

Algebra 1
Converting Quadratics to Vertex Form

Converting Quadratics to Vertex Form | A1-U09-P04

96 problems · Four activity formats

01	Answer Bank Challenge	24 tasks
02	Grid Rounds	24 tasks
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04	Error Analysis & Strategy	24 tasks
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Topic focus
This topic is a focused set of 96 practice tasks on Converting Quadratics to Vertex Form.
8 PDFs and a README; 56 buyer pages.

Algebra 1

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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" data-bbox="147 604 794 638"> <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" data-bbox="820 604 1466 638"> <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" data-bbox="147 940 794 974"> <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" data-bbox="820 940 1466 974"> <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" data-bbox="147 1276 794 1310"> <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" data-bbox="820 1276 1466 1310"> <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" data-bbox="147 1612 794 1646"> <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" data-bbox="820 1577 1466 1610"> <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	$-7x^2 + 28x - 11$				

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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

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

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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="151 632 797 663"> <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 680"> <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 1119"> <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 1119"> <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 1541"> <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 1549"> <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	$x^2 - x + 6$				

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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 $c - 16 = 9$.