response: ______________

Incoming: a: $\frac{1}{2}$; h: 1; k: −1

Find a and write the target rule. Match the complete original rule, ordered point list, or parameter set, with any required justification. Preserve the original input variable and coordinate scale.

Target vertex	−1, −8
Target root	1
Model	$a(x + 1)^2 - 8$

Your response: ______________

Incoming: $g(x) = 3(x - 2)^2 + 1$

Compose the ordered changes into one formula. Match the complete original rule, ordered point list, or parameter set, with any required justification. Preserve the original input variable and coordinate scale.

Parent	$f(x) = x^2$
Operations	shift left 1, shift down 2, multiply current outputs by −2, shift up 3

Your response: ______________

Incoming: $g(x) = -2(x + 1)^2 + 7$

Write the exact final rule. Match the complete original rule, ordered point list, or parameter set, with any required justification. Preserve the original input variable and coordinate scale.

Parent	$f(x) = x^2$
Operations	reflect outputs, shift up 5, multiply all current outputs by $\frac{1}{2}$

Your response: ______________

Algebra 1

Quadratic Function Transformations

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.

Write the transformed quadratic rule. Choose how to organize the work: apply the listed operations to the rule one at a time, or track the horizontal center, vertical scale, and vertical offset through that same sequence. Explain your choice and obtain the original requested rule without changing operation order.

Parent	$f(x) = x^2$
Operations	shift right 3, shift up 2

Write an equation for the final graph. Choose how to organize the work: apply the listed operations to the rule one at a time, or track the horizontal center, vertical scale, and vertical offset through that same sequence. Explain your choice and obtain the original requested rule without changing operation order.

Parent	$f(x) = x^2$
Operations	reflect across the x-axis, shift left 4

Translate the ordered operations into a target formula. Choose how to organize the work: apply the listed operations to the rule one at a time, or track the horizontal center, vertical scale, and vertical offset through that same sequence. Explain your choice and obtain the original requested rule without changing operation order.

Parent	$f(x) = x^2$
Operations	compress vertically by factor $\frac{1}{2}$, shift down 5

Write the target quadratic. Choose how to organize the work: apply the listed operations to the rule one at a time, or track the horizontal center, vertical scale, and vertical offset through that same sequence. Explain your choice and obtain the original requested rule without changing operation order.

Parent	$f(x) = x^2$
Operations	shift left 2, shift up 7

Quadratic Function Transformations

Full Worked Solutions - excerpt

Worked example

Problem. Predict the target vertex and x-axis contact.

Reference vertex	$-1, -4$
Target relation	$g(x) = f(x-3)+4$

Answer. axis: x = 2; multiplicity: 2; vertex: 2, 0; x intercepts: 2 and 0

Explanation and check.

The vertex shifts right 3 and up 4 to the x-axis, so it becomes a double-root tangent point.

Worked example

Problem. Decide whether the target has any real x-intercepts.

Reference range	[2,infinity)
Target relation	$g(x) = f(x-1)+3$

Answer. no real x-intercepts

Explanation and check.

A target zero would require the old output -3, but -3 is outside the reference range [2 ,infinity).

Sets & Steps
Math Practice & Worked Solutions

Algebra 1

Converting Quadratics to Vertex Form

Converting Quadratics to Vertex Form | A1-U09-P04

96 problems · Four activity formats

Topic focus

This topic is a focused set of 96 practice tasks on Converting Quadratics to Vertex Form.

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

Converting Quadratics to Vertex Form

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.

Complete the inner square and scale its compensation. Match the complete requested vertex form. Preserve the outside coefficient and compensating constant; the expanded standard form alone is not the requested response.

Standard	$3x^2 + 18x + 20$

Bank label: _______

Convert the downward-opening quadratic. Match the complete requested vertex form. Preserve the outside coefficient and compensating constant; the expanded standard form alone is not the requested response.

Standard	$-3x^2 + 24x + 1$

Bank label: _______

Express the scaled perfect square in vertex form. Match the complete requested vertex form. Preserve the outside coefficient and compensating constant; the expanded standard form alone is not the requested response.

Standard	$4x^2 - 24x + 36$

Bank label: _______

Rewrite without a trailing zero constant. Match the complete requested vertex form. Preserve the outside coefficient and compensating constant; the expanded standard form alone is not the requested response.

Standard	$-4x^2 - 16x - 16$

Bank label: _______

Convert and retain the remainder after the scaled square. Match the complete requested vertex form. Preserve the outside coefficient and compensating constant; the expanded standard form alone is not the requested response.

Standard	$6x^2 - 12x + 8$

Bank label: _______

Rewrite to reveal the left-shifted vertex. Match the complete requested vertex form. Preserve the outside coefficient and compensating constant; the expanded standard form alone is not the requested response.

Standard	$-6x^2 - 36x - 50$

Bank label: _______

Convert and compute the scaled correction. Match the complete requested vertex form. Preserve the outside coefficient and compensating constant; the expanded standard form alone is not the requested response.

Standard	$7x^2 + 28x + 19$

Bank label: _______

Write the exact vertex form. Match the complete requested vertex form. Preserve the outside coefficient and compensating constant; the expanded standard form alone is not the requested response.

Standard	$-7x^2 + 28x - 11$

Bank label: _______

Algebra 1

Converting Quadratics to Vertex Form

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.

Fill both equal blanks.

Trace	$x^2 + 4x + 9 = (x^2 + 4x +$ _____ - _____ $) + 9 = (x+2)^2 + 5$

What number belongs in both blanks?

Trace	$x^2 - 6x + 1 = (x^2 - 6x +$ _____ $)$- _____ $+1 = (x-3)^2 - 8$

Algebra 1

Converting Quadratics to Vertex Form

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: $(x + \frac{7}{2})^2 - \frac{69}{4}$

Complete the square for $x^2 + x$. Match the complete requested vertex form. Preserve the outside coefficient and compensating constant; the expanded standard form alone is not the requested response.

Standard	$x^2 + x$

Your response: ______________

Incoming: $(x + 12)^2 - 1$

Extract the completed square from the trinomial. Match the complete requested vertex form. Preserve the outside coefficient and compensating constant; the expanded standard form alone is not the requested response.

Standard	$x^2 - 24x + 160$

Your response: ______________

Incoming: $(x - \frac{9}{2})^2 - \frac{81}{4}$

Rewrite using a single rational vertical offset. Match the complete requested vertex form. Preserve the outside coefficient and compensating constant; the expanded standard form alone is not the requested response.

Standard	$x^2 + 7x - 5$

Your response: ______________

Incoming: $(x + \frac{11}{2})^2 - \frac{41}{4}$

Convert and include an exact form that expands back to 50 as the constant. Match the complete requested vertex form. Preserve the outside coefficient and compensating constant; the expanded standard form alone is not the requested response.

Standard	$x^2 + 15x + 50$

Your response: ______________

Incoming: $(x - 11)^2 + 1$

Write vertex form and show the one-unit deficit. Match the complete requested vertex form. Preserve the outside coefficient and compensating constant; the expanded standard form alone is not the requested response.

Standard	$x^2 + 24x + 143$

Your response: ______________

Incoming: $(x + \frac{1}{2})^2 - \frac{1}{4}$

Rewrite and keep all constants as fractions. Match the complete requested vertex form. Preserve the outside coefficient and compensating constant; the expanded standard form alone is not the requested response.

Standard	x^2-$x + 6$

Your response: ______________

Algebra 1

Converting Quadratics to Vertex Form

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.

Rewrite the quadratic in vertex form. Choose how to organize the conversion: insert and compensate a square-completing term, or compare coefficients with a squared-binomial form. Explain which route suits the coefficients, then give the original requested vertex form and verify it.

Standard	$x^2 + 6x + 5$

Complete the square and state the equivalent vertex form. Choose how to organize the conversion: insert and compensate a square-completing term, or compare coefficients with a squared-binomial form. Explain which route suits the coefficients, then give the original requested vertex form and verify it.

Standard	$x^2 - 8x + 19$

Put $x^2 + 10x$ into vertex form without changing its values. Choose how to organize the conversion: insert and compensate a square-completing term, or compare coefficients with a squared-binomial form. Explain which route suits the coefficients, then give the original requested vertex form and verify it.

Standard	$x^2 + 10x$

Find the vertex form and identify the final constant. Choose how to organize the conversion: insert and compensate a square-completing term, or compare coefficients with a squared-binomial form. Explain which route suits the coefficients, then give the original requested vertex form and verify it.

Standard	$x^2 - 4x - 12$

Converting Quadratics to Vertex Form

Full Worked Solutions - excerpt

Worked example

Problem. Complete the final equality.

Trace	$x^2 + 8x + 3 = (x + 4)^2 - 16 + 3 = (x + 4)^2 +$ _____

Answer. -13

Explanation and check.

Combine -16 and 3.

Worked example

Problem. Use the last equality to recover the original constant c.

Trace	$4x^2 - 16x + c = 4[(x - 2)^2 - 4] + c = 4(x - 2)^2 + 9$

Answer. 25

Explanation and check.

The final constant is $c - 16$, so $c - 16 = 9$.

Sets & Steps
Math Practice & Worked Solutions

Algebra 1

Quadratic Zeros and Factored Form

Quadratic Zeros and Factored Form | A1-U09-P05

96 problems · Four activity formats

Topic focus

This topic is a focused set of 96 practice tasks on Quadratic Zeros and Factored Form.

8 PDFs and a README; 109 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.

Published by Tusils LLC.

Algebra 1

Quadratic Zeros and Factored Form

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.

State the zero and its multiplicity. Match the complete original zero set, factored function, contact description, or parameter solution set. Preserve multiplicity and any required orientation or verification.

Function	$g(x) = (x - 4)^2$

Bank label: ______

Express the rule as repeated factors and state the zero data. Match the complete original zero set, factored function, contact description, or parameter solution set. Preserve multiplicity and any required orientation or verification.

Function	$f(x) = 5x^2$

Bank label: ______

Give the zero and multiplicity. Match the complete original zero set, factored function, contact description, or parameter solution set. Preserve multiplicity and any required orientation or verification.

Function	$f(x) = (4x + 1)^2$

Bank label: ______

State all zero information, including multiplicity. Match the complete original zero set, factored function, contact description, or parameter solution set. Preserve multiplicity and any required orientation or verification.

Function	$f(x) = -9(2x - 5)(2x - 5)$

Bank label: ______

Algebra 1

Quadratic Zeros and Factored Form

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.

Identify the zeros and explain the role of 7.

Function	$f(x) = 7(x-1)(x-6)$

Give the x-intercepts from the factored rule.

Function	$f(x) = -2(x+1)(x-8)$

Determine the x-intercepts.

Function	$f(x) = (5-x)(3x+6)$

State where outputs are positive, negative, and zero.

Function	$f(x) = (x+2)(x-5)$

Give the sign pattern across the two zeros.

Function	$f(x) = -3(x-1)(x-4)$

Describe the sign on both sides of the double root.

