

Algebra 1
Quadratic Vertices & Transformations | Algebra 1 | 3-Topic Bundle

3-topic bundle | 288 problems | Four activity formats

01 Quadratic Vertex, Axis, and Intercepts

[View individual product and its full preview](#)

02 Quadratic Function Transformations

[View individual product and its full preview](#)

03 Converting Quadratics to Vertex Form

[View individual product and its full 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.

24 PDFs and 3 READMEs; 183 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.

Algebra 1
Quadratic Vertex, Axis, and Intercepts

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

96 problems · Four activity formats

01	Answer Bank Challenge	24 tasks
02	Grid Rounds	24 tasks
03	Match & Move	24 cards
04	Error Analysis & Strategy	24 tasks
05	Quick Answer Key	96 answers
06	Full Worked Solutions	96 solutions
07	Teacher / Parent Use Guide	included
08	Terms of Use & License	included

Topic focus
This topic is a focused set of 96 practice tasks on Quadratic Vertex, Axis, and Intercepts.
8 PDFs and a README; 61 buyer pages.

Algebra 1

Quadratic Vertex, Axis, and Intercepts

Name: _____ Date: _____ Class: _____

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

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

Algebra 1

Quadratic Vertex, Axis, and Intercepts

Name: _____ Date: _____ Class: _____

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

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

Algebra 1

Quadratic Vertex, Axis, and Intercepts

Name: _____ Date: _____ Class: _____

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

Incoming: $(5, \frac{11}{2})$ Derive the vertex in lowest-term fractions. Match the complete originally requested feature set or point. Include the axis, extremum type, or effective coefficient whenever the original question requires it. The rule is $C(x) = 7x^2 - 3x + 2$ Your response: _____	Incoming: $(\frac{5}{12}, -\frac{71}{24})$ Find the vertex while keeping compound fractions exact. Match the complete originally requested feature set or point. Include the axis, extremum type, or effective coefficient whenever the original question requires it. The rule is $E(x) = (\frac{2}{5})x^2 + 3x - 1$ Your response: _____
Incoming: $(\frac{7}{15}, \frac{41}{90})$ Find the maximum point in the t-coordinate system. Match the complete originally requested feature set or point. Include the axis, extremum type, or effective coefficient whenever the original question requires it. The rule is $H(t) = -(\frac{2}{3})t^2 + 4t + 1$ Your response: _____	START Use the standard-form coefficients to compute the vertex. Match the complete originally requested feature set or point. Include the axis, extremum type, or effective coefficient whenever the original question requires it. The rule is $q(x) = 3x^2 - 12x + 10$ Your response: _____
Incoming: axis: $y = -\frac{7}{2}$; vertex: $(-\frac{7}{2}, -11)$ Interpret the negated input inside the square and identify the vertex. Match the complete originally requested feature set or point. Include the axis, extremum type, or effective coefficient whenever the original question requires it. The rule is $V(x) = -4(0 - x)^2 + 3$ Your response: _____	Incoming: $(-\frac{1}{5}, \frac{21}{5})$ Compute the maximum point from standard form. Match the complete originally requested feature set or point. Include the axis, extremum type, or effective coefficient whenever the original question requires it. The rule is $s(x) = -2x^2 + 20x - 41$ Your response: _____

Algebra 1

Quadratic Vertex, Axis, and Intercepts

Name: _____ Date: _____ Class: _____

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

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

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

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

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

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

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

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

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

Quadratic Vertex, Axis, and Intercepts

Full Worked Solutions - excerpt

Worked example

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

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

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

Explanation and check.

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

Worked example

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

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

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

Explanation and check.

