Sets & Steps
Math Practice & Worked Solutions

Algebra 1

Factoring to Quadratic Roots & Graphs | Algebra 1 | 7-Topic Bundle

7-topic bundle | 672 problems | Four activity formats

Included topics

The following pages list all 7 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.

56 PDFs and 7 READMEs; 746 buyer PDF pages across the 7 products.

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

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

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Sets & Steps
Math Practice & Worked Solutions

Algebra 1

Included topics

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View individual product and its full preview

7 included resources | Complete resource previews follow this guide.

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Sets & Steps
Math Practice & Worked Solutions

Algebra 1

Greatest Common Factor of Polynomials

Greatest Common Factor of Polynomials | A1-U08-P07

96 problems · Four activity formats

Topic focus

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

8 PDFs and a README; 63 buyer pages.

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

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Algebra 1

Greatest Common Factor of Polynomials

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

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

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

Algebra 1

Greatest Common Factor of Polynomials

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

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

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

Algebra 1

Greatest Common Factor of Polynomials

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

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

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

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

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

Your response: _____

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

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

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

Your response: _____

Incoming: x.

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

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

Your response: _____

Incoming: a^2b^2.

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

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

Your response: _____

START

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

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

Your response: _____

Incoming: $12p^2$.

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

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

Your response: _____

Algebra 1

Greatest Common Factor of Polynomials

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

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

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

Terms: $6x$, 9

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

Terms: $8y$, 12

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

Terms: $10a$, $15a$

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

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

Greatest Common Factor of Polynomials

Full Worked Solutions - excerpt

Worked example

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

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

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

Explanation and check.

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

Worked example

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

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

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

Explanation and check.

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

Sets & Steps
Math Practice & Worked Solutions

Algebra 1

Factoring Trinomials

Factoring Trinomials | A1-U08-P08

96 problems · Four activity formats

Topic focus

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

8 PDFs and a README; 64 buyer pages.

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

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Algebra 1

Factoring Trinomials

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

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

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

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

Bank label: _____

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

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

Bank label: _____

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

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

Bank label: _____

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

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

Bank label: _____

Algebra 1

Factoring Trinomials

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

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

State the signed pair you use and the resulting factorization.

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

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

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

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

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

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

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

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

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

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

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

Algebra 1

Factoring Trinomials

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

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

START

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

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

Your response: _____

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

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

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

Your response: _____

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

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

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

Your response: _____

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

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

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

Your response: _____

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

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

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

Your response: _____

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

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

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

Your response: _____

Algebra 1

Factoring Trinomials

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

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

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

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

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

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

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

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

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

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

Factoring Trinomials

Full Worked Solutions - excerpt

Worked example

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

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

Answer. No integer factorization is available.

Explanation and check.

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

Worked example

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

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

Answer. No factorization into monic integer binomials exists.

Explanation and check.

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

Sets & Steps
Math Practice & Worked Solutions

Algebra 1

Difference of Squares

Difference of Squares | A1-U08-P09

96 problems · Four activity formats

Topic focus

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

8 PDFs and a README; 49 buyer pages.

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

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Algebra 1

Difference of Squares

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

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

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

Algebra 1

Difference of Squares

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

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

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

Algebra 1

Difference of Squares

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

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

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

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

Your response: _____

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

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

Your response: _____

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

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

Your response: _____

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

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

Your response: _____

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

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

Your response: _____

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

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

Your response: _____

Algebra 1

Difference of Squares

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

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

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

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

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

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

Difference of Squares

Full Worked Solutions - excerpt

Worked example

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

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

Explanation and check.

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

Worked example

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

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

Explanation and check.

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

Sets & Steps
Math Practice & Worked Solutions

Algebra 1

Factoring Polynomials Completely

Factoring Polynomials Completely | A1-U08-P10

96 problems · Four activity formats

Topic focus

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

8 PDFs and a README; 51 buyer pages.

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Algebra 1

Factoring Polynomials Completely

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

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

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

Algebra 1

Factoring Polynomials Completely

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

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

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

Algebra 1

Factoring Polynomials Completely

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

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

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

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

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

Your response: _____

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

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

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

Your response: _____

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

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

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

Your response: _____

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

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

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

Your response: _____

START

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

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

Your response: _____

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

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

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

Your response: _____

Algebra 1

Factoring Polynomials Completely

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

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

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

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

Available methods: GCF trinomial grouping

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

Expression: $x^4 - 81$

Available methods: GCF difference of squares trinomial

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

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

Given structural clue: four terms with matching local quotients

---

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 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.