Function	$f(x) = 2(x+3)^2$

Algebra 1

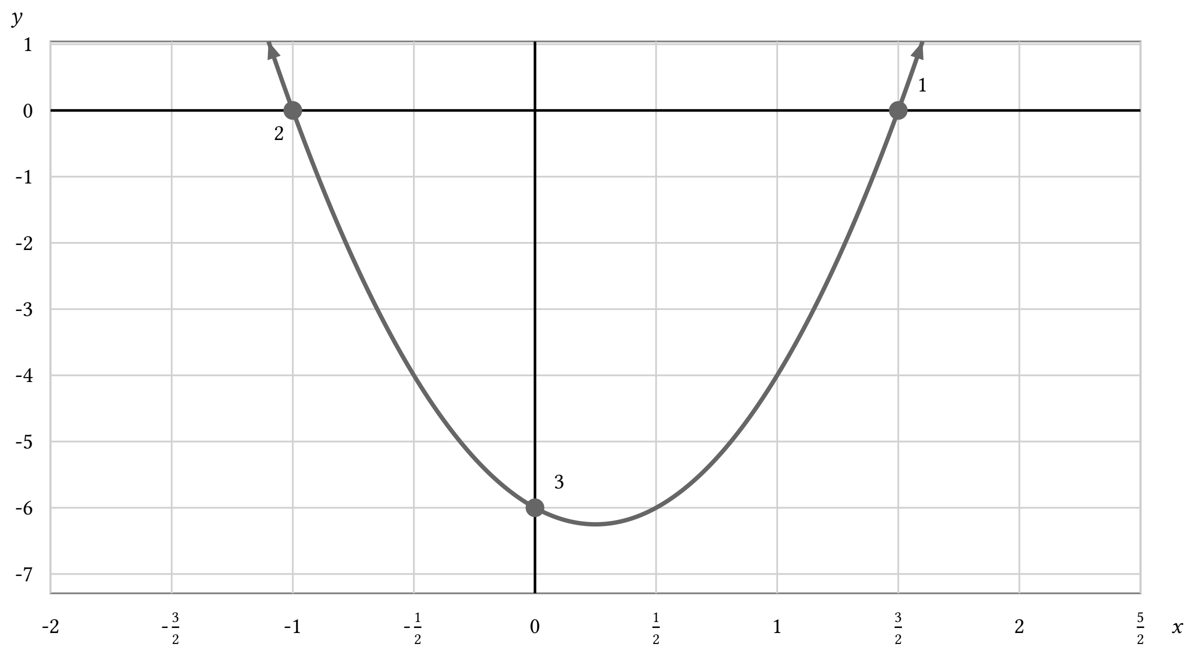
Quadratic Zeros and Factored Form

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: $f(x) = 6(x - \frac{1}{3})(x - 2)$

Give a factored rule using integer-coefficient linear factors. Match the complete original zero set, factored function, contact description, or parameter solution set. Preserve multiplicity and any required orientation or verification.



Marker	Exact coordinate	Boundary status
1	$(\frac{3}{2}, 0)$	included
2	$(-1, 0)$	included
3	$(0, -6)$	included

Graph	X intercepts	$\frac{3}{2}, 0, -1, 0$
	Exact point	$0, -6$
Scales	x	$\frac{1}{2}$
	y	1

Your response: ______________________

Algebra 1

Quadratic Zeros and Factored Form

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.

Construct the quadratic in factored form. Choose between using the root factors with one unknown scale or solving for standard-form coefficients from the same data. Explain which setup is more economical, then give the originally requested factored rule and verify the point and roots.

Zeros	-2, 3
Point	0, -6

Use the two zero rows and the remaining row to find the rule. Choose between using the root factors with one unknown scale or solving for standard-form coefficients from the same data. Explain which setup is more economical, then give the originally requested factored rule and verify the point and roots.

Input	**Output**
1	0
5	0
0	10

Quadratic Zeros and Factored Form

Full Worked Solutions - excerpt

Worked example

Problem. Normalize the factors and give the complete sign chart.

Function	$f(x) = (4x+8)(3x-9)$

Answer. negative: $(-2, 3)$; positive: $(-\text{infinity}, -2)$ union $(3, \text{infinity})$; zero: -2, 3

Explanation and check.

The factors are $4(x+2)$ and $3(x-3)$; their scalar product is positive.

Worked example

Problem. State the sign without treating 4 as two interval boundaries.

Function	$f(x) = (2x-8)(5x-20)$

Answer. negative: none; positive: $(-\text{infinity}, 4)$ union $(4, \text{infinity})$; zero: 4

Explanation and check.

Both factors are positive multiples of $x-4$, so their product is a positive square multiple.

Sets & Steps
Math Practice & Worked Solutions

Algebra 1

Comparing Forms of Quadratic Functions

Comparing Forms of Quadratic Functions | A1-U09-P06

96 problems · Four activity formats

Topic focus

This topic is a focused set of 96 practice tasks on Comparing Forms of Quadratic Functions.

8 PDFs and a README; 59 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.

Published by Tusils LLC.

Algebra 1

Comparing Forms of Quadratic Functions

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.

Select the equivalent factored form. Match the complete expression, feature values, or parameter values requested below; show the requested verification. The standard form is $x^2 - 5x + 6$. Compare the proposed factored forms $(x - 2)(x - 3)$; $(x + 2)(x + 3)$.

Bank label: ______

Choose the equivalent vertex form. Match the complete expression, feature values, or parameter values requested below; show the requested verification. The standard form is $x^2 + 6x + 5$. Compare the proposed vertex forms $(x + 3)^2 - 4$; $(x - 3)^2 - 4$.

Bank label: ______

Verify whether the three representations agree.

Label	**Supplied expression or information**
standard	$-2x^2 + 8x - 6$
vertex	$-2(x - 2)^2 + 2$
factored	$-2(x - 1)(x - 3)$

Bank label: ______

Which candidate matches the standard form? Match the complete expression, feature values, or parameter values requested below; show the requested verification. The standard form is $3x^2 - 15x + 18$.

Label	**Supplied expression or information**
A	$(x - 2)(x - 3)$
B	$3(x - 2)(x - 3)$

Bank label: ______

Algebra 1

Comparing Forms of Quadratic Functions

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.

Choose the representation and state the roots.

Label	Supplied expression or information
standard	$6x^2 + x - 2$
factored	$(3x + 2)(2x - 1)$

Which form should be read, and what is the vertex?

Label	Supplied expression or information
standard	$3x^2 + 12x + 8$
vertex	$3(x + 2)^2 - 4$

Choose the representation that preserves the units and answer the question. The context is height $h(t)$ in feet. Determine initial height at $t = 0$.

Label	Supplied expression or information
standard	$-16t^2 + 48t + 6$
vertex	$-16(t - \frac{3}{2})^2 + 42$

Which form decides the claim immediately? Determine whether $x = 5$ is a zero.

Label	Supplied expression or information
standard	$2x^2 - 6x - 20$
factored	$2(x - 5)(x + 2)$

Select the single form that shows both requested features. Determine opening direction and extreme output.

Label	Supplied expression or information
standard	$-2x^2 + 20x - 41$
vertex	$-2(x - 5)^2 + 9$

Which available form best answers the feature question? Determine minimum value.

Label	Supplied expression or information
standard	$x^2 + 4x + 8$
vertex	$(x + 2)^2 + 4$
real factored	does not exist

Algebra 1

Comparing Forms of Quadratic Functions

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: b: −16; c: 9

Find a and k. Match the complete expression, feature values, or parameter values requested below; show the requested verification.

Label	Supplied expression or information
standard	$ax^2 + 18x + 20$
vertex	$a(x+3)^2 + k$

Your response: ______________

Incoming: factored form: $(x\text{-}m)(x-2)$; zeros: m, 2

Give the minimum and minimizers in terms of r. Use $f(x) = 2(x\text{-}r)(x+r)$. Restrict x to $[0, \infty)$. Let r be real. Determine minimum on domain.

Your response: ______________

Incoming: p: 3; q: −12

Choose and perform the useful conversion. Use $h(x) = x^2 - 7x + 12$. Determine zeros.

Your response: ______________

Incoming: factored form: $(x-3)(x-4)$; zeros: 3, 4

State the range and explain why no conversion is needed. Use $f(x) = -4(x+1)^2 + 9$. Determine range.

Your response: ______________

Incoming: factored form: $-2(x-3)(x+2)$; positive: $(-2, 3)$

Find the range with a minimal vertex calculation. Use $f(x) = 5(x+2)(x-4)$. Determine range.

Your response: ______________

Incoming: factored form: $(3x+2)(2x-1)$; zeros: $-\frac{2}{3}$, $\frac{1}{2}$

Factor and answer the sign question. Use $f(x) = -2x^2 + 2x + 12$. Determine positive-output interval.

Your response: ______________

Algebra 1

Comparing Forms of Quadratic Functions

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 supplied form reveals the requested feature most directly? Justify the form choice from the requested feature and the supplied expressions, then complete the original feature reading. Preserve the supplied alternatives and any restrictions. Determine y-intercept.

Label	**Supplied expression or information**
standard	$2x^2 - 5x + 7$
vertex	$2(x - \frac{5}{4})^2 + \frac{31}{8}$
factored	not supplied

Choose the form that answers the question immediately. Justify the form choice from the requested feature and the supplied expressions, then complete the original feature reading. Preserve the supplied alternatives and any restrictions. Determine minimum value.

Label	**Supplied expression or information**
standard	$x^2 - 6x + 11$
vertex	$(x - 3)^2 + 2$

Comparing Forms of Quadratic Functions

Full Worked Solutions - excerpt

Worked example

Problem. Convert directly from vertex to factored form. Use $f(x) = 3(x+1)^2 - 27$. Determine zeros.

Answer. factored form: $3(x-2)(x+4)$; zeros: -4, 2

Explanation and check.

Factor $3[(x+1)^2 - 9] = 3[(x+1) - 3][(x+1) + 3]$.

Worked example

Problem. Find a purposeful factorization and state the roots. Use $f(x) = x^2 - (m+2)x + 2m$. Determine zeros in terms of m.

Answer. factored form: $(x - m)(x-2)$; zeros: m, 2

Explanation and check.

The required sum is $m+2$ and product $2m$, so the factors separate as $x - m$ and $x-2$.

Sets & Steps
Math Practice & Worked Solutions

Algebra 1

Solving Quadratics by Factoring

Solving Quadratics by Factoring | A1-U09-P07

96 problems · Four activity formats

Topic focus

This topic is a focused set of 96 practice tasks on Solving Quadratics by Factoring.

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

Solving Quadratics by Factoring

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.

Solve the product equation and list both roots. Match the complete solution set while showing the original required normalized equation, factorization and zero-product branches. Equation: $(x-2)(x+5)=0$ Bank label: ______	Find the complete solution set without dividing by x. Match the complete solution set while showing the original required normalized equation, factorization and zero-product branches. Equation: $x(x-7)=0$ Bank label: ______
Solve each linear factor equation. Match the complete solution set while showing the original required normalized equation, factorization and zero-product branches. Equation: $(2x-3)(x+1)=0$ Bank label: ______	Explain whether the outside -3 changes the roots. Match the complete solution set while showing the original required normalized equation, factorization and zero-product branches. Equation: $-3(x+2)(x-6)=0$ Bank label: ______
Solve by separating the two factor equations. Match the complete solution set while showing the original required normalized equation, factorization and zero-product branches. Equation: $(x-9)(x+9)=0$ Bank label: ______	Keep every root of the product. Match the complete solution set while showing the original required normalized equation, factorization and zero-product branches. Equation: $4x(3x+2)=0$ Bank label: ______
Solve the nonmonic factor equations exactly. Match the complete solution set while showing the original required normalized equation, factorization and zero-product branches. Equation: $(3x+4)(2x-5)=0$ Bank label: ______	Account for the reversed second factor. Match the complete solution set while showing the original required normalized equation, factorization and zero-product branches. Equation: $7(x-3)(5\text{-}x)=0$ Bank label: ______

Algebra 1

Solving Quadratics by Factoring

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.

Give the distinct real solution and its multiplicity. Equation: $(x+4)^2 = 0$	State the distinct root and multiplicity. Equation: $(5x+1)^2 = 0$
How many distinct solutions are there? Equation: -$(x-1)(x-1) = 0$	Find the root represented twice. Equation: $(7-2x)^2 = 0$
Recognize duplicate roots from opposite factors. Equation: $(4x+5)(-4x-5) = 0$	State the repeated solution exactly. Equation: $(\frac{x}{3} - 5)^2 = 0$

Algebra 1

Solving Quadratics by Factoring

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: factorization: $(-\frac{x}{7})(5-3x)$; solutions: $0, \frac{5}{3}$

Factor the nonmonic trinomial and solve exactly. Match the complete solution set while showing the original required normalized equation, factorization and zero-product branches.

Equation: $2x^2+7x+3=0$

Your response: ______________

Incoming: factorization: $(3x+1)(x-2)$; solutions: $-\frac{1}{3}, 2$

Use nonmonic linear factors to solve. Match the complete solution set while showing the original required normalized equation, factorization and zero-product branches.

