Sets & Steps
Math Practice & Worked Solutions

Algebra 1

Quadratic Applications & Graphical Solutions | Algebra 1 | 3-Topic Bundle

3-topic bundle | 288 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.

24 PDFs and 3 READMEs; 566 buyer PDF pages across the 3 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

Quadratic Word Problems

Quadratic Word Problems | A1-U09-P12

96 problems · Four activity formats

Topic focus

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

8 PDFs and a README; 126 buyer pages.

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

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Algebra 1

Quadratic Word Problems

Name: ____________________ **Date:** ____________________ **Class:** ____________________

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

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

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

Bank label: ______

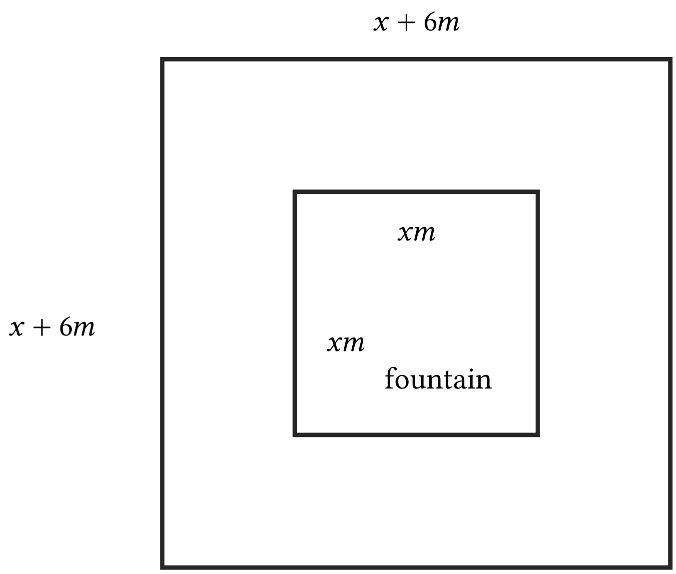
Algebra 1

Quadratic Word Problems

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

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

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



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

Algebra 1

Quadratic Word Problems

Name: ______________________ **Date:** ______________________ **Class:** ______________________

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

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

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

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

Your response: ____

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

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

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

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

Your response: ____

Algebra 1

Quadratic Word Problems

Name: ____________________ **Date:** ____________________ **Class:** ____________________

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

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

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

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

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

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

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

Quadratic Word Problems

Full Worked Solutions - excerpt

Worked example

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

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

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

Explanation and check.

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

Worked example

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

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

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

Explanation and check.

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

Sets & Steps
Math Practice & Worked Solutions

Algebra 1

Linear-Quadratic Systems

Linear-Quadratic Systems | A1-U09-P13

96 problems · Four activity formats

Topic focus

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

8 PDFs and a README; 79 buyer pages.

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

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Algebra 1

Linear-Quadratic Systems

Name: ______________ **Date:** ______________ **Class:** ______________

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

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

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

Bank label: ______

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

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

Bank label: ______

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

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

Bank label: ______

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

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

Bank label: ______

Algebra 1

Linear-Quadratic Systems

Name: ______________ **Date:** ______________ **Class:** ______________

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

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

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

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

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

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

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

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

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

Algebra 1

Linear-Quadratic Systems

Name: ________________ **Date:** ________________ **Class:** ________________

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

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

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

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

Your response: ________________

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

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

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

Your response: ________________

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

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

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

Your response: ________________

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

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

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

Your response: ________________

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

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

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

Your response: ________________

Incoming: points: ; real intersection count: 0

Report the ordered pair common to $y = -2x^2$-$x + 4$ 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.

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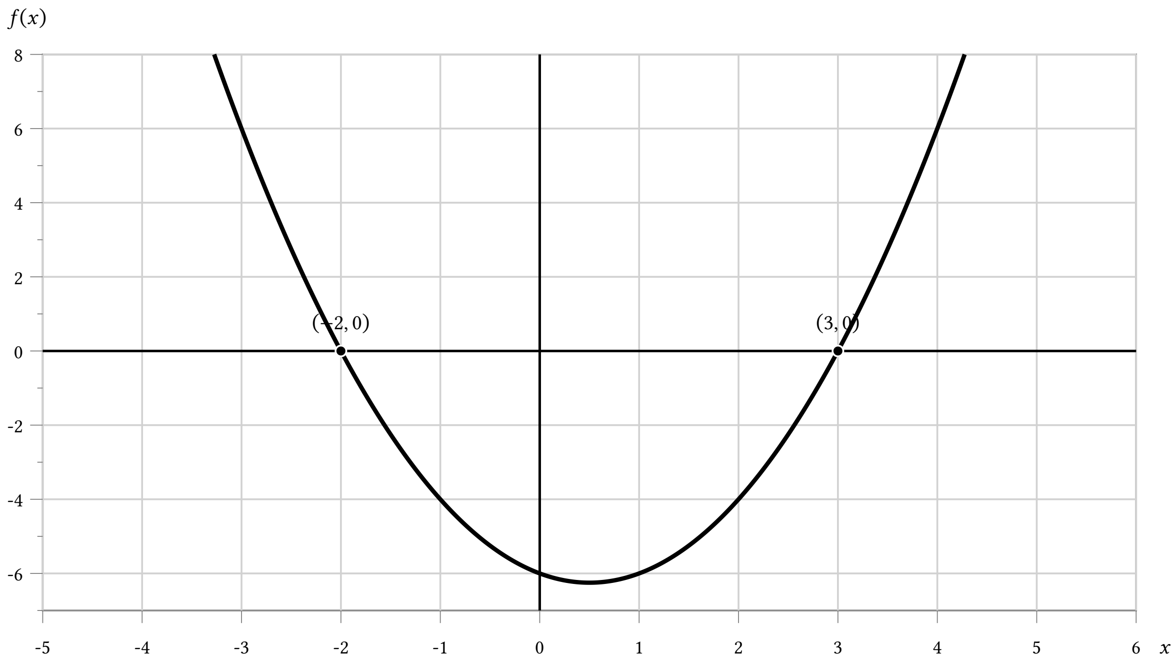
Algebra 1

