FOIL METHOD You can change quadratic functions from intercept form or vertex form to standard form by multiplying algebraic expressions. One method for multiplying two expressions each containing two terms is *FOIL*.

KEY CONCEPT *For Your Notebook*

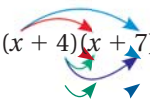
FOIL Method

Words To multiply two expressions that each contain two terms, add the products of the **F**irst terms, the **O**uter terms, the **I**nner terms, and the **L**ast terms.

Example

F O I L

$(x + 4)(x + 7) = x^2 + 7x + 4x + 28 = x^2 + 11x + 28$



EXAMPLE 5 Change from intercept form to standard form

REVIEW FOIL
For help with using the FOIL method, see p. 985.

Write $y = -2(x + 5)(x - 8)$ in standard form.

$y = -2(x + 5)(x - 8)$	Write original function.
$= -2(x^2 - 8x + 5x - 40)$	Multiply using FOIL.
$= -2(x^2 - 3x - 40)$	Combine like terms.
$= -2x^2 + 6x + 80$	Distributive property

EXAMPLE 6 Change from vertex form to standard form

Write $f(x) = 4(x - 1)^2 + 9$ in standard form.

$f(x) = 4(x - 1)^2 + 9$	Write original function.
$= 4(x - 1)(x - 1) + 9$	Rewrite $(x - 1)^2$.
$= 4(x^2 - x - x + 1) + 9$	Multiply using FOIL.
$= 4(x^2 - 2x + 1) + 9$	Combine like terms.
$= 4x^2 - 8x + 4 + 9$	Distributive property
$= 4x^2 - 8x + 13$	Combine like terms.

GUIDED PRACTICE for Examples 5 and 6

Write the quadratic function in standard form.

9. $y = -(x - 2)(x - 7)$

10. $y = -4(x - 1)(x + 3)$

11. $f(x) = 2(x + 5)(x + 4)$

12. $y = -7(x - 6)(x + 1)$

13. $y = -3(x + 5)^2 - 1$

14. $g(x) = 6(x - 4)^2 - 10$

15. $f(x) = -(x + 2)^2 + 4$

16. $y = 2(x - 3)^2 + 9$