Equation: $6x^2+x-2=0$

Your response: ______________

Incoming: cross terms: $-15x+8x=-7x$; factorization: $(3x+4)(2x-5)=0$; solutions: $-\frac{4}{3}, \frac{5}{2}$

Factor with product -120 and solve. Match the complete solution set while showing the original required normalized equation, factorization and zero-product branches.

Equation: $20x^2+7x-6=0$

Your response: ______________

Incoming: factorization: $2(2x-1)(2x+1)$; solutions: $-\frac{1}{2}, \frac{1}{2}$

Factor by coordinating the cross terms. Match the complete solution set while showing the original required normalized equation, factorization and zero-product branches.

Equation: $10x^2-17x+3=0$

Your response: ______________

Incoming: factorization: $(x+8)(x+3)$; solutions: $-8, -3$

Use two factors with leading term $2x$. Match the complete solution set while showing the original required normalized equation, factorization and zero-product branches.

Equation: $4x^2+4x-15=0$

Your response: ______________

Incoming: factorization: $5(x-3)(x+3)$; solutions: $-3, 3$

Factor completely before solving. Match the complete solution set while showing the original required normalized equation, factorization and zero-product branches.

Equation: $3x^2+12x+9=0$

Your response: ______________

Algebra 1

Solving Quadratics by Factoring

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 trinomial and solve. Choose a factoring setup: test integer binomial factor pairs directly, or split the middle term using a product-sum pair. Explain which is efficient for this equation, then finish the original factor-and-solve task with every zero-product branch.

Equation: $x^2 + 5x + 6 = 0$

Use a factor pair with product -12. Choose a factoring setup: test integer binomial factor pairs directly, or split the middle term using a product-sum pair. Explain which is efficient for this equation, then finish the original factor-and-solve task with every zero-product branch.

Equation: $x^2 - x - 12 = 0$

Recognize the difference of squares and solve. Choose a factoring setup: test integer binomial factor pairs directly, or split the middle term using a product-sum pair. Explain which is efficient for this equation, then finish the original factor-and-solve task with every zero-product branch.

Equation: $x^2 - 9 = 0$

Factor and report distinct roots. Choose a factoring setup: test integer binomial factor pairs directly, or split the middle term using a product-sum pair. Explain which is efficient for this equation, then finish the original factor-and-solve task with every zero-product branch.

Equation: $x^2 + 8x + 16 = 0$

Solving Quadratics by Factoring

Full Worked Solutions - excerpt

Worked example

Problem. A student factors correctly as $(2x + 1)(x + 3)$ but solves only $2x + 1 = 0$. Complete the reasoning.

Answer. factorization: $(2x + 1)(x + 3) = 0$; first error: the factor $x + 3$ was never set to zero; solutions: -3, $-\frac{1}{2}$

Explanation and check.

Zero-product reasoning is a union of both factor equations, so -3 must be added to $-\frac{1}{2}$.

Worked example

Problem. A student claims $(x + 4)(x + 3) = 0$. Find the first mismatch and repair the solution.

Equation: $x^2 + x - 12 = 0$ Student Factorization: $(x + 4)(x + 3) = 0$

Answer. correct factorization: $(x + 4)(x - 3) = 0$; first error: the claimed factors expand to $x^2 + 7x + 12$; solutions: -4, 3

Explanation and check.

The constant must be -12 and the linear coefficient $+1$; constants 4 and -3 meet both conditions.

Sets & Steps
Math Practice & Worked Solutions

Algebra 1

Solving Quadratics by Square Roots

Solving Quadratics by Square Roots | A1-U09-P08

96 problems · Four activity formats

Topic focus

This topic is a focused set of 96 practice tasks on Solving Quadratics by Square Roots.

8 PDFs and a README; 51 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

Solving Quadratics by Square Roots

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.

Solve over the real numbers and show both branches. Match the complete exact real solution set. Show the steps that isolate the square and include every real branch. Keep radicals exact. Solve $x^2 = 16$ over the real numbers. Bank label: _______	How many distinct real solutions are there? Match the complete exact real solution set. Show the steps that isolate the square and include every real branch. Keep radicals exact. Solve $x^2 = 0$ over the real numbers. Bank label: _______
Classify the real solution set before attempting a square root. Match the complete exact real solution set. Show the steps that isolate the square and include every real branch. Keep radicals exact. Solve $x^2 = -9$ over the real numbers. Bank label: _______	Distinguish the principal square root from the equation solutions. Match the complete exact real solution set. Show the steps that isolate the square and include every real branch. Keep radicals exact. Solve $x^2 = 1$ over the real numbers. Bank label: _______
List the complete real solution set. Match the complete exact real solution set. Show the steps that isolate the square and include every real branch. Keep radicals exact. Solve $x^2 = 49$ over the real numbers. Bank label: _______	Use square-root branches to solve. Match the complete exact real solution set. Show the steps that isolate the square and include every real branch. Keep radicals exact. Solve $x^2 = 25$ over the real numbers. Bank label: _______
Find and verify both roots. Match the complete exact real solution set. Show the steps that isolate the square and include every real branch. Keep radicals exact. Solve $x^2 = 100$ over the real numbers. Bank label: _______	State both real roots rather than only the radical value. Match the complete exact real solution set. Show the steps that isolate the square and include every real branch. Keep radicals exact. Solve $x^2 = 4$ over the real numbers. Bank label: _______

Algebra 1

Solving Quadratics by Square Roots

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.

Determine the number of real roots. Solve $x^2 = -36$ over the real numbers.	Classify the equation in the real domain. Solve $x^2 = -\frac{4}{9}$ over the real numbers.
Decide whether any real branch exists. Solve $x^2 = -0.49$ over the real numbers.	Use sign evidence to classify real solvability. Solve $x^2 = -\frac{121}{9}$ over the real numbers.
Determine the real solution count. Solve $x^2 = -0.0001$ over the real numbers.	Separate perfect-square magnitude from the sign classification. Solve $x^2 = -\frac{289}{64}$ over the real numbers.

Algebra 1

Solving Quadratics by Square Roots

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: x = -2 or $x = 4$

Separate the outer operations from the final translation. Match the complete exact real solution set. Show the steps that isolate the square and include every real branch. Keep radicals exact.

Solve $3(x+4)^2 + 2 = 29$ over the real numbers.

Your response: ______________

Incoming: x = -1 or $x = 7$

Interpret the plus sign inside the square correctly. Match the complete exact real solution set. Show the steps that isolate the square and include every real branch. Keep radicals exact.

Solve $(x+5)^2 = 9$ over the real numbers.

Your response: ______________

Incoming: x = -8 or $x = -2$

Determine whether the branch notation creates distinct roots. Match the complete exact real solution set. Show the steps that isolate the square and include every real branch. Keep radicals exact.

Solve $(x-4)^2 = 0$ over the real numbers.

Your response: ______________

Incoming: x = $-\frac{17}{10}$ or $x = \frac{17}{10}$

Control the subtraction and the negative decimal divisor. Match the complete exact real solution set. Show the steps that isolate the square and include every real branch. Keep radicals exact.

Solve $-0.8x^2 + 1.25 = -2.982$ over the real numbers.

Your response: ______________

Incoming: x = $-\frac{20}{9}$ or $x = \frac{20}{9}$

Find the common-denominator isolation and all real roots. Match the complete exact real solution set. Show the steps that isolate the square and include every real branch. Keep radicals exact.

Solve $(\frac{7}{3})x^2 + \frac{5}{6} = \frac{599}{84}$ over the real numbers.

Your response: ______________

Incoming: x = $-\frac{19}{10}$ or $x = \frac{19}{10}$

Invert the fractional scale, then take square roots. Match the complete exact real solution set. Show the steps that isolate the square and include every real branch. Keep radicals exact.

Solve $(\frac{81}{4})x^2 + 6 = 106$ over the real numbers.

Your response: ______________

Algebra 1

Solving Quadratics by Square Roots

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.

Isolate x squared before taking both square-root branches. Choose whether to remove the additive term before dividing by the square coefficient, or divide the whole equation by that nonzero coefficient first. Justify the cleaner arithmetic, then isolate the square and finish both branches as originally requested.

Solve $8x^2 + 3 = 53$ over the real numbers.

Preserve equality through both inverse operations and solve. Choose whether to remove the additive term before dividing by the square coefficient, or divide the whole equation by that nonzero coefficient first. Justify the cleaner arithmetic, then isolate the square and finish both branches as originally requested.

Solve $18x^2 - 7 = 91$ over the real numbers.

Determine whether the two sign branches remain distinct. Choose whether to remove the additive term before dividing by the square coefficient, or divide the whole equation by that nonzero coefficient first. Justify the cleaner arithmetic, then isolate the square and finish both branches as originally requested.

Solve $4x^2 + 13 = 13$ over the real numbers.

Track the negative coefficient while isolating the square. Choose whether to remove the additive term before dividing by the square coefficient, or divide the whole equation by that nonzero coefficient first. Justify the cleaner arithmetic, then isolate the square and finish both branches as originally requested.

Solve $-25x^2 + 8 = -56$ over the real numbers.

Solving Quadratics by Square Roots

Full Worked Solutions - excerpt

Worked example

Problem. Isolate the middle squared term, then branch.

Solve $7 - 2(x - 4)^2 = 5$ over the real numbers.

Answer. branches: $x - 4 = \pm 1$; center: 4 ; radius squared: 1 ; real solution count: 2 ; solutions: 3 , 5

Explanation and check.

Subtract 7 and divide by -2 to find $(x - 4)^2 = 1$. Therefore x is 3 or 5 .

Worked example

Problem. Determine the number of real roots.

Solve $x^2 = -36$ over the real numbers.

Answer. isolated square value: -36 ; real solution count: 0 ; No real solutions

Explanation and check.

Because x squared is at least zero for every real x , there are no real roots.

Sets & Steps
Math Practice & Worked Solutions

Algebra 1

Solving Quadratics by Completing the Square

Solving Quadratics by Completing the Square | A1-U09-P09

96 problems · Four activity formats

Topic focus

This topic is a focused set of 96 practice tasks on Solving Quadratics by Completing the Square.

8 PDFs and a README; 62 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.

Published by Tusils LLC.

Algebra 1

Solving Quadratics by Completing the Square

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.

Complete the square and solve the symmetric integer branches. Match the complete exact real solution set and show every originally requested square isolation, equality-preserving step, and branch. Do not replace exact radicals with decimals. Work over the real numbers with $x^2 + 16x + 60 = 0$. Bank label: _______	Find the center and both roots using equality-preserving additions. Match the complete exact real solution set and show every originally requested square isolation, equality-preserving step, and branch. Do not replace exact radicals with decimals. Work over the real numbers with $x^2 - 14x + 40 = 0$. Bank label: _______
Preserve the exact nonsquare distance from the completed center. Match the complete exact real solution set and show every originally requested square isolation, equality-preserving step, and branch. Do not replace exact radicals with decimals. Work over the real numbers with $x^2 + 18x + 70 = 0$. Bank label: _______	Complete the square with a negative linear term. Match the complete exact real solution set and show every originally requested square isolation, equality-preserving step, and branch. Do not replace exact radicals with decimals. Work over the real numbers with $x^2 - 2x - 10 = 0$. Bank label: _______
Build the square and simplify the exact solution statement. Match the complete exact real solution set and show every originally requested square isolation, equality-preserving step, and branch. Do not replace exact radicals with decimals. Work over the real numbers with $x^2 + 12x + 29 = 0$. Bank label: _______	Use the fractional half-coefficient and give exact roots. Match the complete exact real solution set and show every originally requested square isolation, equality-preserving step, and branch. Do not replace exact radicals with decimals. Work over the real numbers with $x^2 + 3x - 1 = 0$. Bank label: _______
Complete the square without rounding the half-integer center. Match the complete exact real solution set and show every originally requested square isolation, equality-preserving step, and branch. Do not replace exact radicals with decimals. Work over the real numbers with $x^2 - 5x + 2 = 0$. Bank label: _______	Track the quarter fractions created by the odd coefficient. Match the complete exact real solution set and show every originally requested square isolation, equality-preserving step, and branch. Do not replace exact radicals with decimals. Work over the real numbers with $x^2 + 7x + 3 = 0$. Bank label: _______

Algebra 1

Solving Quadratics by Completing the Square

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.