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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

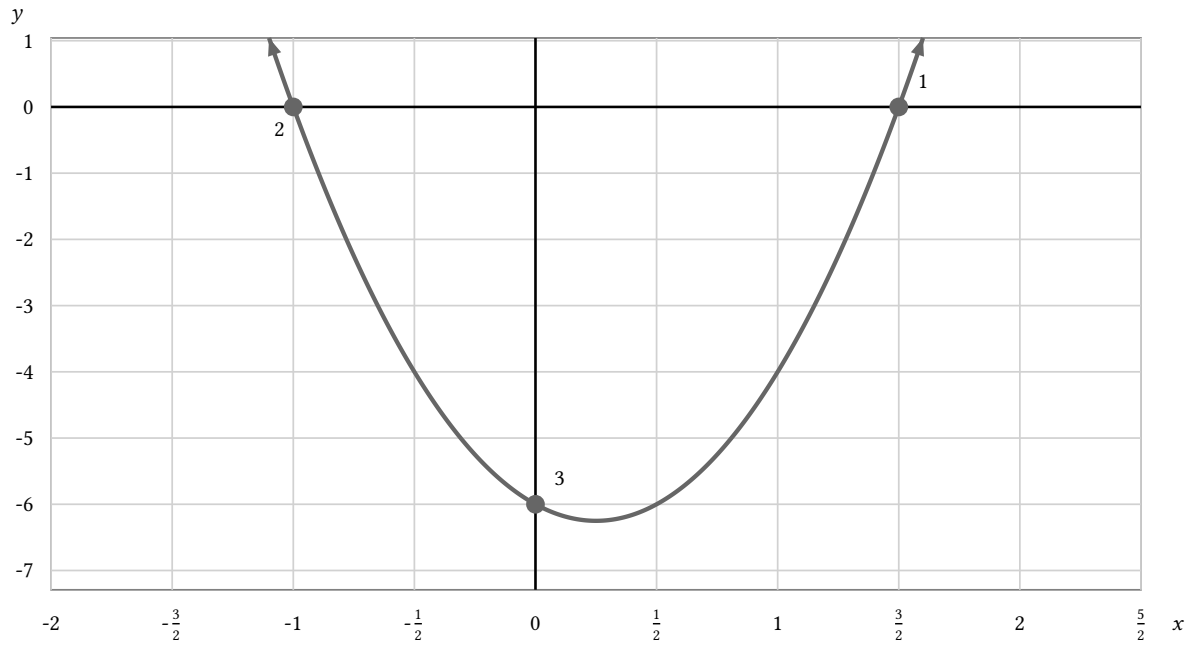
Quadratic Zeros and Factored Form

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

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.

Published by Tusils LLC.

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 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.

Published by Tusils LLC.