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

Algebra 1
Quadratic Function Transformations

Quadratic Function Transformations | A1-U09-P03

96 problems · Four activity formats

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Topic focus

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

8 PDFs and a README; 66 buyer pages.

Algebra 1

Quadratic Function Transformations

Name: _____ Date: _____ Class: _____

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

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

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

Bank label: _____

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

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

Bank label: _____

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

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

Bank label: _____

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

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

Bank label: _____

Algebra 1

Quadratic Function Transformations

Name: _____ Date: _____ Class: _____

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

Predict the target vertex and axis. <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 30%;">Reference</td> <td style="width: 70%;"> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 30%;">Rule</td> <td style="width: 70%;">$f(x) = x^2$</td> </tr> <tr> <td>Vertex</td> <td>0, 0</td> </tr> </table> </td> </tr> <tr> <td>Target relation</td> <td>$g(x) = f(x - 3) + 2$</td> </tr> </table> 	Reference	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 30%;">Rule</td> <td style="width: 70%;">$f(x) = x^2$</td> </tr> <tr> <td>Vertex</td> <td>0, 0</td> </tr> </table>	Rule	$f(x) = x^2$	Vertex	0, 0	Target relation	$g(x) = f(x - 3) + 2$	Map the reference vertex and classify the target extremum. <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 30%;">Reference vertex</td> <td style="width: 70%;">2, -1</td> </tr> <tr> <td>Reference opening</td> <td>up</td> </tr> <tr> <td>Transformation</td> <td> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 30%;">h</td> <td style="width: 70%;">0</td> </tr> <tr> <td>a</td> <td>3</td> </tr> <tr> <td>k</td> <td>4</td> </tr> </table> </td> </tr> </table> 	Reference vertex	2, -1	Reference opening	up	Transformation	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 30%;">h</td> <td style="width: 70%;">0</td> </tr> <tr> <td>a</td> <td>3</td> </tr> <tr> <td>k</td> <td>4</td> </tr> </table>	h	0	a	3	k	4
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Predict the target x-intercepts. <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 30%;">Reference roots</td> <td style="width: 70%;">-2, 2</td> </tr> <tr> <td>Target relation</td> <td>$g(x) = f(x - 3)$</td> </tr> </table> 	Reference roots	-2, 2	Target relation	$g(x) = f(x - 3)$	Predict the new x-intercepts. <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 30%;">Reference</td> <td style="width: 70%;">$f(x) = x^2$</td> </tr> <tr> <td>Target relation</td> <td>$g(x) = f(x) - 4$</td> </tr> </table> 	Reference	$f(x) = x^2$	Target relation	$g(x) = f(x) - 4$												
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Predict the target vertex and extremum type. <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 30%;">Reference vertex</td> <td style="width: 70%;">-1, -3</td> </tr> <tr> <td>Reference extremum</td> <td>minimum</td> </tr> <tr> <td>Target relation</td> <td>$g(x) = -f(x) + 2$</td> </tr> </table> 	Reference vertex	-1, -3	Reference extremum	minimum	Target relation	$g(x) = -f(x) + 2$	Predict the target vertex and x-intercepts using the supplied old level. <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 30%;">Reference vertex</td> <td style="width: 70%;">0, -5</td> </tr> <tr> <td>Reference level points</td> <td> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 30%;">y</td> <td style="width: 70%;">-2</td> </tr> <tr> <td>Points</td> <td>-3, -2, 3, -2</td> </tr> </table> </td> </tr> <tr> <td>Target relation</td> <td>$g(x) = f(x) + 2$</td> </tr> </table> 	Reference vertex	0, -5	Reference level points	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 30%;">y</td> <td style="width: 70%;">-2</td> </tr> <tr> <td>Points</td> <td>-3, -2, 3, -2</td> </tr> </table>	y	-2	Points	-3, -2, 3, -2	Target relation	$g(x) = f(x) + 2$				
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Algebra 1