<table>
<tr>
<td>
Supply the omitted line and finish the partial solution.
Work over the real numbers with $x^2 + 6x = 7$.
$x^2 + 6x = 7$
____
$(x + 3)^2 = 16$
</td>
<td>
Fill the equality-preserving completion step.
Work over the real numbers with $x^2 - 8x = -7$.
$x^2 - 8x = -7$
____
$(x - 4)^2 = 9$
</td>
</tr>
<tr>
<td>
Supply the normalization line that must precede square completion.
Work over the real numbers with $2x^2 + 12x = 10$.
$2x^2 + 12x = 10$
____
$x^2 + 6x + 9 = 5 + 9$
</td>
<td>
Repair the trace by supplying the omitted signed branch.
Work over the real numbers with $x^2 + 4x - 5 = 0$.
$(x + 2)^2 = 9$
$x + 2 = 3$
$x = 1$
</td>
</tr>
<tr>
<td>
Determine the fractional amount missing from both sides.
Work over the real numbers with $x^2 + 5x = 2$.
$x^2 + 5x = 2$
$x^2 + 5x +$ ________ $= 2 +$ ________
</td>
<td>
Replace the trinomial with its equivalent squared-binomial form.
Work over the real numbers with $x^2 - 6x + 9 = 14$.
$x^2 - 6x + 9 = 14$
____
$x - 3 = \pm\sqrt{14}$
</td>
</tr>
</table>

Algebra 1

Solving Quadratics by Completing the Square

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: amount added to each side: $\frac{25}{16}$; completed square equation: $(x-\frac{5}{4})^2=\frac{31}{16}$; real solution count: 2; solutions: $\frac{5-\sqrt{31}}{4}$, $\frac{5+\sqrt{31}}{4}$; square root radicand: $\frac{31}{16}$

Recognize the repeated root created by a rational completion amount. Match the complete exact real solution set and show every originally requested square isolation, equality-preserving step, and branch. Do not replace exact radicals with decimals.

Work over the real numbers with $x^2+(\frac{7}{5})x+\frac{49}{100}=0$.

Your response: ____________________

Incoming: amount added to each side: $\frac{9}{16}$; completed square equation: $(x+\frac{3}{4})^2=\frac{33}{16}$; real solution count: 2; solutions: $\frac{-3-\sqrt{33}}{4}$, $\frac{-3+\sqrt{33}}{4}$; square root radicand: $\frac{33}{16}$

Normalize the leading coefficient before completing the square. Match the complete exact real solution set and show every originally requested square isolation, equality-preserving step, and branch. Do not replace exact radicals with decimals.

Work over the real numbers with $2x^2+8x+1=0$.

Your response: ____________________

Incoming: amount added after normalizing: 1; completed square equation: $(x-1)^2=\frac{8}{5}$; leading coefficient divisor: 5; normalized equation: $x^2-2x-\frac{3}{5}=0$; real solution count: 2; solutions: $1-2\cdot\frac{\sqrt{10}}{5}$, $1+2\cdot\frac{\sqrt{10}}{5}$; square root radicand: $\frac{8}{5}$

Use normalization to expose the repeated root. Match the complete exact real solution set and show every originally requested square isolation, equality-preserving step, and branch. Do not replace exact radicals with decimals.

Work over the real numbers with $2x^2-4x+2=0$.

Your response: ____________________

Incoming: amount added after normalizing: $\frac{25}{4}$; completed square equation: $(x-\frac{5}{2})^2=\frac{13}{12}$; leading coefficient divisor: 6; normalized equation: $x^2-5x+\frac{31}{6}=0$; real solution count: 2; solutions: $\frac{5}{2}-\frac{\sqrt{39}}{6}$, $\frac{5}{2}+\frac{\sqrt{39}}{6}$; square root radicand: $\frac{13}{12}$

Normalize the odd linear coefficient and solve exactly. Match the complete exact real solution set and show every originally requested square isolation, equality-preserving step, and branch. Do not replace exact radicals with decimals.

Work over the real numbers with $4x^2+20x+11=0$.

Your response: ____________________

Incoming: amount added after normalizing: $\frac{9}{4}$; completed square equation: $(x+\frac{3}{2})^2=\frac{1}{4}$; leading coefficient divisor: 10; normalized equation: $x^2+3x+2=0$; real solution count: 2; solutions: -2, -1; square root radicand: $\frac{1}{4}$

Normalize and simplify the small exact radius. Match the complete exact real solution set and show every originally requested square isolation, equality-preserving step, and branch. Do not replace exact radicals with decimals.

Work over the real numbers with $12x^2-24x+11=0$.

Your response: ____________________

START

Rearrange the constants and use the completed-square sign to classify roots. Match the complete exact real solution set and show every originally requested square isolation, equality-preserving step, and branch. Do not replace exact radicals with decimals.

Work over the real numbers with $x^2-5x+9=2$.

Your response: ____________________

Algebra 1

Solving Quadratics by Completing the Square

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.

Complete the square and keep both exact radical branches. Choose between adding the completing quantity to both sides and inserting a compensating pair on the left before isolating the square. Justify the clearer equality-preserving route, then solve by the requested square completion.

Work over the real numbers with $x^2 + 6x + 1 = 0$.

Use half the linear coefficient to build the square. Choose between adding the completing quantity to both sides and inserting a compensating pair on the left before isolating the square. Justify the clearer equality-preserving route, then solve by the requested square completion.

Work over the real numbers with $x^2 - 4x - 3 = 0$.

Show the equal addition that creates a perfect-square trinomial. Choose between adding the completing quantity to both sides and inserting a compensating pair on the left before isolating the square. Justify the clearer equality-preserving route, then solve by the requested square completion.

Work over the real numbers with $x^2 + 8x + 5 = 0$.

Complete the square and simplify the resulting radical. Choose between adding the completing quantity to both sides and inserting a compensating pair on the left before isolating the square. Justify the clearer equality-preserving route, then solve by the requested square completion.

Work over the real numbers with $x^2 - 10x + 7 = 0$.

Solving Quadratics by Completing the Square

Full Worked Solutions - excerpt

Worked example

Problem. Use normalization to expose the repeated root. Match the complete exact real solution set and show every originally requested square isolation, equality-preserving step, and branch. Do not replace exact radicals with decimals.

Work over the real numbers with $2x^2 - 4x + 2 = 0$.

Answer. amount added after normalizing: 1; completed square equation: $(x-1)^2 = 0$; leading coefficient divisor: 2; normalized equation: $x^2 - 2x + 1 = 0$; real solution count: 1; solutions: 1; square root radicand: 0

Explanation and check.

Dividing by 2 already displays the perfect square $x^2 - 2x + 1$. Its only root is $x = 1$.

Worked example

Problem. Show how negative normalization reveals a zero radius. Match the complete exact real solution set and show every originally requested square isolation, equality-preserving step, and branch. Do not replace exact radicals with decimals.

Work over the real numbers with $-5x^2 + 20x - 20 = 0$.

Answer. amount added after normalizing: 4; completed square equation: $(x-2)^2 = 0$; leading coefficient divisor: -5; normalized equation: $x^2 - 4x + 4 = 0$; real solution count: 1; solutions: 2; square root radicand: 0

Explanation and check.

Every term divided by -5 gives the perfect square $x^2 - 4x + 4$. Hence $x = 2$ is repeated.

Sets & Steps
Math Practice & Worked Solutions

Algebra 1

Quadratic Formula

Quadratic Formula | A1-U09-P10

96 problems · Four activity formats

Topic focus

This topic is a focused set of 96 practice tasks on Quadratic Formula.

8 PDFs and a README; 58 buyer pages.

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Algebra 1

Quadratic Formula

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.

Consider $4x^2 + 9 = 12x$ over the real numbers. Rewrite with zero on one side and identify the coefficient used for *-b*. Use the quadratic formula, show your substitution and simplification, and match the complete exact real solution set. Bank label: ______	Consider $x(x - 3) = 10$ over the real numbers. Expand the product and normalize before filling the formula slots. Use the quadratic formula, show your substitution and simplification, and match the complete exact real solution set. Bank label: ______
Consider $2x(x + 4) = 3$ over the real numbers. Distribute the outside factors and determine the signed constant after normalization. Use the quadratic formula, show your substitution and simplification, and match the complete exact real solution set. Bank label: ______	Consider $(x - 2)(x + 5) = 7$ over the real numbers. Expand, combine the product constant with the right-side value, and then identify coefficients. Use the quadratic formula, show your substitution and simplification, and match the complete exact real solution set. Bank label: ______
Consider $3(x^2 - 2) = x + 1$ over the real numbers. Remove grouping and collect both right-side terms before entering a, b, and c. Use the quadratic formula, show your substitution and simplification, and match the complete exact real solution set. Bank label: ______	Consider $(x + 1)^2 = 8$ over the real numbers. Convert the square to standard zero form for a formula substitution. Use the quadratic formula, show your substitution and simplification, and match the complete exact real solution set. Bank label: ______
Consider $5x^2 = 2(x + 3)$ over the real numbers. Distribute the right side and move its two terms with the correct signs. Use the quadratic formula, show your substitution and simplification, and match the complete exact real solution set. Bank label: ______	Consider $0.5x^2 - 1.5x = 2$ over the real numbers. Keep the fractional coefficients rather than clearing them, and normalize c correctly. Use the quadratic formula, show your substitution and simplification, and match the complete exact real solution set. Bank label: ______

Algebra 1

Quadratic Formula

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.

Consider $6x - 5 = 2x^2$ over the real numbers. Place the quadratic term first without losing the signs of the other terms.

Consider 4-$x(x + 2) = 0$ over the real numbers. Use an equivalent positive-leading normalization and state the coefficient triple it creates.

Consider -$(x - 4)^2 = 3x - 20$ over the real numbers. Expand the leading negative square, collect, and choose a positive-leading zero form.

Consider $x^2 + x - 1 = 0$ over the real numbers. Round the final approximations to 2 decimal places. Report the exact pair first and then fill a hundredths-and-residual table.

branch	**exact root**	**rounded to 2 places**	**absolute residual**
Smaller root	______	______	______
Larger root	______	______	______

Consider $2x^2$-$x - 2 = 0$ over the real numbers. Round the final approximations to 2 decimal places. Approximate each branch to the nearest hundredth and substitute the rounded results.

branch	**exact root**	**rounded to 2 places**	**absolute residual**
Smaller root	______	______	______
Larger root	______	______	______

Consider $3x^2 - 2x - 2 = 0$ over the real numbers. Round the final approximations to 2 decimal places. Simplify the exact radical before giving hundredth approximations.

Algebra 1

Quadratic Formula

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

Consider $8x^2 + 2x - 3 = 0$ over the real numbers. Evaluate the radical 10 and reduce the two sixteenth-denominator branches. Use the quadratic formula, show your substitution and simplification, and match the complete exact real solution set.

Your response: ____________________

Incoming: $\{1, \frac{7}{2}\}$

Consider $3x^2 - 5x = 2x^2 + 6$ over the real numbers. Collect the quadratic terms first and apply the formula to the net leading coefficient. Use the quadratic formula, show your substitution and simplification, and match the complete exact real solution set.

Your response: ____________________

Incoming: $\{1\}$

Consider $16x^2 + 24x + 9 = 0$ over the real numbers. Evaluate the formula at a zero discriminant with an even denominator reduction. Use the quadratic formula, show your substitution and simplification, and match the complete exact real solution set.

Your response: ____________________

Incoming: $\{-1, \frac{7}{2}\}$

Consider $(3x - 2)^2 = 25$ over the real numbers. Expand the affine square and solve the resulting quadratic by the complete formula. Use the quadratic formula, show your substitution and simplification, and match the complete exact real solution set.

