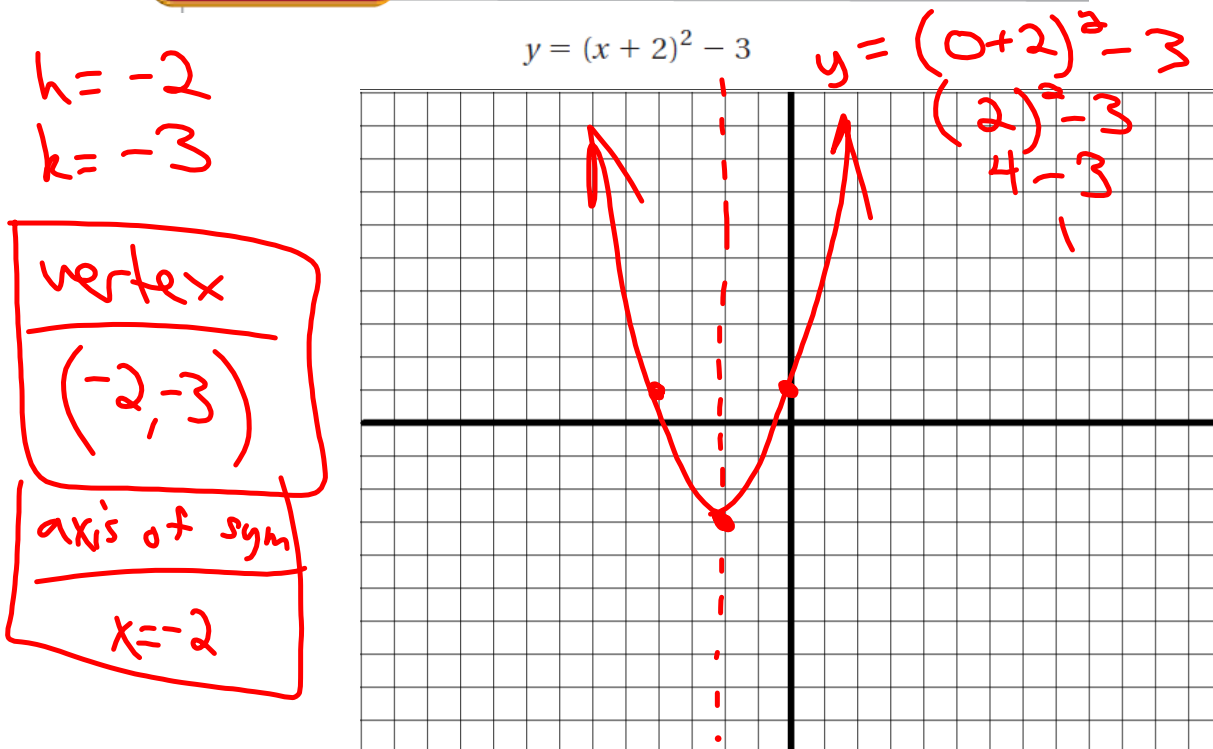


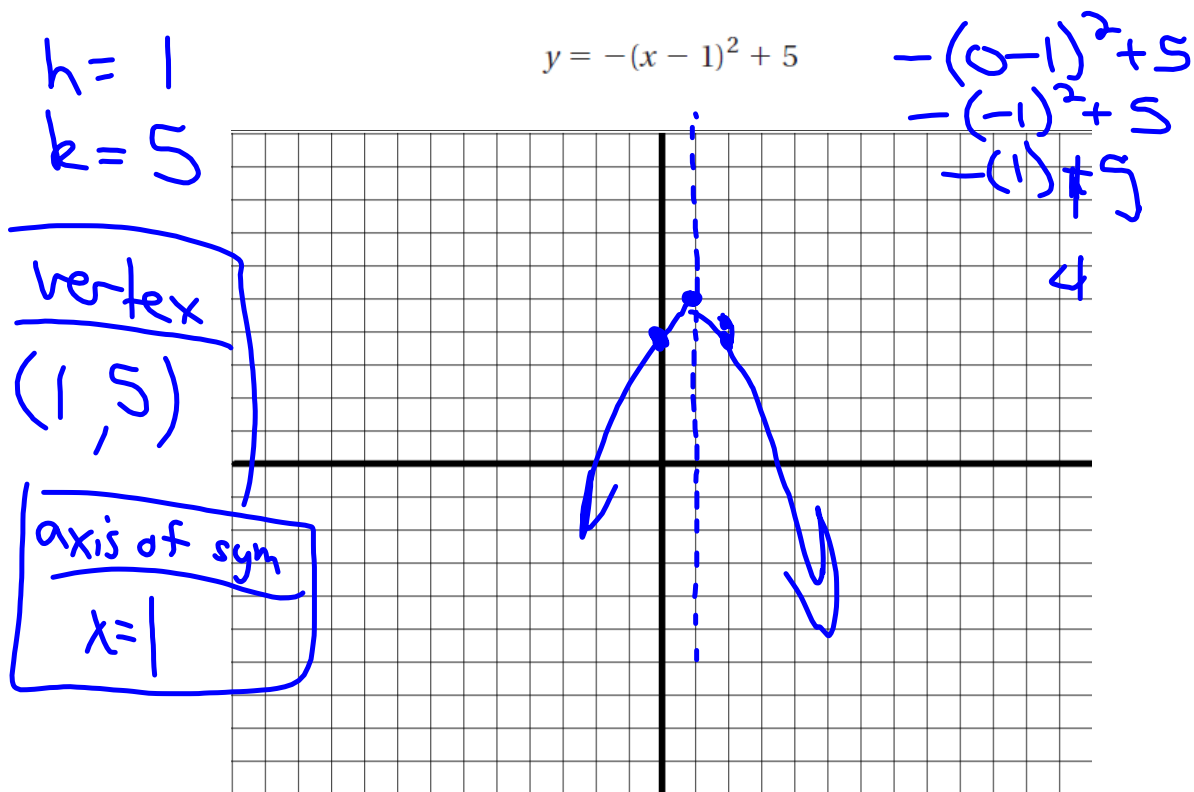
4.2 Graph Quadratic Functions in Vertex Form

