Mathematics 10D

Q.03 – Vertex Form

Mr. D. Hagen

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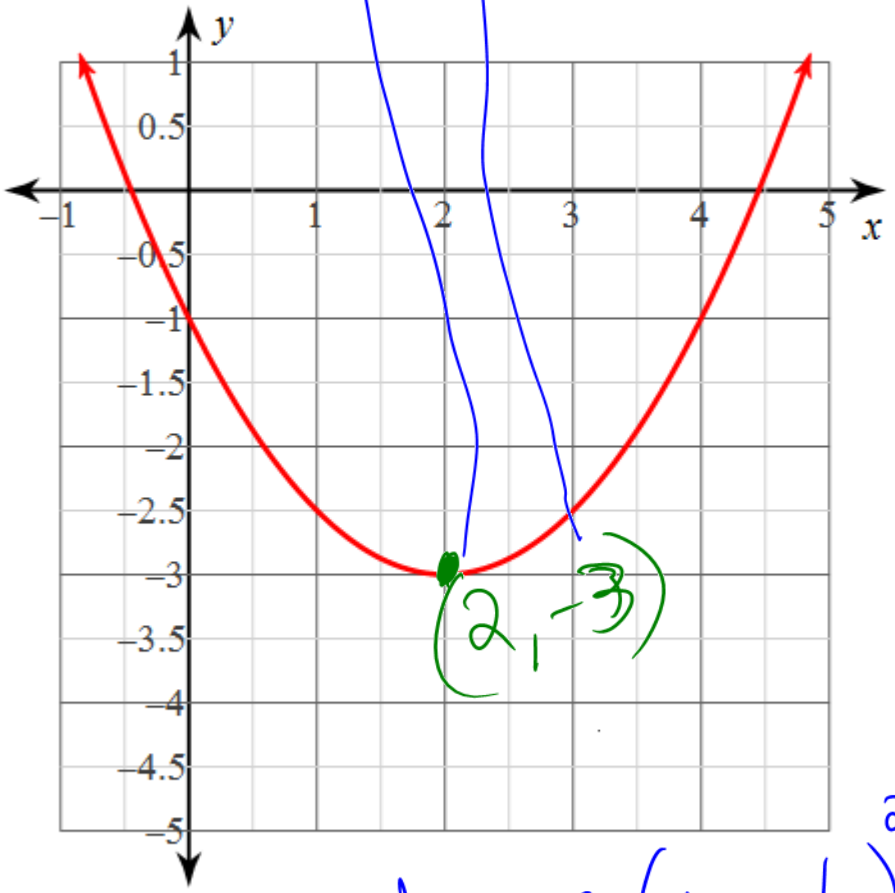
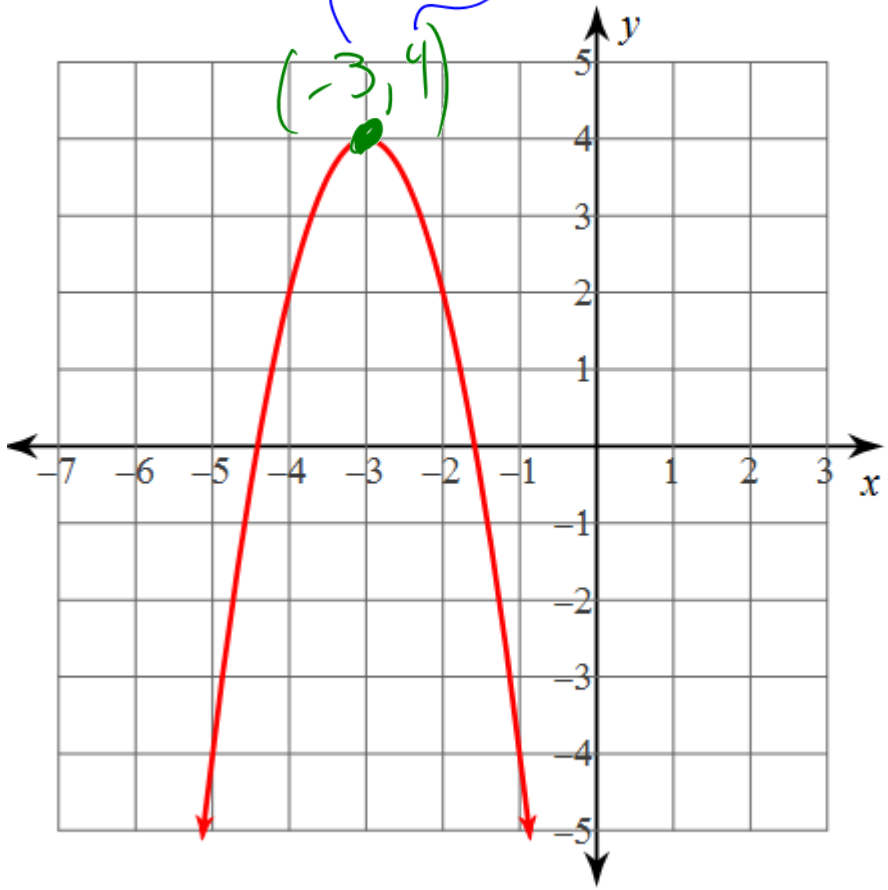
$$y = \frac{1}{2}(x-2)^2 - 3$$