Your response: ____________________

Incoming: $\{-2 - \sqrt{3}, -2 + \sqrt{3}\}$

Consider $2x^2 - 3x - 1 = 0$ over the real numbers. State the exact formula roots when the positive discriminant has no square factor. Use the quadratic formula, show your substitution and simplification, and match the complete exact real solution set.

Your response: ____________________

Incoming: $\{-2, 3\}$

Consider $3x^2 - 12 = 0$ over the real numbers. Use $a = 3$ and $b = 0$ directly rather than simplifying the equation first. Use the quadratic formula, show your substitution and simplification, and match the complete exact real solution set.

Your response: ____________________

Algebra 1

Quadratic Formula

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.

Consider $2x^2 + 3x - 5 = 0$ over the real numbers. Read a, b, and c with their signs, then write the full quadratic-formula substitution. Choose how to organize the arithmetic: calculate the discriminant first and then insert it, or write the complete signed formula substitution before simplifying any component. Justify your choice for these coefficients, then show the coefficients and the full formula substitution.

Consider $4x^2 - 9 = 0$ over the real numbers. Insert the absent term explicitly before setting up the formula. Choose how to organize the arithmetic: calculate the discriminant first and then insert it, or write the complete signed formula substitution before simplifying any component. Justify your choice for these coefficients, then show the coefficients and the full formula substitution.

Consider $-x^2 + 6x + 7 = 0$ over the real numbers. Keep the displayed leading sign and form the denominator $2a$. Choose how to organize the arithmetic: calculate the discriminant first and then insert it, or write the complete signed formula substitution before simplifying any component. Justify your choice for these coefficients, then show the coefficients and the full formula substitution.

Consider $3x^2 - 8x + 2 = 0$ over the real numbers. Record the coefficient triple and the unsimplified radical expression. Choose how to organize the arithmetic: calculate the discriminant first and then insert it, or write the complete signed formula substitution before simplifying any component. Justify your choice for these coefficients, then show the coefficients and the full formula substitution.

Quadratic Formula

Full Worked Solutions - excerpt

Worked example

Problem. Consider $6x - 5 = 2x^2$ over the real numbers. Place the quadratic term first without losing the signs of the other terms.

Answer. coefficients: a: 2 ; b: -6 ; c: 5 ; discriminant: -4 ; formula substitution: x = $\frac{-(-6)\pm\sqrt{(-6)^2-4(2)(5)}}{2(2)}$; normalized equation: $2x^2 - 6x + 5 = 0$; solutions:

Explanation and check.

Subtracting the left side from both sides gives $2x^2 - 6x + 5 = 0$, so $a = 2, b = -6, c = 5$.

Worked example

Problem. Consider $(x + 1)^2 = 8$ over the real numbers. Convert the square to standard zero form for a formula substitution. Use the quadratic formula, show your substitution and simplification, and match the complete exact real solution set.

Answer. $\{-1 + 2 \cdot \sqrt{2}\,,\ -2 \cdot \sqrt{2} - 1\}$

Explanation and check.

The signed coefficients are $a = 1, b = 2, c = -7$. In standard form, $x^2 + 2x - 7 = 0$. The discriminant is 32 . Substitution in the quadratic formula gives $x = \frac{-(2)\pm\sqrt{(2)^2-4(1)(-7)}}{2(1)}$. Expanding gives $x^2 + 2x + 1 = 8$; moving 8 left gives $c = -7$ while $b = 2$.

Sets & Steps
Math Practice & Worked Solutions

Algebra 1

Discriminant and Real Roots

Discriminant and Real Roots | A1-U09-P11

96 problems · Four activity formats

Topic focus

This topic is a focused set of 96 practice tasks on Discriminant and Real Roots.

8 PDFs and a README; 89 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

Discriminant and Real Roots

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.

Consider $x^2 - 5x + 6 = 0$. The coefficients are real. Compute only the discriminant and state the number of distinct real roots. Match the discriminant and the requested root classification or graph contact. Classify without solving for the roots. Bank label: _______	Consider $x^2 + 4x + 4 = 0$. The coefficients are real. Classify the real roots from b squared minus $4ac$, without finding the root. Match the discriminant and the requested root classification or graph contact. Classify without solving for the roots. Bank label: _______
Consider $x^2 + 2x + 5 = 0$. The coefficients are real. Use the sign of the formula radicand to classify this equation. Match the discriminant and the requested root classification or graph contact. Classify without solving for the roots. Bank label: _______	Consider $2x^2 - 3x - 2 = 0$. The coefficients are real. Determine the distinct real-root count from the discriminant alone. Match the discriminant and the requested root classification or graph contact. Classify without solving for the roots. Bank label: _______
Consider $2x^2 + x + 2 = 0$. The coefficients are real. Calculate the discriminant sign and interpret it over the reals. Match the discriminant and the requested root classification or graph contact. Classify without solving for the roots. Bank label: _______	Consider $x^2 - 9 = 0$. The coefficients are real. Insert the absent linear coefficient and classify by discriminant sign. Match the discriminant and the requested root classification or graph contact. Classify without solving for the roots. Bank label: _______
Consider $x^2 + 9 = 0$. The coefficients are real. Make $b = 0$ explicit before determining the real-root count. Match the discriminant and the requested root classification or graph contact. Classify without solving for the roots. Bank label: _______	Consider $-2x^2 - 3x - 5 = 0$. The coefficients are real. Track all three signs and classify the roots without multiplying by -1. Match the discriminant and the requested root classification or graph contact. Classify without solving for the roots. Bank label: _______

Algebra 1

Discriminant and Real Roots

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.

Consider $0x^2 + 5x - 1 = 0$. The coefficients are real. Explain why the quadratic discriminant classification is unavailable here.	Consider $-x^2 + 4x - 4 = 0$. The coefficients are real. Retain the negative leading coefficient and evaluate the discriminant.
Consider $4x^2 - 12x + 9 = 0$. The coefficients are real. Check whether the two discriminant terms cancel for this scaled equation.	Consider $(\frac{1}{3})x^2 + (\frac{2}{3})x + \frac{1}{3} = 0$. The coefficients are real. Compute the rational discriminant exactly and classify distinct roots.
Consider $7x^2 = 0$. The coefficients are real. Account for both missing terms and count distinct real roots.	Consider $3(x - 2)^2 = 6x - 15$. The coefficients are real. Expand the square, collect the external linear expression, and classify the resulting contact.

Algebra 1

Discriminant and Real Roots

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 = 41; two distinct irrational roots.

Consider $4x^2 + 3x - 1 = x^2 - 2x + 1$. The coefficients are rational. Collect both polynomials and classify the two exact roots arithmetically. Match the discriminant and the requested root classification or graph contact. Classify without solving for the roots.

Your response: ________________________________

Algebra 1

Discriminant and Real Roots

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.

Consider $x^2 + 4x + k = 0$. Let k be real. Partition all real k by the number of distinct real roots. Choose a classification route: analyze the discriminant inequality, or normalize to a square and analyze its right-hand side. Explain which gives simpler parameter conditions here; first separate any value that makes the equation nonquadratic.

Consider $2x^2 + 3x + k = 0$. Let k be real. Find the exact constant threshold for zero, one, and two real roots. Choose a classification route: analyze the discriminant inequality, or normalize to a square and analyze its right-hand side. Explain which gives simpler parameter conditions here; first separate any value that makes the equation nonquadratic.

Consider $3x^2 - 6x + k = 0$. Let k be real. Use the discriminant to classify every real k without solving any quadratic. Choose a classification route: analyze the discriminant inequality, or normalize to a square and analyze its right-hand side. Explain which gives simpler parameter conditions here; first separate any value that makes the equation nonquadratic.

Consider $-x^2 + 2x + k = 0$. Let k be real. Track the inequality direction for a parameter with negative leading coefficient. Choose a classification route: analyze the discriminant inequality, or normalize to a square and analyze its right-hand side. Explain which gives simpler parameter conditions here; first separate any value that makes the equation nonquadratic.

Discriminant and Real Roots

Full Worked Solutions - excerpt

Worked example

Problem. Consider $-3x^2 + x + 1 = 0$. The coefficients are rational. Use the positive nonsquare discriminant to classify exact root type. Match the discriminant and the requested root classification or graph contact. Classify without solving for the roots.

Answer. D = 13; two distinct irrational roots.

Explanation and check.

The discriminant calculation is $(1)^2 - 4(-3)(1) = 13$. Its square root is $\sqrt{13}$. The coefficients are rational, but $\sqrt{13}$ is not, so both real roots are irrational. The discriminant is 13; its square root is $\sqrt{13}$, so the equation has two distinct irrational roots.

Worked example

Problem. Consider $2x^2 - 8 = 0$. The coefficients are rational. Insert $b = 0$ and determine whether the symmetric roots are rational. Match the discriminant and the requested root classification or graph contact. Classify without solving for the roots.

Answer. D = 64; two distinct rational roots.

Explanation and check.

The discriminant calculation is $(0)^2 - 4(2)(-8) = 64$. Its square root is 8. The discriminant 64 has rational radical 8. The discriminant is 64; its square root is 8, so the equation has two distinct rational roots.

Sets & Steps
Math Practice & Worked Solutions

Algebra 1

Quadratic Word Problems

Quadratic Word Problems | A1-U09-P12

96 problems · Four activity formats

Topic focus

This topic is a focused set of 96 practice tasks on Quadratic Word Problems.

8 PDFs and a README; 126 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

Quadratic Word Problems

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.

A rectangular herb plot has 46 meters of edging. Let w be its width. Build the area function, state its square-meter unit, and give the open domain that keeps both dimensions positive. Match the complete original model with its requested units, meaningful domain and interpretation or verification. The coefficient polynomial alone is not the complete contextual response.

Context	A rectangular herb plot uses all 46 meters of edging on four sides.
Variable definition	w is the width in meters
Length unit	meters
Area unit	square meters

Bank label: ______

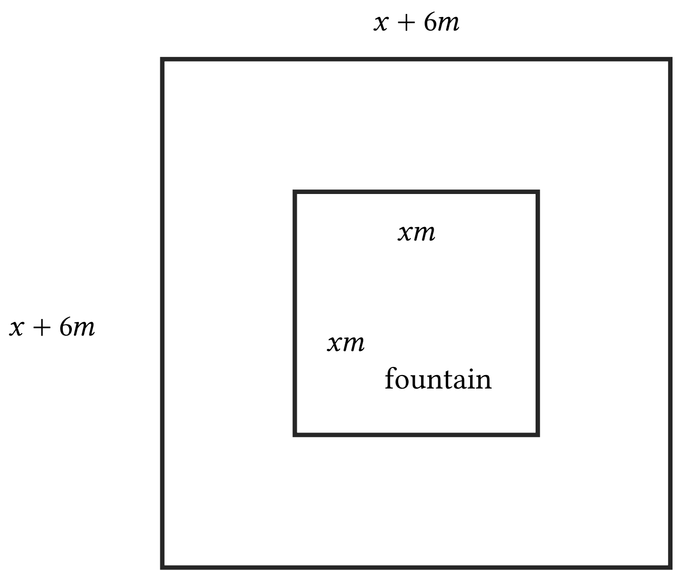
Algebra 1

Quadratic Word Problems

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 centered square fountain has side x, and the surrounding square plaza has side $x + 6$ meters. Build the walkable ring-area model by distinguishing the two dependent squares.



Context	A square plaza of side $x + 6$ meters surrounds a centered square fountain of side x meters.
Variable definition	x is the fountain side length in meters
Length unit	meters
Area unit	square meters

Algebra 1

Quadratic Word Problems

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: feasible domain: $0 \leq x \leq 20$; x is an integer; model: $R(x) = (12 + x)(180 - 9x)$; output unit: dollars

A concert forecast pairs each 2-dollar discount with 16 additional ticket sales, starting from 30 dollars and 240 sales. Model revenue by discount count d and prevent a negative ticket price. Match the complete original model with its requested units, meaningful domain and interpretation or verification. The coefficient polynomial alone is not the complete contextual response.