EXAMPLE 1 Graph a quadratic function in vertex form



EXAMPLE 1 Graph a quadratic function in vertex form

Graph the function. Label the vertex and axis of symmetry.



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Graph the function. Label the vertex and axis of symmetry.

$$h = 3$$

$$f(x) = \frac{1}{2}(x - 3)^2 - 4$$

$$\frac{1}{2}(1-3)^2 - 4$$

$$k = -4$$

$$\frac{1}{2}(-2)^2 - 4$$

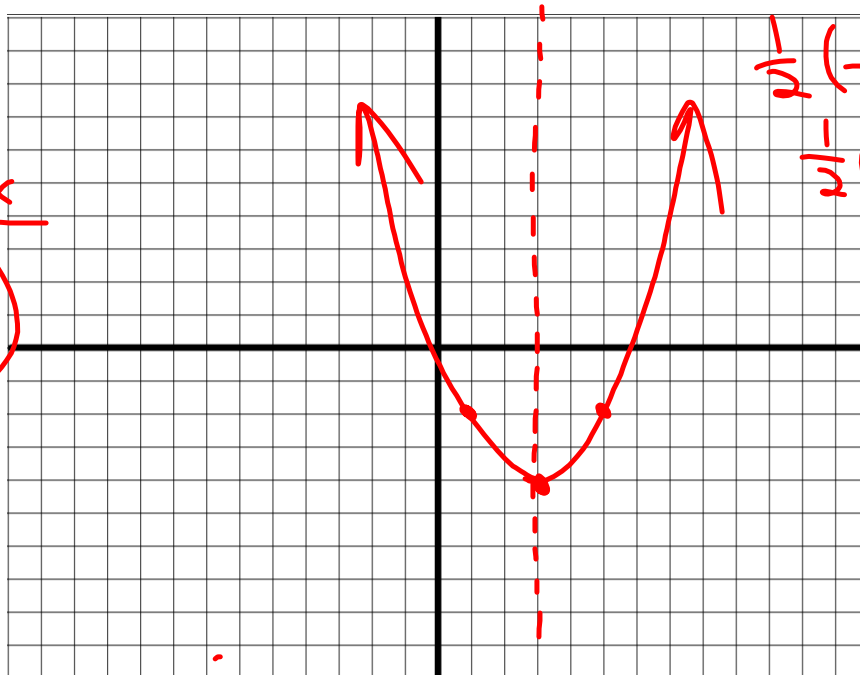
Vertex

$$\frac{1}{2}(4) - 4$$

$$(3, -4)$$

$$2 - 4$$

$$-2$$



EXAMPLE 6 Change from vertex form to standard formWrite $f(x) = 4(x - 1)^2 + 9$ in standard form.

$$= 4(x - 1)^2 + 9$$

$$= 4(x - 1)(x - 1) + 9$$

$$= 4(x^2 - x - x + 1) + 9$$

$$= 4(x^2 - 2x + 1) + 9$$

$$= 4x^2 - 8x + 4 + 9$$

$$f(x) = 4x^2 - 8x + 13$$

EXAMPLE 6 Change from vertex form to standard form

Write the quadratic function in standard form.