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

$(x-(-3))^2$



$$y = a(x-h)^2 + k$$

Convert from Vertex form to Standard form

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

$y = \frac{1}{2}(x-2)(x-2) - 3$

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

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

$y = \frac{1}{2}x^2 - 2x + 2 - 3$

$y = \frac{1}{2}x^2 - 2x - 1$

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

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

$y = -2(x^2 + 3x + 3x + 9) + 4$

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

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

$y = -2x^2 - 12x - 14$

Convert from Standard form to Vertex form

$y = 4x^2 + 24x - 64$

$a = 4$

$y = 4(x^2 + 6x - 16)$

$y = 4(x + 8)(x - 2)$

Zeros: $x = -8, x = 2$

AoS: $h = \frac{-8 + 2}{2} = -3$

Vertex: $k = 4(-3)^2 + 24(-3) - 64$

$k = 36 - 72 - 64$

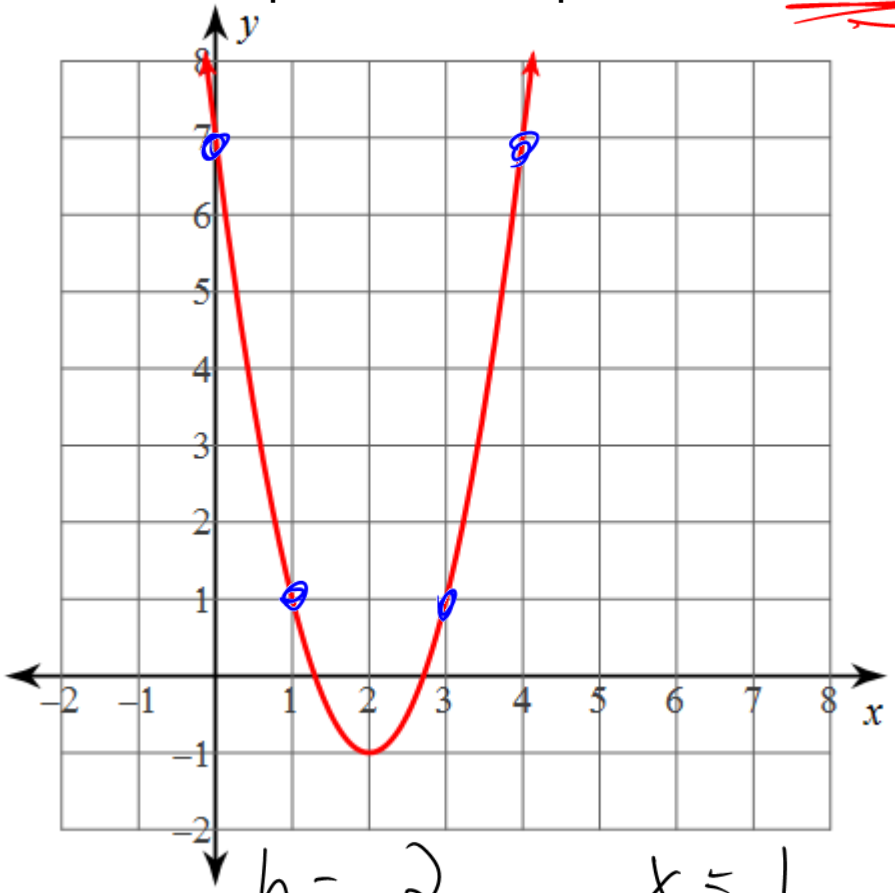
$k = -100$

$\therefore$ vertex is $(-3, -100)$

$y = a(x - h)^2 + k$

$y = 4(x + 3)^2 - 100$

Write the equation of the parabola in vertex form



$h = 2$ $\quad x = 1$

$k = -1$ $\quad y = 1$

$y = a(x-h)^2 + k$

$1 = a(1-2)^2 - 1$

$1 = a(-1)^2 - 1$

$+1 \quad +1$

$1 = a(1)(-1)$

$2 = a$

$\therefore y = 2(x-2)^2 - 1$

A parabola has a zero at (3,0) and a vertex at (5,12). State the equation of the parabola in both vertex and standard form.