Context	A fictional concert sells 240 tickets at 30 dollars; every 2-dollar discount adds 16 predicted sales.
Variable definition	d is the number of 2-dollar discounts
Factor relations	price=$30 - 2d$ dollars, tickets=$240 + 16d$
Output unit	dollars

Your response: ____________

Incoming: feasible domain: $0 \leq d \leq 15$; d is an integer; model: $R(d) = (30 - 2d)(240 + 16d)$; output unit: dollars

A table is organized by blocks of five extra tour visitors. Starting from 20 visitors at 28 dollars each, every added block lowers everyone's rate by 1 dollar. Write total income in b and preserve the block-count domain. Match the complete original model with its requested units, meaningful domain and interpretation or verification. The coefficient polynomial alone is not the complete contextual response.

additional blocks	**visitors**	**rate (dollars/visitor)**	**income (dollars)**
0	20	28	560
4	40	24	960
12	80	16	1280

Context	A fictional museum tour charges 28 dollars per visitor for 20 visitors and lowers the per-person rate by 1 dollar for each additional block of 5 visitors.
Variable definition	b is the number of additional 5-visitor blocks
Factor relations	visitors=$20 + 5b$, rate=28-b dollars per visitor
Output unit	dollars

Your response: ____________

Algebra 1

Quadratic Word Problems

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.

The exact table has $R(0) = 2, R(1) = 6$, and $R(2) = 14$. Given $R(x) = ax^2 + bx + 2$, recover a and b and verify the row at $x = 2$. Choose a calibration setup: use the known initial value to reduce the coefficient unknowns first, or write the full observation equations and eliminate systematically. Explain which setup is more economical for these data, then complete the original model and verification requirements.

input	**output (response units)**
0	2
1	6
2	14

Context	A sensor response follows $R(x) = ax^2 + bx + 2$.
Variable definition	x is the input setting
Known initial value	$R(0) = 2$
Measurement unit	response units

For $Q(x) = ax^2 + bx + 5$, the table gives $Q(-1) = 4$ and $Q(1) = 8$. Add and subtract the equations to recover the even and odd contributions. Choose a calibration setup: use the known initial value to reduce the coefficient unknowns first, or write the full observation equations and eliminate systematically. Explain which setup is more economical for these data, then complete the original model and verification requirements.

input	**output (calibration units)**
-1	4
0	5
1	8

Context	A calibration curve is $Q(x) = ax^2 + bx + 5$.
Variable definition	x is signed control offset
Known initial value	$Q(0) = 5$
Measurement unit	calibration units

Quadratic Word Problems

Full Worked Solutions - excerpt

Worked example

Problem. A model multiplies 2 meters by x centimeters and labels $2x$ as square meters. Repair the unit conversion and area rule.

Context	A panel is 2 meters wide and x centimeters tall.
Supplied rule	area equals width times height
Proposed argument	$A(x) = 2x$ square meters.

Answer. correction: convert x centimeters to $\frac{x}{100}$ meters, so $A(x) = \frac{x}{50}$ square meters; defect: the factors use incompatible length units; evidence: x centimeters = $\frac{x}{100}$ meters, $2(\frac{x}{100}) = \frac{x}{50}$

Explanation and check.

Convert the height before multiplying: x centimeters is $\frac{x}{100}$ meters. The area is $2(\frac{x}{100}) = \frac{x}{50}$ square meters.

Worked example

Problem. A student treats $A(15) = -45$ as a possible rectangular area for $A = x(12 - x)$. Identify the first contextual failure and repair the domain.

Context	A rectangle has width x meters and length 12-x meters.
Supplied rule	$A(x) = x(12 - x)$
Proposed argument	Use $x = 15$ because the algebra returns $A(15) = -45$.

Answer. correction: restrict the geometry to $0 < x < 12$; negative area is not a physical rectangle; defect: x = 15 makes the dependent length -3 meters; evidence: $12 - 15 = -3$ meters, valid dimensions must be positive

Explanation and check.

At $x = 15$ the other side is -3 meters, so no rectangle exists. The correct model domain is $0 < x < 12$; the negative algebraic output is outside that domain.

Sets & Steps
Math Practice & Worked Solutions

Algebra 1

Linear-Quadratic Systems

Linear-Quadratic Systems | A1-U09-P13

96 problems · Four activity formats

Topic focus

Across 96 tasks this topic asks for feasible equal-output events with units, complete set of real ordered pairs, diagnosis and complete corrected ordered-pair set and complete parameter partition by 0, 1, or 2 intersections.

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

Linear-Quadratic Systems

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.

$f(x) = -2x^2 - 3x + 10$ and $g(x) = -3x + 2$. Determine the complete real solution set of this line-quadratic system, then check each coordinate in both rules. Match the complete ordered-pair set, or the constructed line with all requested contact points. Keep every original substitution check.

Quadratic rule	$f(x) = -2x^2 - 3x + 10$
Line rule	$g(x) = -3x + 2$
Required check	each ordered pair must satisfy both displayed rules

Bank label: ______

$f(x) = x^2 - 9x + 3$ and $g(x) = -4x + 3$. Solve for the common inputs and recover the matching output for each one. Give points, not roots alone. Match the complete ordered-pair set, or the constructed line with all requested contact points. Keep every original substitution check.

Quadratic rule	$f(x) = x^2 - 9x + 3$
Line rule	$g(x) = -4x + 3$
Required check	each ordered pair must satisfy both displayed rules

Bank label: ______

$f(x) = x^2 + 4x - 7$ and $g(x) = 2x + 1$. Locate all real intersections algebraically and verify that every reported point lies on both relations. Match the complete ordered-pair set, or the constructed line with all requested contact points. Keep every original substitution check.

Quadratic rule	$f(x) = x^2 + 4x - 7$
Line rule	$g(x) = 2x + 1$
Required check	each ordered pair must satisfy both displayed rules

Bank label: ______

$f(x) = -x^2 + 13$ and $g(x) = 4$. First decide whether there are zero, one, or two real intersections; then report all ordered pairs. Match the complete ordered-pair set, or the constructed line with all requested contact points. Keep every original substitution check.

Quadratic rule	$f(x) = -x^2 + 13$
Line rule	$g(x) = 4$
Required check	each ordered pair must satisfy both displayed rules

Bank label: ______

Algebra 1

Linear-Quadratic Systems

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.

$f(x) = 3x^2 + \frac{7}{2}x + \frac{19}{4}$ and $g(x) = \frac{1}{2}x + 2$. Locate all real intersections algebraically and verify that every reported point lies on both relations.

Quadratic rule	$f(x) = 3x^2 + \frac{7}{2}x + \frac{19}{4}$
Line rule	$g(x) = \frac{1}{2}x + 2$
Required check	each ordered pair must satisfy both displayed rules

$f(x) = -x^2 + 9x - 15$ and $g(x) = 3x - 4$. Find every ordered pair shared by the line and the parabola. Show the equation obtained by equating their outputs.

Quadratic rule	$f(x) = -x^2 + 9x - 15$
Line rule	$g(x) = 3x - 4$
Required check	each ordered pair must satisfy both displayed rules

$f(x) = \frac{3}{2}x^2 - \frac{1}{3}x - \frac{1}{4}$ and $g(x) = \frac{5}{3}x - \frac{7}{4}$. Use the most revealing exact method for the difference equation and state the full intersection set.

Quadratic rule	$f(x) = \frac{3}{2}x^2 - \frac{1}{3}x - \frac{1}{4}$
Line rule	$g(x) = \frac{5}{3}x - \frac{7}{4}$
Required check	each ordered pair must satisfy both displayed rules

Where does $x = 0$ meet $y = -x^2 + 2x + 5$? Treat the line as a fixed input rather than trying to write it as $y = mx + b$.

Quadratic rule	$y = -x^2 + 2x + 5$
Line relation	$x = 0$

Algebra 1

Linear-Quadratic Systems

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: points: (x: -3; y: $\frac{19}{2}$); real intersection count: 1

Find all points where $y = x^2$ reaches the horizontal line $y = 9$. Match the complete ordered-pair set, or the constructed line with all requested contact points. Keep every original substitution check.

Quadratic rule	$y = x^2$
Line relation	$y = 9$

Your response: ______________________

Incoming: points: (x: -2; y: 5); real intersection count: 1

The line $x = \frac{1}{2}$ cannot be isolated as a y-function. Substitute its exact input into $y = 2x^2 - 3x + 1$ and report the point. Match the complete ordered-pair set, or the constructed line with all requested contact points. Keep every original substitution check.

Quadratic rule	$y = 2x^2 - 3x + 1$
Line relation	$x = \frac{1}{2}$

Your response: ______________________

Incoming: points: (x: $-\frac{3}{2}$; y: $-\frac{17}{4}$); real intersection count: 1

Evaluate the system $y = -2x^2 + 7x - 5$ with $x = -1$. Pay attention to the signs produced by the negative fixed input. Match the complete ordered-pair set, or the constructed line with all requested contact points. Keep every original substitution check.

Quadratic rule	$y = -2x^2 + 7x - 5$
Line relation	$x = -1$

Your response: ______________________

Incoming: points: (x: $-\frac{1}{2}$; y: $\frac{3}{2}$), (x: $\frac{1}{2}$; y: $\frac{3}{2}$); real intersection count: 2

Solve the fixed-output system formed by $y = -2x^2 + 4$ and $y = \frac{7}{2}$, giving ordered pairs exactly. Match the complete ordered-pair set, or the constructed line with all requested contact points. Keep every original substitution check.

Quadratic rule	$y = -2x^2 + 4$
Line relation	$y = \frac{7}{2}$

Your response: ______________________

Incoming: points: (x: $\frac{1}{2}$; y: 3), (x: 2; y: 6); real intersection count: 2

Reduce or isolate the line $4x + 2y = 6$, then coordinate its outputs with $y = 2x^2 + 2x - 3$. Match the complete ordered-pair set, or the constructed line with all requested contact points. Keep every original substitution check.

Quadratic rule	$y = 2x^2 + 2x - 3$
Line relation	$4x + 2y = 6$

Your response: ______________________

Incoming: points: ; real intersection count: 0

Report the ordered pair common to $y = -2x^2\text{-}x + 4$ and the non-isolated line relation $x = 1$. Match the complete ordered-pair set, or the constructed line with all requested contact points. Keep every original substitution check.

Quadratic rule	$y = -2x^2\text{-}x + 4$
Line relation	$x = 1$

Your response: ______________________

Algebra 1

Linear-Quadratic Systems

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.

$f(x) = x^2 + 2x - 4$ and $g(x) = x + 2$. Find every ordered pair shared by the line and the parabola. Show the equation obtained by equating their outputs. After equating the outputs as requested, choose factoring or the quadratic formula for the resulting equation. Justify the choice from its coefficients, then recover every shared ordered pair and verify both original rules.

Quadratic rule	$f(x) = x^2 + 2x - 4$
Line rule	$g(x) = x + 2$
Required check	each ordered pair must satisfy both displayed rules

$f(x) = -x^2 + 3x + 5$ and $g(x) = 2x - 1$. Solve for the common inputs and recover the matching output for each one. Give points, not roots alone. After equating the outputs as requested, choose factoring or the quadratic formula for the resulting equation. Justify the choice from its coefficients, then recover every shared ordered pair and verify both original rules.

Quadratic rule	$f(x) = -x^2 + 3x + 5$
Line rule	$g(x) = 2x - 1$
Required check	each ordered pair must satisfy both displayed rules

Linear-Quadratic Systems

Full Worked Solutions - excerpt

Worked example

Problem. Does the horizontal line $y = 3$ meet $y = x^2 - 2x + 5$ over the reals? Justify the complete intersection set.

Quadratic rule	$y = x^2 - 2x + 5$
Line relation	$y = 3$

Answer. points: ; real intersection count: 0

Explanation and check.

The horizontal condition makes $x^2 - 2x + 5 = 3$. Solving gives the listed input value(s); each has output 3.

Worked example

Problem. Where does $x = 0$ meet $y = -x^2 + 2x + 5$? Treat the line as a fixed input rather than trying to write it as $y = mx + b$.