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: ______

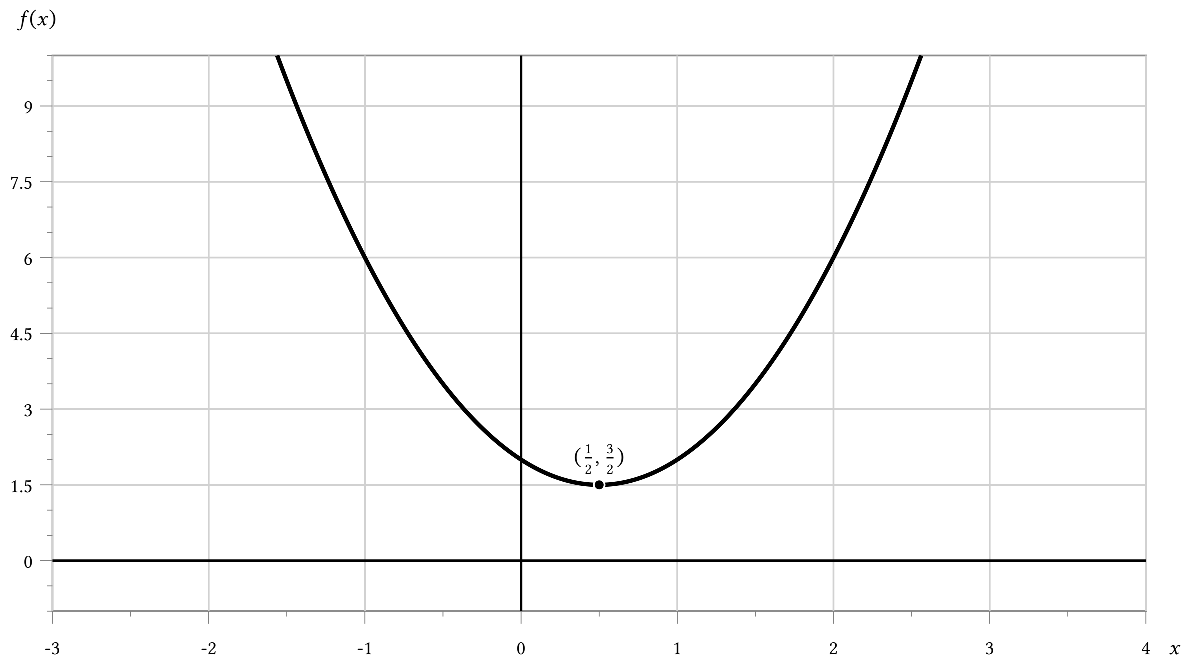
Algebra 1

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

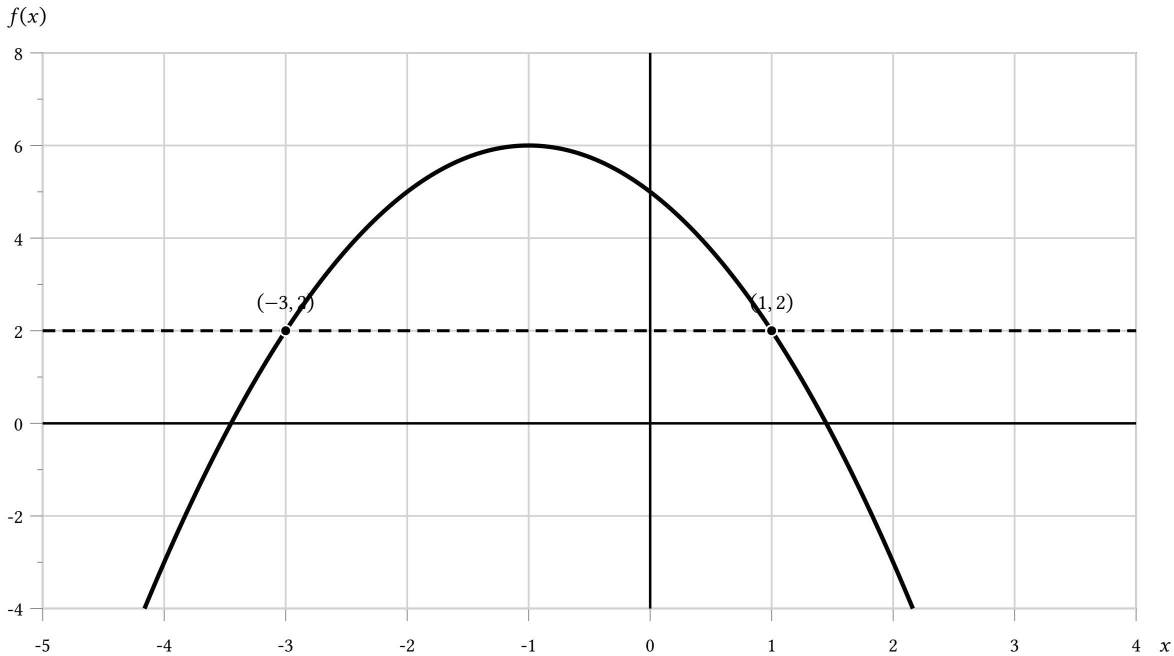
Solving Quadratics Using Graphs

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.