Sets & Steps
Math Practice & Worked Solutions

Algebra 1

Counting Solutions & Intersections | Algebra 1 | 5-Topic Bundle

5-topic bundle | 480 problems | Four activity formats

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.

40 PDFs and 5 READMEs; 664 buyer PDF pages across the 5 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

Linear Equations: One, None, or All Real Solutions

Multi-Step Equations: One, No, or Infinitely Many Solutions | A1-U02-P08

96 problems · Four activity formats

Topic focus

Across 96 tasks this topic asks for constructed equation and coefficient-constant verification, first error, corrected class, and solution-set meaning, local forms, solution class, complete set, and justification, parameter conditions and all corresponding solution classes, permitted edit or impossibility proof and resulting class and real classification, domain intersection, and actual set.

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

Linear Equations: One, None, or All Real Solutions

Name: ____________ **Date:** ____________ **Class:** ____________

Solve each question and match the whole requested response. If two bank entries express the same result, either label is accepted; labels may be reused. Give exact values and any requested reasoning.

Classify $-2(4x-3)+5=4(-2x+1)+7$ after carrying every outer factor through its group. Give the full solution set. Bank label: ______	The equation $2x+7=2x+11$ is considered only for x in $\{-3,1,5\}$. Find the actual set after both algebra and domain restriction. Bank label: ______
Break the current degeneracy in $-2x+9=-2x+9$ using only the left x-coefficient so the result has one real solution. Verify the new class. Bank label: ______	Find when $(k+\frac{9}{4})x+\frac{11}{8}=(-\frac{3}{5})x+\frac{11}{8}$ becomes an identity. Also state the solution class for every remaining k. Bank label: ______
Analyze the cancellation in $-6x-5+3x+8=-x+4-2x-8$. Explain what remains and classify every possible value of x. Bank label: ______	For $6x+1=2x+13$, the allowed domain is $[0,4]$. Determine the actual solution set and show whether the algebraic root is admitted. Bank label: ______
Partition all real values of k by the number of solutions of $(k-\frac{7}{8})x+\frac{13}{10}=(\frac{5}{6})x-\frac{4}{7}$. Identify the exceptional coefficient condition first. Bank label: ______	Reduce $2(-5x+6)+3=5(-x-1)+35$ to $\mathrm{A}x+B=\mathrm{C}x+D$, compare both totals, and report the entire solution set. Bank label: ______

Algebra 1

Linear Equations: One, None, or All Real Solutions

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.

Classify the reduced equation $3x = 0$. Explain why a zero value for x is different from having no solutions.	Partition all real values of k by the number of solutions of $(k + 1)x + 4 = 5x + 4$. Identify the exceptional coefficient condition first.
In $3(2x - 1) + 5 = 2(3x + 1) + 4$, expose the final coefficient and constant comparison. Use the residual statement to decide one, none, or all.	The equation $3x + 5 = x + 13$ currently has one real solution; solution set $\{4\}$. Change only the right x-coefficient to obtain no solution, or prove it cannot be done.
For $(k - 2)x + 7 = 3x + 9$, determine which k, if any, causes coefficient cancellation and classify both that case and its complement.	Read $-4x = -8$ as a final reduced form. State the complete real solution set and justify the division used.

Algebra 1

Linear Equations: One, None, or All Real Solutions

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: one real solution; solution set $\{-\frac{4}{9}\}$ For $(-\frac{5}{3})x + \frac{7}{6} = (\frac{1}{3})x - \frac{5}{6}$, the allowed domain is $\{-2, 1, \frac{5}{3}\}$. Determine the actual solution set and show whether the algebraic root is admitted. Your response: ____________	**Incoming:** $\{1\}$ Construct a two-sided linear equation whose only solution is $x = 4$. You must use unequal nonzero x-coefficients and constants on both sides. Verify it. Your response: ____________
Incoming: one real solution; solution set $\{\frac{5}{3}\}$ Read $(\frac{15}{7})x = -\frac{20}{21}$ as a final reduced form. State the complete real solution set and justify the division used. Your response: ____________	**Incoming:** $(-4, 2)$ Construct a two-sided equation with no solution. Begin with left side $5x + 4$ and use outer factor 1 on the grouped right side. Match the final x-coefficients but force unequal constants. Your response: ____________
Incoming: $(\frac{7}{4})x - \frac{5}{6} = (\frac{7}{8})(2x + \frac{3}{5}) - \frac{163}{120}$ Solve $(\frac{3}{2})x + \frac{5}{4} = (\frac{3}{2})x + \frac{5}{4}$ only over the declared finite domain $\{-\frac{1}{2}, \frac{2}{3}, \frac{7}{4}\}$. Intersect the real solution class with the allowed values. Your response: ____________	**Incoming:** $-2x + 7 = 4x + 25$ Solve $3x + 5 = 3x + 5$ only over the declared finite domain $\{-2, 0, 4\}$. Intersect the real solution class with the allowed values. Your response: ____________