Quadratic Function Transformations

Name: _____ Date: _____ Class: _____

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

Incoming: $g(x) = 2x^2 + 6$ Write the final rule and preserve the operation order. Match the complete original rule, ordered point list, or parameter set, with any required justification. Preserve the original input variable and coordinate scale. <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 30%;">Parent</td> <td>$f(x) = x^2$</td> </tr> <tr> <td>Operations</td> <td>multiply outputs by 2, shift the resulting graph up 3</td> </tr> </table> Your response: _____	Parent	$f(x) = x^2$	Operations	multiply outputs by 2, shift the resulting graph up 3	Incoming: $g(x) = 5x^2 - 2$ Write and simplify the final rule. Match the complete original rule, ordered point list, or parameter set, with any required justification. Preserve the original input variable and coordinate scale. <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 30%;">Parent</td> <td>$f(x) = x^2$</td> </tr> <tr> <td>Operations</td> <td>shift up 3, multiply all current outputs by 2</td> </tr> </table> Your response: _____	Parent	$f(x) = x^2$	Operations	shift up 3, multiply all current outputs by 2				
Parent	$f(x) = x^2$												
Operations	multiply outputs by 2, shift the resulting graph up 3												
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Operations	shift up 3, multiply all current outputs by 2												
Incoming: a: 2; h: 2; k: 1 Recover the complete parameter triple. Match the complete original rule, ordered point list, or parameter set, with any required justification. Preserve the original input variable and coordinate scale. <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 30%;">Target vertex</td> <td>2, -3</td> </tr> <tr> <td>Target point</td> <td>4, 5</td> </tr> <tr> <td>Model</td> <td>$g(x) = a(x-h)^2 + k$</td> </tr> </table> Your response: _____	Target vertex	2, -3	Target point	4, 5	Model	$g(x) = a(x-h)^2 + k$	Incoming: a: $\frac{1}{2}$; h: 1; k: -1 Find a and write the target rule. Match the complete original rule, ordered point list, or parameter set, with any required justification. Preserve the original input variable and coordinate scale. <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 30%;">Target vertex</td> <td>-1, -8</td> </tr> <tr> <td>Target root</td> <td>1</td> </tr> <tr> <td>Model</td> <td>$a(x + 1)^2 - 8$</td> </tr> </table> Your response: _____	Target vertex	-1, -8	Target root	1	Model	$a(x + 1)^2 - 8$
Target vertex	2, -3												
Target point	4, 5												
Model	$g(x) = a(x-h)^2 + k$												
Target vertex	-1, -8												
Target root	1												
Model	$a(x + 1)^2 - 8$												
Incoming: $g(x) = 3(x - 2)^2 + 1$ Compose the ordered changes into one formula. Match the complete original rule, ordered point list, or parameter set, with any required justification. Preserve the original input variable and coordinate scale. <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 30%;">Parent</td> <td>$f(x) = x^2$</td> </tr> <tr> <td>Operations</td> <td>shift left 1, shift down 2, multiply current outputs by -2, shift up 3</td> </tr> </table> Your response: _____	Parent	$f(x) = x^2$	Operations	shift left 1, shift down 2, multiply current outputs by -2, shift up 3	Incoming: $g(x) = -2(x + 1)^2 + 7$ Write the exact final rule. Match the complete original rule, ordered point list, or parameter set, with any required justification. Preserve the original input variable and coordinate scale. <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 30%;">Parent</td> <td>$f(x) = x^2$</td> </tr> <tr> <td>Operations</td> <td>reflect outputs, shift up 5, multiply all current outputs by $\frac{1}{2}$</td> </tr> </table> Your response: _____	Parent	$f(x) = x^2$	Operations	reflect outputs, shift up 5, multiply all current outputs by $\frac{1}{2}$				
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Operations	reflect outputs, shift up 5, multiply all current outputs by $\frac{1}{2}$												

Algebra 1

Quadratic Function Transformations

Name: _____ Date: _____ Class: _____

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

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

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

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

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

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

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

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

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

Quadratic Function Transformations

Full Worked Solutions - excerpt

Worked example

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

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

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

Explanation and check.

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

Worked example

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

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

Answer. no real x -intercepts

Explanation and check.