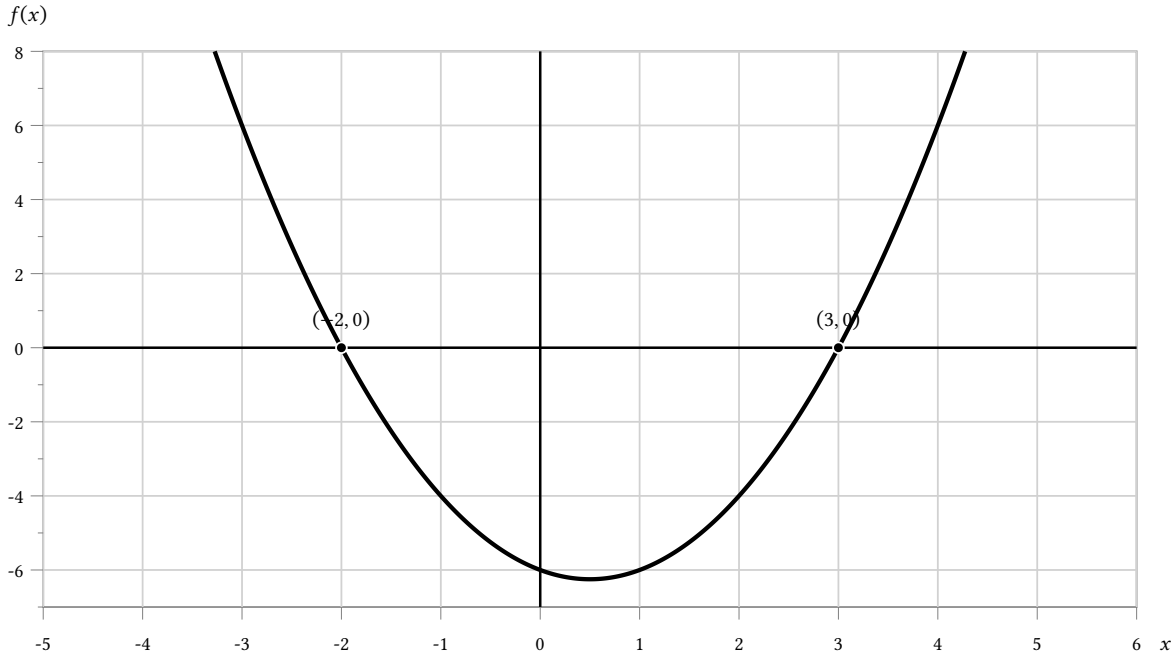
Algebra 1

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: _____

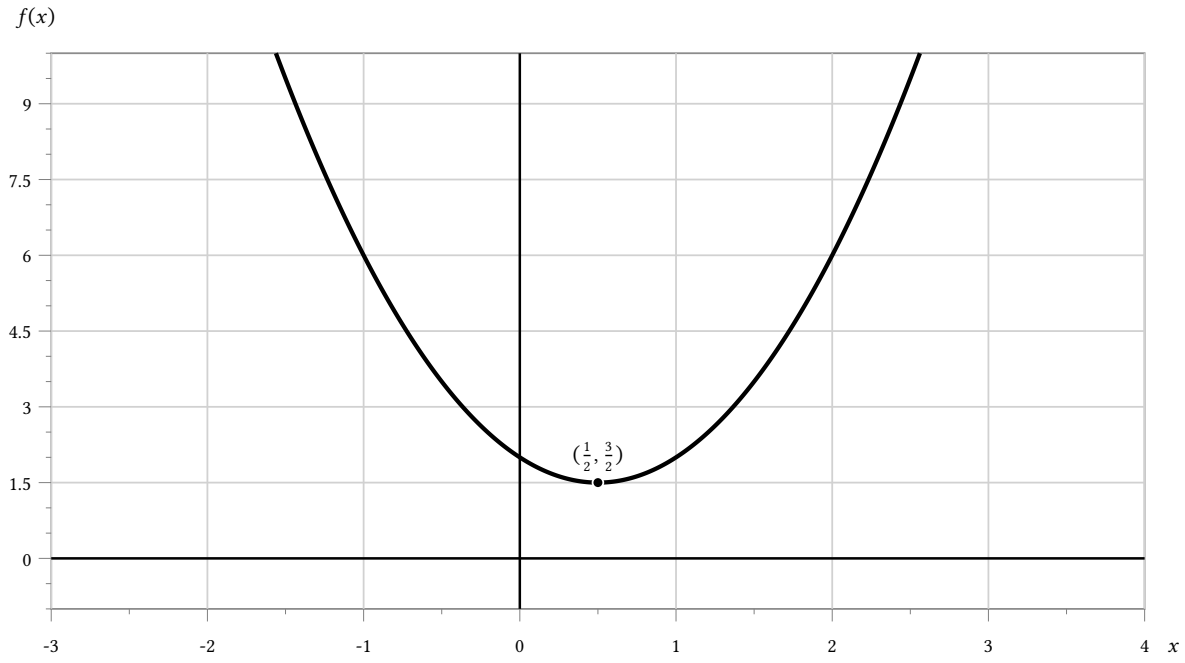
Algebra 1

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

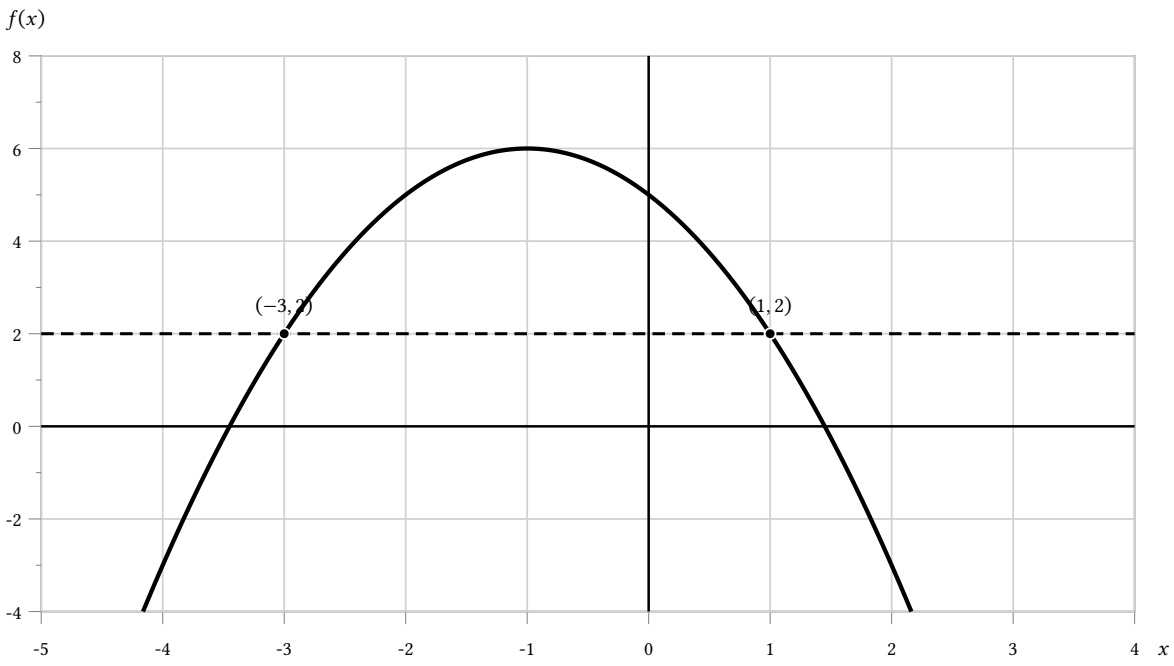
Solving Quadratics Using Graphs

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 $-5 \le x \le 4$. 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.