Algebra 1

Linear Equations: One, None, or All Real Solutions

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.

For the explicitly linear equation $3x + 5 = 3x + 5$, the table shows equality at distinct inputs $x = -2$ and $x = 4$. Evaluate the claim that the equation holds for all real x, using only justified implications.

Audit this work for $3x + 5 = x + 5$: 'The constants cancel, so $x = 0$. Therefore there are no solutions.' Identify the first conceptual error and give the correct complete solution set.

For $2x + 1 = 2x + 4$, the table reports $x = 0$, left$= 1$, and right$= 4$. Does this evidence support the claim that the equation is an identity? Give the strongest warranted conclusion.

A student classifies $4x + 7 = 4x + 7$ using: 'Everything cancels to $0 = 0$, so the only solution is $x = 0$.' Diagnose the meaning of $0 = 0$ and correct the conclusion.

Linear Equations: One, None, or All Real Solutions

Full Worked Solutions - excerpt

Worked example

Problem. Classify $5x - 3 = 2x + 9$ over the restricted domain $\{-4, 0, 3\}$; an algebraic root outside that set must be excluded.

Answer. empty solution set

Explanation and check.

Over the reals the equation has one real solution; solution set $\{4\}$. Intersecting that set with $\{-4, 0, 3\}$ gives empty solution set.

Worked example

Problem. Intersect the real solution set of $7x - 2 = 7x - 2$ with the interval $[-3, 5]$. Report the resulting set exactly.

Answer. $[-3, 5]$

Explanation and check.

Over the reals the equation has all real numbers. Intersecting that set with $[-3, 5]$ gives $[-3, 5]$.

Sets & Steps
Math Practice & Worked Solutions

Algebra 1

Number of Solutions in Linear Systems

Number of Solutions in Linear Systems | A1-U06-P02

96 problems · Four activity formats

Topic focus

Across 96 tasks this topic asks for one, none, or infinitely many solutions with exact justification.

8 PDFs and a README; 85 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

Number of Solutions in Linear 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.

An exact graph marks one crossing of two genuine lines and also labels their unequal direction vectors. Is the full system count determined?

Bank label: ______

Algebra 1

Number of Solutions in Linear 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.

Decide whether these genuine lines cross, remain distinct, or coincide: $2x + y = 7$ and $x - 2y = -4$. Give exact coefficient evidence.	A student must classify the system before choosing any solving method: $4x + 7y = -2$ and $12x + 21y = -6$. Give exact coefficient evidence.
A student claims $5y = 10$ and $y = -3$ must cross because their constants differ. Correct the count.	Classify this pair of standard-form equations without finding an intersection: $4x - 7y = 2$ and $-8x + 14y = -9$. Give exact coefficient evidence.
Simplify both equations before classifying the system: $2(x + y) - y = 7$ and $x - 3(y - 1) = 4$. Show the normalized pair as evidence.	A solution labels $2x + 3y = 7$ and $4x + 6y = 20$ as the same line because the variable coefficients double. Correct it.