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

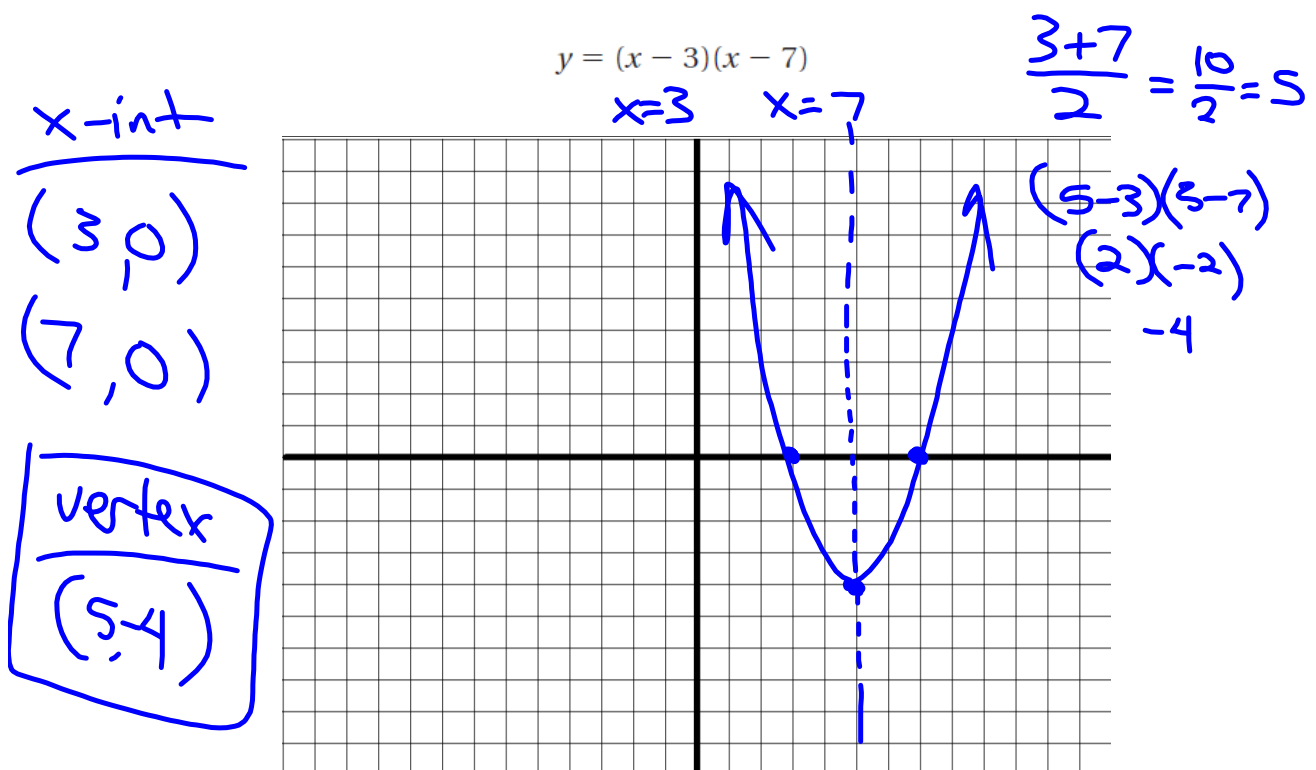
$$= -3(x+5)(x+5) - 1$$

$$= -3(x^2 + 5x + 5x + 25) - 1$$

$$= -3(x^2 + 10x + 25) - 1$$

$$= -3x^2 - 30x - 75 - 1$$

$$f(x) = -3x^2 - 30x - 76$$

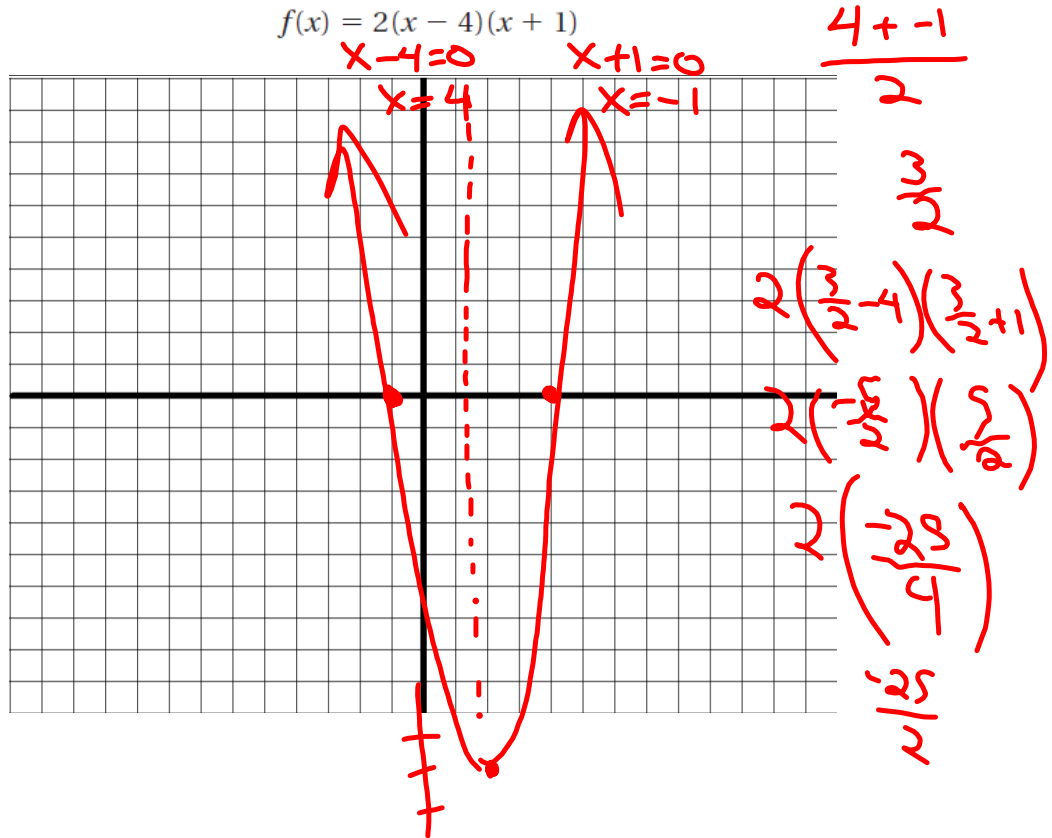
EXAMPLE 3 Graph a quadratic function in intercept form

EXAMPLE 3 Graph a quadratic function in intercept form

Graph the function. Label the vertex, axis of symmetry, and x-intercepts.

$$f(x) = 2(x - 4)(x + 1)$$

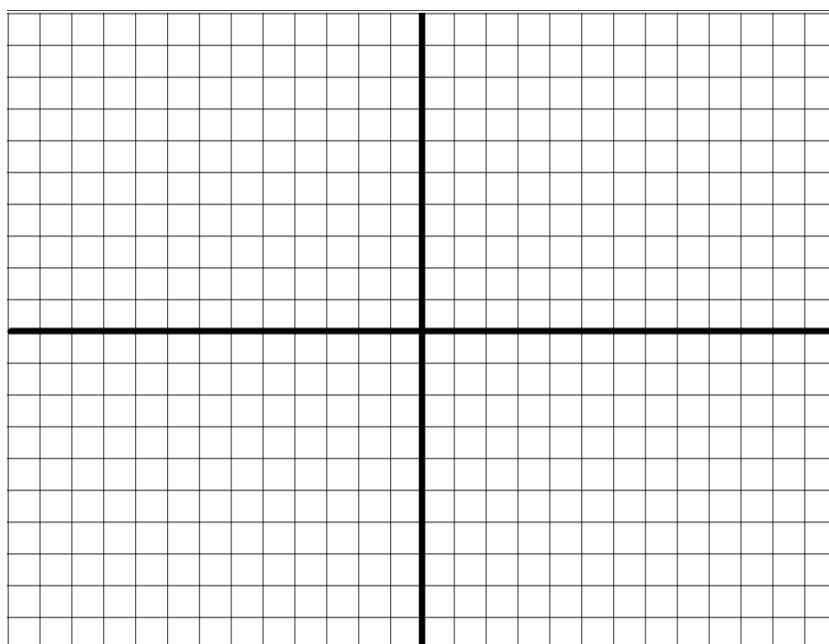
x-int
 $(4, 0)$
 $(-1, 0)$
Vertex
 $(\frac{3}{2}, -\frac{25}{2})$



EXAMPLE 3 Graph a quadratic function in intercept form

Graph the function. Label the vertex, axis of symmetry, and x -intercepts.

$$y = -(x + 1)(x - 5)$$



EXAMPLE 5 Change from intercept form to standard formWrite $y = -2(x + 5)(x - 8)$ in standard form.

$$\begin{aligned} &= -2(x+5)(x-8) \\ &= -2(x^2 - 8x + 5x - 40) \\ &= -2(x^2 - 3x - 40) \\ & y = -2x^2 + 6x + 80 \end{aligned}$$

EXAMPLE 5 Change from intercept form to standard form

Write the quadratic function in standard form.

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

$$y = -(x^2 - 7x - 2x + 14)$$

$$y = -(x^2 - 9x + 14)$$

$$y = -x^2 + 9x - 14$$