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

Algebra 1
Converting Quadratics to Vertex Form

Converting Quadratics to Vertex Form | A1-U09-P04

96 problems · Four activity formats

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Algebra 1

Converting Quadratics to Vertex Form

Name: _____ Date: _____ Class: _____

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

Complete the inner square and scale its compensation. Match the complete requested vertex form. Preserve the outside coefficient and compensating constant; the expanded standard form alone is not the requested response. <table border="1"> <tr> <td>Standard</td> <td>$3x^2 + 18x + 20$</td> </tr> </table> _____ Bank label: _____	Standard	$3x^2 + 18x + 20$	Convert the downward-opening quadratic. Match the complete requested vertex form. Preserve the outside coefficient and compensating constant; the expanded standard form alone is not the requested response. <table border="1"> <tr> <td>Standard</td> <td>$-3x^2 + 24x + 1$</td> </tr> </table> _____ Bank label: _____	Standard	$-3x^2 + 24x + 1$
Standard	$3x^2 + 18x + 20$				
Standard	$-3x^2 + 24x + 1$				
Express the scaled perfect square in vertex form. Match the complete requested vertex form. Preserve the outside coefficient and compensating constant; the expanded standard form alone is not the requested response. <table border="1"> <tr> <td>Standard</td> <td>$4x^2 - 24x + 36$</td> </tr> </table> _____ Bank label: _____	Standard	$4x^2 - 24x + 36$	Rewrite without a trailing zero constant. Match the complete requested vertex form. Preserve the outside coefficient and compensating constant; the expanded standard form alone is not the requested response. <table border="1"> <tr> <td>Standard</td> <td>$-4x^2 - 16x - 16$</td> </tr> </table> _____ Bank label: _____	Standard	$-4x^2 - 16x - 16$
Standard	$4x^2 - 24x + 36$				
Standard	$-4x^2 - 16x - 16$				
Convert and retain the remainder after the scaled square. Match the complete requested vertex form. Preserve the outside coefficient and compensating constant; the expanded standard form alone is not the requested response. <table border="1"> <tr> <td>Standard</td> <td>$6x^2 - 12x + 8$</td> </tr> </table> _____ Bank label: _____	Standard	$6x^2 - 12x + 8$	Rewrite to reveal the left-shifted vertex. Match the complete requested vertex form. Preserve the outside coefficient and compensating constant; the expanded standard form alone is not the requested response. <table border="1"> <tr> <td>Standard</td> <td>$-6x^2 - 36x - 50$</td> </tr> </table> _____ Bank label: _____	Standard	$-6x^2 - 36x - 50$
Standard	$6x^2 - 12x + 8$				
Standard	$-6x^2 - 36x - 50$				
Convert and compute the scaled correction. Match the complete requested vertex form. Preserve the outside coefficient and compensating constant; the expanded standard form alone is not the requested response. <table border="1"> <tr> <td>Standard</td> <td>$7x^2 + 28x + 19$</td> </tr> </table> _____ Bank label: _____	Standard	$7x^2 + 28x + 19$	Write the exact vertex form. Match the complete requested vertex form. Preserve the outside coefficient and compensating constant; the expanded standard form alone is not the requested response. <table border="1"> <tr> <td>Standard</td> <td>$-7x^2 + 28x - 11$</td> </tr> </table> _____ Bank label: _____	Standard	$-7x^2 + 28x - 11$
Standard	$7x^2 + 28x + 19$				
Standard	$-7x^2 + 28x - 11$				

Algebra 1

Converting Quadratics to Vertex Form

Name: _____ Date: _____ Class: _____

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

Fill both equal blanks.

Trace

$$x^2 + 4x + 9 = (x^2 + 4x + \underline{\hspace{1cm}} - \underline{\hspace{1cm}}) + 9 = (x + 2)^2 + 5$$

What number belongs in both blanks?

Trace

$$x^2 - 6x + 1 = (x^2 - 6x + \underline{\hspace{1cm}}) - \underline{\hspace{1cm}} + 1 = (x - 3)^2 - 8$$