Quadratic rule	$y = -x^2 + 2x + 5$
Line relation	$x = 0$

Answer. points: (x: 0; y: 5); real intersection count: 1

Explanation and check.

A vertical line fixes $x = 0$. Direct evaluation of the quadratic gives $y = 5$, so the unique shared point is $(0, 5)$.

Sets & Steps
Math Practice & Worked Solutions

Algebra 1

Solving Quadratics Using Graphs

Solving Quadratics Using Graphs | A1-U09-P14

96 problems · Four activity formats

Topic focus

Across 96 tasks this topic asks for correct difference-function graph and its zeros, justified root bracket or exact endpoint root, diagnosis and corrected graphical root statement, root conclusion and decisive exact evidence, complete set of distinct real roots and better window choice with justified precision.

8 PDFs and a README; 361 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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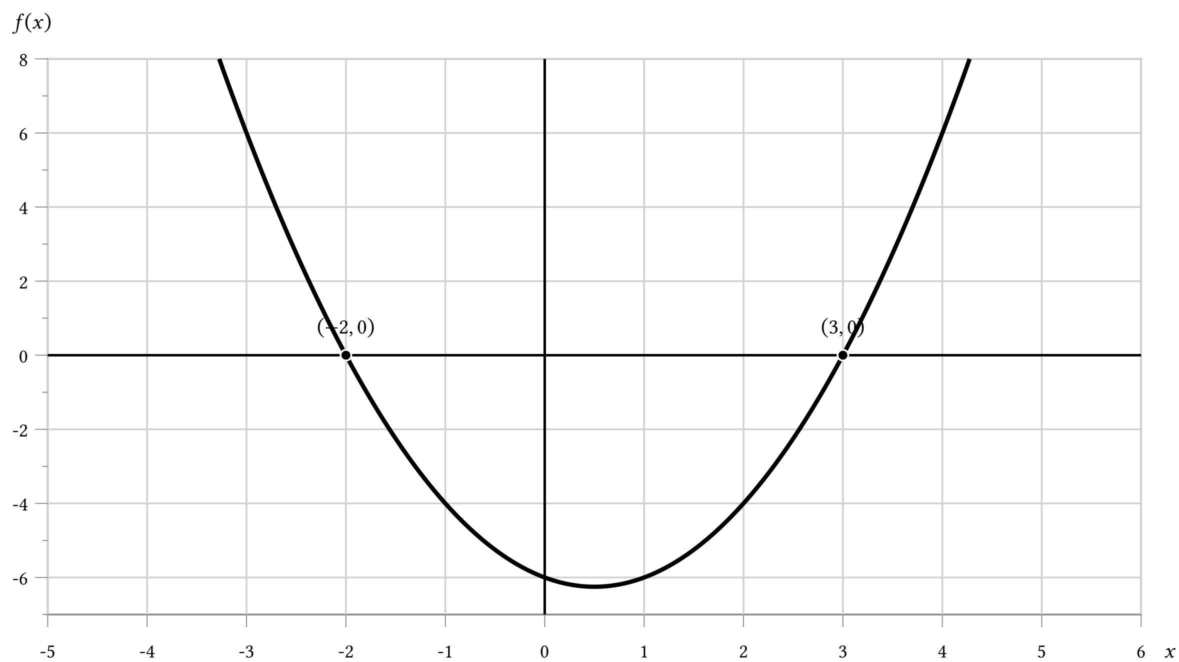
Algebra 1

Solving Quadratics Using Graphs

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.

The exact unit-grid graph of $f(x) = x^2\text{-}x - 6$ marks both x-intercepts. State the roots. Match the complete original graphical response, including the chosen zero-function graph or level and any excluded inputs where requested. Read the preserved graph at its stated precision.



Graph data	**Value**
Rule	$f(x) = x^2\text{-}x - 6$
Window	$x \in [-5, 6]$; $y \in [-7, 8]$
Minor tick intervals	x: 1; y: 1
Coordinate labels	exact
Axes / units	x/ units; $f(x)$/ units
Axes	Shared coordinate axes
Supplied visible labels	$(-2, 0)$; $(3, 0)$

Bank label: ______

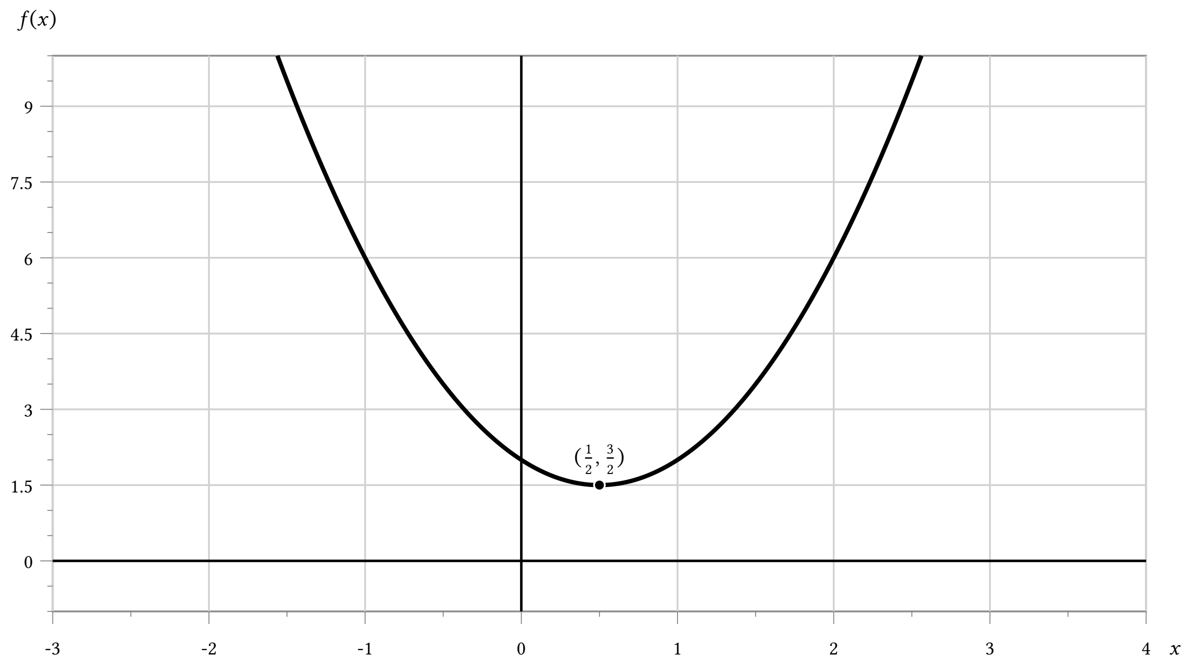
Algebra 1

Solving Quadratics Using Graphs

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.

The vertex of $f(x) = 2x^2 - 2x + 2$ is exactly labeled above $y = 0$. Use the opening to determine the root set.



Graph data	Value
Rule	$f(x) = 2x^2 - 2x + 2$
Window	$x \in [-3, 4]$; $y \in [-1, 10]$
Minor tick intervals	x: $\frac{1}{2}$; y: $\frac{1}{2}$
Coordinate labels	exact
Axes / units	x/ units; $f(x)$/ units
Axes	Shared coordinate axes
Opening	up
Certified Extremum Relative To Axis	above
Supplied visible labels	$(\frac{1}{2}, \frac{3}{2})$

Algebra 1

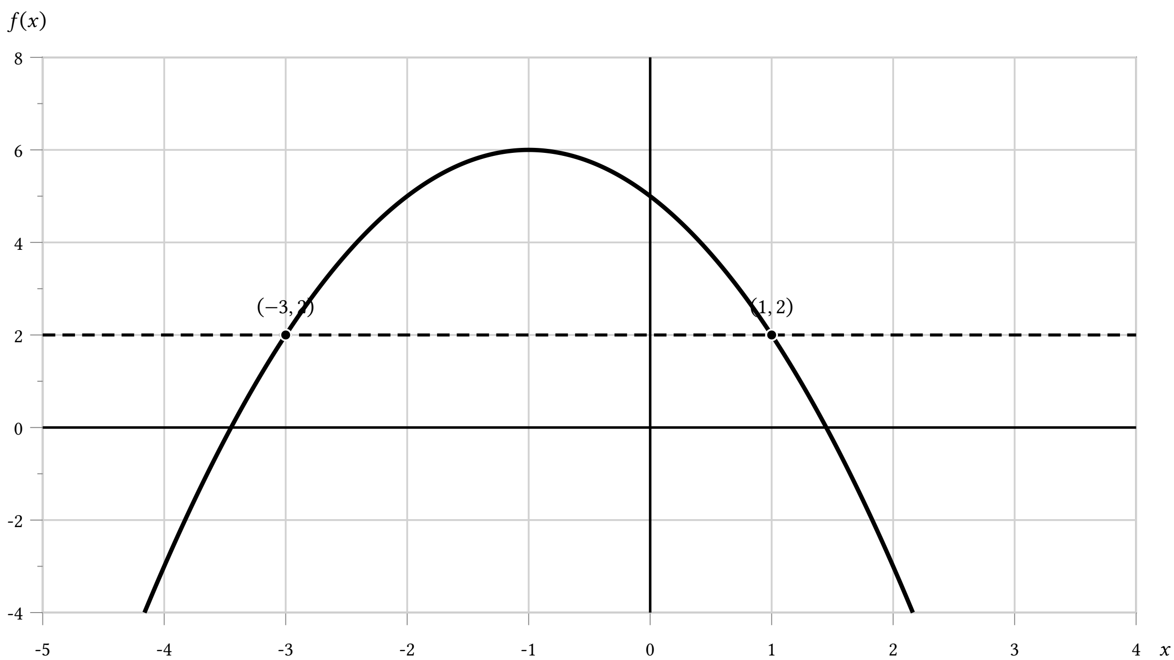
Solving Quadratics Using Graphs

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: excluded or clipped inputs: ; inputs: $-1, 5$; level: 10

For $f(x) = -x^2 - 2x + 5$, solve $f(x) = 2$ graphically on $-5 \leq x \leq 4$. The requested level lies below the maximum. Match the complete original graphical response, including the chosen zero-function graph or level and any excluded inputs where requested. Read the preserved graph at its stated precision.



Graph data	Value
Rule	$f(x) = -x^2 - 2x + 5$
Window	$x \in [-5, 4]$; $y \in [-4, 8]$
Minor tick intervals	x: 1; y: 1
Coordinate labels	exact
Axes / units	x/ units; $f(x)$/ units
Axes	Shared coordinate axes
Requested line	$y = 2$
Supplied visible labels	$(-3, 2)$; $(1, 2)$

Your response: ______________

Algebra 1

Solving Quadratics Using Graphs

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.

Near-axis data for $f(x) = x^2 - 4x + 4$ have the same sign at $x = 1$ and $x = 3$. Decide whether a tangent root is possible and cite decisive evidence. Compare what the endpoint sign test establishes with what the original exact resolving evidence establishes. Explain why equal endpoint signs alone cannot rule out a tangent root or two crossings, then answer the original root question.

Display precision: exact. Exact values and rounded displays have distinct roles.

x	f(x)
1	1
3	1

Near-axis data for $f(x) = -2x^2 - 4x - 2$ have the same sign at $x = -2$ and $x = 0$. Do not conclude no root from the missing sign change. Compare what the endpoint sign test establishes with what the original exact resolving evidence establishes. Explain why equal endpoint signs alone cannot rule out a tangent root or two crossings, then answer the original root question.

Display precision: exact. Exact values and rounded displays have distinct roles.

x	f(x)
−2	−2
0	−2

Solving Quadratics Using Graphs

Full Worked Solutions - excerpt

Worked example

Problem. Near-axis data for $f(x) = x^2 - 4x + 4$ have the same sign at $x = 1$ and $x = 3$. Decide whether a tangent root is possible and cite decisive evidence. Compare what the endpoint sign test establishes with what the original exact resolving evidence establishes. Explain why equal endpoint signs alone cannot rule out a tangent root or two crossings, then answer the original root question.