Algebra 1

Number of Solutions in Linear 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: No solution. Justification: The first equation becomes $8 = 5$, a contradiction. No point on the horizontal line can satisfy it. Start with $x - 2y = 3$. Construct a second genuine-line equation so the system has infinitely many solutions. Constraint: The second equation must contain both $(3, 0)$ and $(5, 1)$ and differ in appearance. Give the equation and verify the complete line relation. Your response: ______________	**Incoming:** One valid construction is $-3x + 6y = -9$; with $x - 2y = 3$, it has infinitely many solutions. Justification: The direction cross-product is 0, and the constant checks are both 0; the equations name the same line. Therefore the construction meets the stated count and the additional constraint. Start with $x + y = 5$. Construct a second genuine-line equation so the system has one solution. Constraint: Both equations must contain $(3, 2)$, and the second direction must differ. Give the equation and verify the complete line relation. Your response: ______________

Algebra 1

Number of Solutions in Linear 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.

A student treats $4x - y = 6$ and $6 = 4x - y$ as two different lines because the sides are reversed. Audit the system.

Complete the task, then compare two valid approaches from this topic (compare normalized equations, use slopes/intercepts, or analyze coefficient proportionality) and justify why they agree on the required conclusion. Start with $x = 4$. Construct a second genuine-line equation so the system has one solution. Constraint: Make the second line horizontal while the first is vertical. Give the equation and verify the complete line relation.

Complete the task, then compare two valid approaches from this topic (compare normalized equations, use slopes/intercepts, or analyze coefficient proportionality) and justify why they agree on the required conclusion. Start with $y = 4$. Construct a second genuine-line equation so the system has one solution. Constraint: The second line must be oblique, not another horizontal line. Give the equation and verify the complete line relation.

Choose and justify a method before solving (compare normalized equations, use slopes/intercepts, or analyze coefficient proportionality). Then complete the task: From a graph, slopes 0.333 and 0.334 are both rounded to 0.33, and the system is labeled no solution. Audit the conclusion.

Number of Solutions in Linear Systems

Full Worked Solutions - excerpt

Worked example

Problem. An exact graph marks one crossing of two genuine lines and also labels their unequal direction vectors. Is the full system count determined?

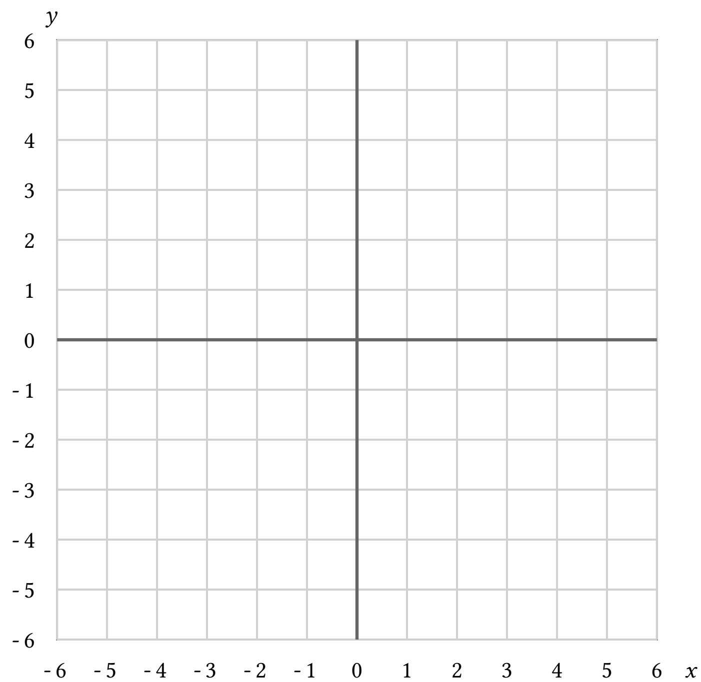
Answer. Yes. The system has one solution. Justification: The marked crossing supplies existence, and unequal directions prevent coincidence or a second meeting. Genuine lines with different directions intersect once.

Explanation and check.

The marked crossing supplies existence, and unequal directions prevent coincidence or a second meeting. Genuine lines with different directions intersect once.

Worked example

Problem. The graphing display uses the rules below: $x = 12$ and $x - y = -15$, in the window x from -6 to 6 and y from -6 to 6. The viewing note says one trace is outside the displayed x-range. Classify the complete system; do not infer from the crop alone.



