

Date 8.2.5 How can I put it in vertex form? Completing the square.

Vertex / Graphing Form:

$y = a(x-h)^2 + k$ ← vertical shift

↑ opens up if + ← horizontal shift
 ↓ opens down if -

- narrower/thinner if $|a| > 1$
- wider if $0 < |a| < 1$

Standard Form: $ax^2 + bx + c$

→ how to convert from vertex form to standard form

$y = -2(x+3)^2 - 4$ ^{vertex}
 (-3, -4)

expand

$= -2(x+3)(x+3) - 4$

$= -2(x^2 + 6x + 9) - 4$

$y = -2x^2 - 12x - 18 - 4$

$y = -2x^2 - 12x - 22$ ← y-intercept

x	x^2	$+3x$
3	$3x$	9

substitute sum for product

$x^2 + 6x + 9$

generic rectangle

Completing the Square:

→ how to convert from standard form to vertex form.

$x^2 + 6x - 7 = 0$ ← y-intercept
 +7 +7 ← move constant

Vertex
 (-3, -16)

$x^2 + 6x + 9 = 7 + 9$ ← complete the square

half of b term $\frac{6}{2}$

$x^2 + 6x + 9 = 16$

$(x+3)^2 = 16$
 $-16 -16$

$(x+3)^2 - 16 = 0$

$3x$	9
x^2	$3x$

3	$3x$	9
x	x^2	$3x$
	x	3

$\frac{9x^2}{3x} = 3x$
 $\frac{6x}{3x} = 2$
 factor

$(x+3)(x+3) = (x+3)^2$