Algebra 1

Converting Quadratics to Vertex Form

Name: _____ Date: _____ Class: _____

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

Incoming: $(x + \frac{7}{2})^2 - \frac{69}{4}$ Complete the square for $x^2 + x$. Match the complete requested vertex form. Preserve the outside coefficient and compensating constant; the expanded standard form alone is not the requested response. <table border="1" data-bbox="151 632 797 665"> <tr> <td>Standard</td> <td>$x^2 + x$</td> </tr> </table> Your response: _____	Standard	$x^2 + x$	Incoming: $(x + 12)^2 - 1$ Extract the completed square from the trinomial. Match the complete requested vertex form. Preserve the outside coefficient and compensating constant; the expanded standard form alone is not the requested response. <table border="1" data-bbox="828 648 1471 682"> <tr> <td>Standard</td> <td>$x^2 - 24x + 160$</td> </tr> </table> Your response: _____	Standard	$x^2 - 24x + 160$
Standard	$x^2 + x$				
Standard	$x^2 - 24x + 160$				
Incoming: $(x - \frac{9}{2})^2 - \frac{81}{4}$ Rewrite using a single rational vertical offset. Match the complete requested vertex form. Preserve the outside coefficient and compensating constant; the expanded standard form alone is not the requested response. <table border="1" data-bbox="151 1087 797 1121"> <tr> <td>Standard</td> <td>$x^2 + 7x - 5$</td> </tr> </table> Your response: _____	Standard	$x^2 + 7x - 5$	Incoming: $(x + \frac{11}{2})^2 - \frac{41}{4}$ Convert and include an exact form that expands back to 50 as the constant. Match the complete requested vertex form. Preserve the outside coefficient and compensating constant; the expanded standard form alone is not the requested response. <table border="1" data-bbox="828 1087 1471 1121"> <tr> <td>Standard</td> <td>$x^2 + 15x + 50$</td> </tr> </table> Your response: _____	Standard	$x^2 + 15x + 50$
Standard	$x^2 + 7x - 5$				
Standard	$x^2 + 15x + 50$				
Incoming: $(x - 11)^2 + 1$ Write vertex form and show the one-unit deficit. Match the complete requested vertex form. Preserve the outside coefficient and compensating constant; the expanded standard form alone is not the requested response. <table border="1" data-bbox="151 1509 797 1543"> <tr> <td>Standard</td> <td>$x^2 + 24x + 143$</td> </tr> </table> Your response: _____	Standard	$x^2 + 24x + 143$	Incoming: $(x + \frac{1}{2})^2 - \frac{1}{4}$ Rewrite and keep all constants as fractions. Match the complete requested vertex form. Preserve the outside coefficient and compensating constant; the expanded standard form alone is not the requested response. <table border="1" data-bbox="828 1518 1471 1551"> <tr> <td>Standard</td> <td>$x^2 - x + 6$</td> </tr> </table> Your response: _____	Standard	$x^2 - x + 6$
Standard	$x^2 + 24x + 143$				
Standard	$x^2 - x + 6$				

Algebra 1

Converting Quadratics to Vertex Form

Name: _____ Date: _____ Class: _____

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

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

Standard	$x^2 + 6x + 5$
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Complete the square and state the equivalent vertex form. Choose how to organize the conversion: insert and compensate a square-completing term, or compare coefficients with a squared-binomial form. Explain which route suits the coefficients, then give the original requested vertex form and verify it.

Standard	$x^2 - 8x + 19$
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Put $x^2 + 10x$ into vertex form without changing its values. Choose how to organize the conversion: insert and compensate a square-completing term, or compare coefficients with a squared-binomial form. Explain which route suits the coefficients, then give the original requested vertex form and verify it.

Standard	$x^2 + 10x$
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Find the vertex form and identify the final constant. Choose how to organize the conversion: insert and compensate a square-completing term, or compare coefficients with a squared-binomial form. Explain which route suits the coefficients, then give the original requested vertex form and verify it.

Standard	$x^2 - 4x - 12$
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Converting Quadratics to Vertex Form

Full Worked Solutions - excerpt

Worked example

Problem. Complete the final equality.

Trace	$x^2 + 8x + 3 = (x + 4)^2 - 16 + 3 = (x + 4)^2 + \underline{\hspace{2cm}}$
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Answer. -13

Explanation and check.

Combine -16 and 3 .

Worked example

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

Trace	$4x^2 - 16x + c = 4[(x - 2)^2 - 4] + c = 4(x - 2)^2 + 9$
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Answer. 25

Explanation and check.

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