Answer. The system x = 12; $x - y = -15$ has one solution. Justification: The direction cross-product is -1, not 0, so the genuine lines are nonparallel and meet once. The location of that meeting is not needed for this classification.

Explanation and check.

The direction cross-product is -1, not 0, so the genuine lines are nonparallel and meet once. The location of that meeting is not needed for this classification.

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

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 $y = -2x^2$-$x + 4$ 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	$y = -2x^2$-$x + 4$
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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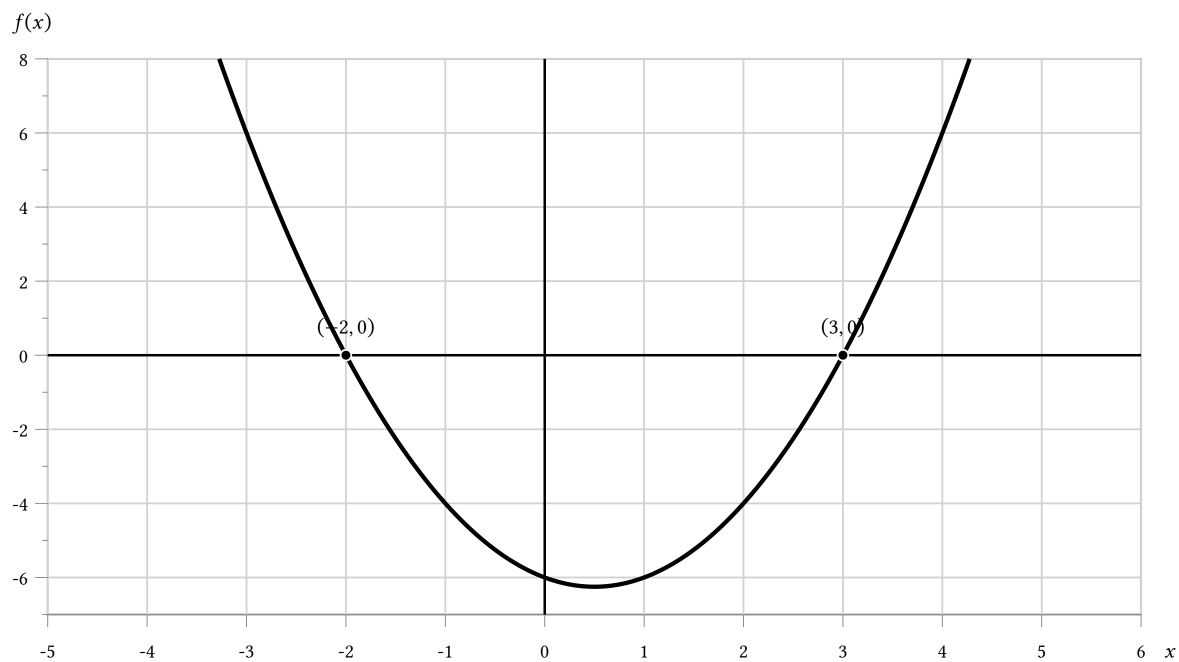
Algebra 1