Display precision: exact. Exact values and rounded displays have distinct roles.

x	f(x)
1	1
3	1

Answer. decisive evidence: exact vertex: x: 2; y: 0; opening: up; has real root: True; roots: 2

Explanation and check.

Same-sign samples do not exclude a root. Exact vertex data show $f(2) = 0$, so $x = 2$ is a repeated root with no sign change. A sign change certifies a crossing on a continuous interval. Equal signs alone are inconclusive; use the original exact vertex, rule, or resolving evidence without inventing precision.

Worked example

Problem. Near-axis data for $f(x) = -2x^2 - 4x - 2$ have the same sign at $x = -2$ and $x = 0$. Do not conclude no root from the missing sign change. Compare what the endpoint sign test establishes with what the original exact resolving evidence establishes. Explain why equal endpoint signs alone cannot rule out a tangent root or two crossings, then answer the original root question.

Display precision: exact. Exact values and rounded displays have distinct roles.

x	f(x)
-2	-2
0	-2

Answer. decisive evidence: exact vertex: x: -1; y: 0; opening: down; has real root: True; roots: -1

Explanation and check.

Same-sign samples do not exclude a root. Exact vertex data show $f(-1) = 0$, so $x = -1$ is a repeated root with no sign change. A sign change certifies a crossing on a continuous interval. Equal signs alone are inconclusive; use the original exact vertex, rule, or resolving evidence without inventing precision.

Sets & Steps
Math Practice & Worked Solutions

Algebra 1

Choosing a Quadratic Solving Method

Choosing a Quadratic Solving Method | A1-U09-P16

96 problems · Four activity formats

Topic focus

Across 96 tasks this topic asks for equivalence verdict, solution effect, witness, and corrected step, validity verdict, completeness verdict, corrected set, and certificate, recommended method, structural reason, and first step, chosen independent tool, independence reason, outcome, and limitation, validity, shared solution set, efficiency reason, and preferred route and constructed equation, method-sensitive justification, root set, and independent verification.

8 PDFs and a README; 70 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.

Published by Tusils LLC.

Algebra 1

Choosing a Quadratic Solving Method

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.

For $(x-4)(x+3)=0$, choose the most efficient solution method for the requirement "find all exact real roots." State the structural reason and a valid first step. Both factors must be checked. Match the complete requested strategy with its actual first-step equality or branches, constructed equation, or full set-verification response. A method label alone is insufficient. Do not carry out routine solving where the original asks only for strategy and first step. Bank label: ______	For $(x+2)^2=25$, choose the most efficient solution method for the requirement "give exact real roots." State the structural reason and a valid first step. The plus-minus symbol preserves both branches. Match the complete requested strategy with its actual first-step equality or branches, constructed equation, or full set-verification response. A method label alone is insufficient. Do not carry out routine solving where the original asks only for strategy and first step. Bank label: ______
Decide whether factoring, the square-root method, completing the square, the quadratic formula, or graphing is best for $x^2+7x+12=0$ under this answer requirement: solve exactly with minimal arithmetic. The factorization is visible without formula arithmetic. Match the complete requested strategy with its actual first-step equality or branches, constructed equation, or full set-verification response. A method label alone is insufficient. Do not carry out routine solving where the original asks only for strategy and first step. Bank label: ______	Select a solution route for $x^2-2x-7=0$ that respects this precision demand: estimate roots to the nearest tenth from a displayed curve. Explain why a different representation would be less suitable. An exact radical is not the requested answer form. Match the complete requested strategy with its actual first-step equality or branches, constructed equation, or full set-verification response. A method label alone is insufficient. Do not carry out routine solving where the original asks only for strategy and first step. Bank label: ______

Algebra 1

Choosing a Quadratic Solving Method

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.

Audit these two correct approaches to $9x^2 - 12x + 4 = 0$ under the requirement "identify the distinct root and verify multiplicity two." A: factor $(3x-2)^2 = 0$. B: compute discriminant 0 and use $x = \frac{12}{18} = \frac{2}{3}$. Which better preserves the requested answer form, and why? The zero discriminant independently confirms the double root.	Audit these two correct approaches to $x^2 - 6x + 12 = 0$ under the requirement "prove there are no real roots." A: complete $(x-3)^2 = -3$. B: compute discriminant $36 - 48 = -12$. Which better preserves the requested answer form, and why? The negative discriminant is an equally valid certificate.
Two valid routes solve $(\frac{1}{3})x^2 - (\frac{4}{3})x + 1 = 0$. Route A: multiply by 3 and factor $x^2 - 4x + 3$. Route B: apply the formula to fractional coefficients. Compare their efficiency without treating the longer route as incorrect. Route B is valid but less convenient.	For $2x^2 + x - 4 = 0$, compare the algebraic route "use $x = \frac{-1\pm\sqrt{33}}{4}$, then approximate." with the representation-based route "graph and read approximate intercepts near -1.69 and 1.19.." State what each can certify and which fits exact roots and a decimal reasonableness check. Approximate graph values do not replace exact answers.
Audit these two correct approaches to $x^2 - 8x + 10 = 0$ under the requirement "exact roots and their midpoint." A: complete $(x-4)^2 = 6$, giving $4 \pm \sqrt{6}$. B: use $\frac{8\pm\sqrt{24}}{2}$ and simplify. Which better preserves the requested answer form, and why? Formula results are equivalent after simplification.	Two valid routes solve $4x^2 - 4x - 15 = 0$. Route A: split $-4x$ as $6x - 10x$ and factor by grouping. Route B: recognize directly $(2x-5)(2x+3) = 0$. Compare their efficiency without treating the longer route as incorrect. Both factorizations encode the same zero-product branches.

Algebra 1

Choosing a Quadratic Solving Method

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: constraint audit: the midpoint is 3 and each root is distance 4 from it.; equation: $(x-3)^2 = 16$; favored method: the square-root method; roots: $\{-1, 7\}$; verification: expansion gives $x^2 - 6x - 7 = 0 = (x+1)(x-7)$.

Construct a quadratic equation satisfying these independent requirements: use midpoint -2 and irrational offsets $\sqrt{5}$. The visible form must genuinely favor completing the square, and the roots must be $-2 \pm \sqrt{5}$. Give the equation and verify it by a different route. The equation starts in standard form so completion is a meaningful choice. Match the complete requested strategy with its actual first-step equality or branches, constructed equation, or full set-verification response. A method label alone is insufficient. Do not carry out routine solving where the original asks only for strategy and first step.

Your response: ______________

Incoming: constraint audit: dividing by x would violate the completeness requirement.; equation: $x(2x+3) = 0$; favored method: factoring; roots: $\{-\frac{3}{2}, 0\}$; verification: expansion gives $2x^2 + 3x = 0$, and direct substitution confirms both values.

Construct a quadratic equation satisfying these independent requirements: use symmetric rational roots $\pm\frac{5}{2}$ and a leading coefficient 4. The visible form must genuinely favor factoring as a difference of squares, and the roots must be $-\frac{5}{2}$ and $\frac{5}{2}$. Give the equation and verify it by a different route. The leading coefficient requirement is satisfied independently. Match the complete requested strategy with its actual first-step equality or branches, constructed equation, or full set-verification response. A method label alone is insufficient. Do not carry out routine solving where the original asks only for strategy and first step.

Your response: ______________

Incoming: constraint audit: the root sum is zero, consistent with the missing linear term.; equation: $4x^2 - 25 = 0$; favored method: factoring as a difference of squares; roots: $\{-\frac{5}{2}, \frac{5}{2}\}$; verification: isolating $x^2 = \frac{25}{4}$ and taking both square roots confirms the pair.

Construct a quadratic equation satisfying these independent requirements: use axis $x = \frac{3}{2}$ and offsets $\frac{\sqrt{7}}{2}$ while keeping integer standard coefficients. The visible form must genuinely favor completing the square, and the roots must be $\frac{3\pm\sqrt{7}}{2}$. Give the equation and verify it by a different route. The method requirement determines the chosen linear coefficient. Match the complete requested strategy with its actual first-step equality or branches, constructed equation, or full set-verification response. A method label alone is insufficient. Do not carry out routine solving where the original asks only for strategy and first step.

Your response: ______________

Incoming: certificate: $(x+2)(x-3) = 0$ gives exactly -2 and 3.; complete: no; correct solution set: $\{-2, 3\}$; listed values valid: no

For $6x^2 + x - 2 = 0$, a proposed real solution set is $\{-\frac{2}{3}, \frac{1}{2}\}$. Decide separately whether every listed value is valid and whether the set is complete. Exact fractions are retained. Match the complete requested strategy with its actual first-step equality or branches, constructed equation, or full set-verification response. A method label alone is insufficient. Do not carry out routine solving where the original asks only for strategy and first step.

Your response: ______________

Algebra 1

Choosing a Quadratic Solving Method

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.

Two valid routes solve $x^2 - 5x + 6 = 0$. Route A: factor to $(x - 2)(x - 3) = 0$, giving $x = 2$ or 3. Route B: use the quadratic formula to obtain $\frac{5 \pm 1}{2}$, giving $x = 2$ or 3. Compare their efficiency without treating the longer route as incorrect. Formula use is not an error. Compare the two original routes for validity and efficiency under the stated answer requirement. Do not label a longer correct route as an error; justify any preference from the visible equation structure.

Both traces for $(x - 4)^2 = 9$ claim the same solution set. Route A: take $x - 4 = \pm 3$, so $x = 1$ or 7. Route B: expand to $x^2 - 8x + 7 = 0$ and apply the formula, obtaining $x = 1$ or 7. Compare how each route preserves all branches and identify the more direct one. Both routes retain plus and minus. Compare the two original routes for validity and efficiency under the stated answer requirement. Do not label a longer correct route as an error; justify any preference from the visible equation structure.

Two valid routes solve $x^2 + 4x - 5 = 0$. Route A: complete $(x + 2)^2 = 9$, then get $x = 1$ or -5. Route B: use $\frac{-4 \pm 6}{2}$, then get $x = 1$ or -5. Compare their efficiency without treating the longer route as incorrect. The formula is still exact. Compare the two original routes for validity and efficiency under the stated answer requirement. Do not label a longer correct route as an error; justify any preference from the visible equation structure.

For $x^2 - 2 = 0$, compare the algebraic route "solve exactly as $x = \pm\sqrt{2}$ and round to ± 1.41." with the representation-based route "read graph intercepts near -1.41 and 1.41 from a sufficiently scaled graph.." State what each can certify and which fits roots to the nearest hundredth. The graph is valid at the requested precision if its scale supports hundredths. Compare the two original routes for validity and efficiency under the stated answer requirement. Do not label a longer correct route as an error; justify any preference from the visible equation structure.

Choosing a Quadratic Solving Method

Full Worked Solutions - excerpt

Worked example

Problem. What should be the strategic first step for $9x^2 - 16 = 0$ if the goal is find exact roots? Name the method that this step prepares. This avoids unnecessary formula substitution. Match the complete requested strategy with its actual first-step equality or branches, constructed equation, or full set-verification response. A method label alone is insufficient. Do not carry out routine solving where the original asks only for strategy and first step.

Answer. decisive structure: the left side is a difference of squares; first step: factor as $(3x - 4)(3x + 4) = 0$; method: factoring

Explanation and check.

The decisive feature is the left side is a difference of squares. Therefore use factoring. A valid strategic first step is factor as $(3x - 4)(3x + 4) = 0$. This avoids unnecessary formula substitution.

Worked example

Problem. Two valid routes solve $(\frac{1}{3})x^2 - (\frac{4}{3})x + 1 = 0$. Route A: multiply by 3 and factor $x^2 - 4x + 3$. Route B: apply the formula to fractional coefficients. Compare their efficiency without treating the longer route as incorrect. Route B is valid but less convenient.

Answer. both valid: True; common solution set: $\{1\,,\ 3\}$; preferred route: Route A; reason: nonzero scaling preserves roots and removes fraction arithmetic.

Explanation and check.

Both routes are reversible and give $\{1, 3\}$. Route A is more efficient here because nonzero scaling preserves roots and removes fraction arithmetic. The other route remains mathematically valid. Route B is valid but less convenient.