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: ______

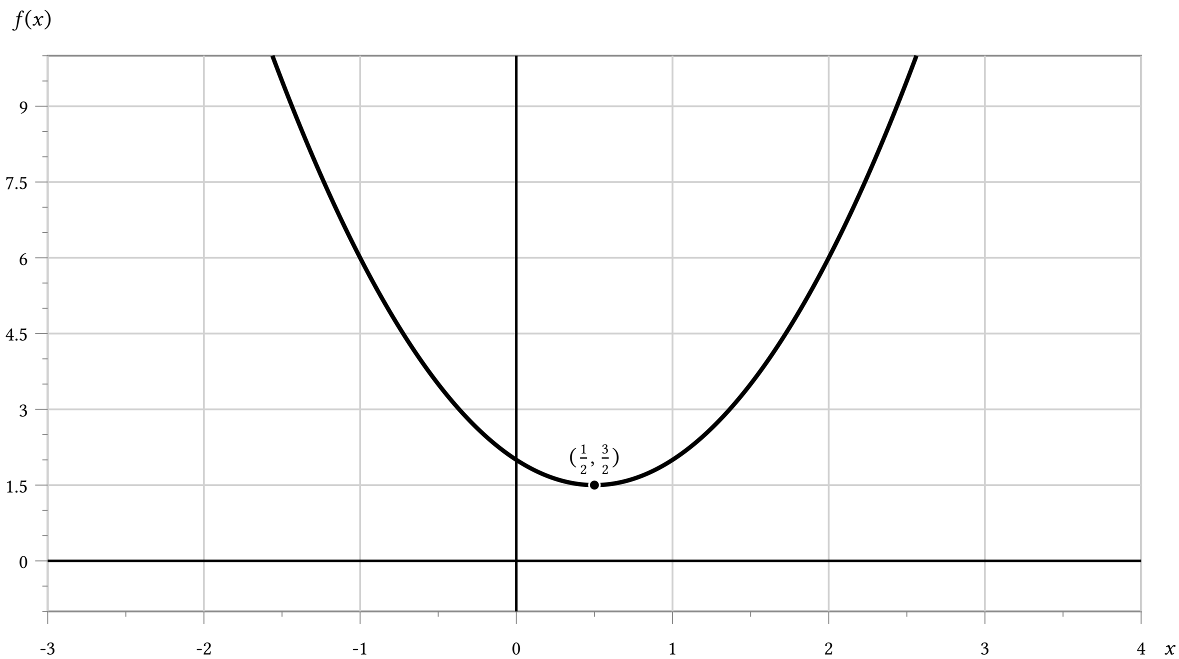
Algebra 1

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

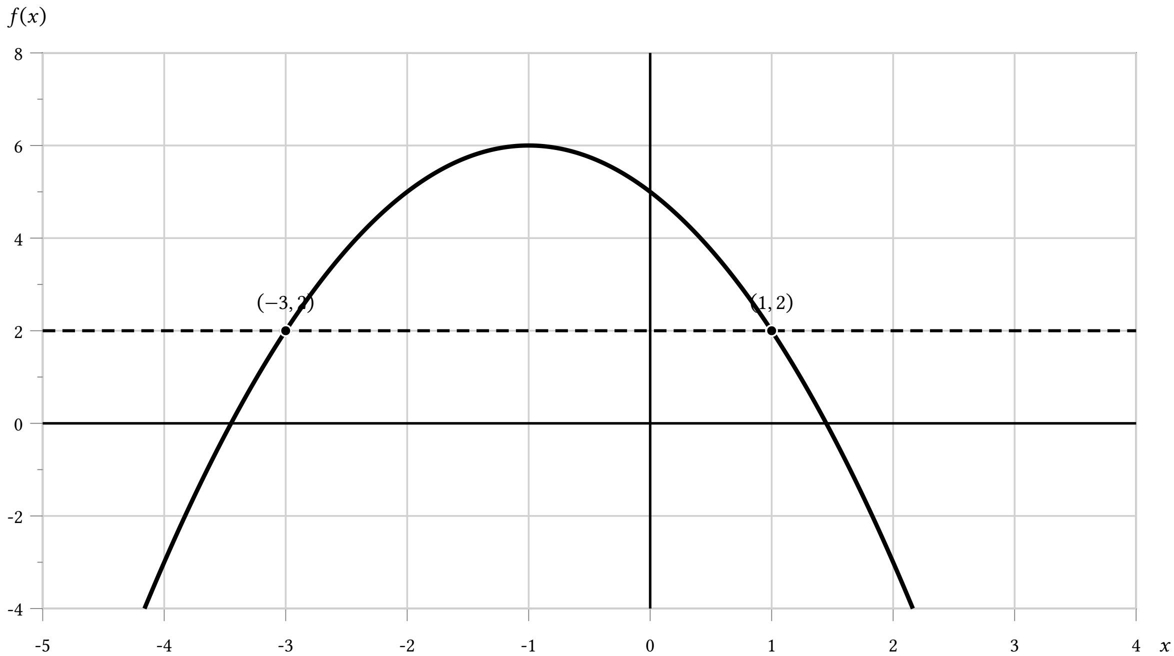
Solving Quadratics Using Graphs

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