Mathematics 10D

Q.03 – Vertex Form

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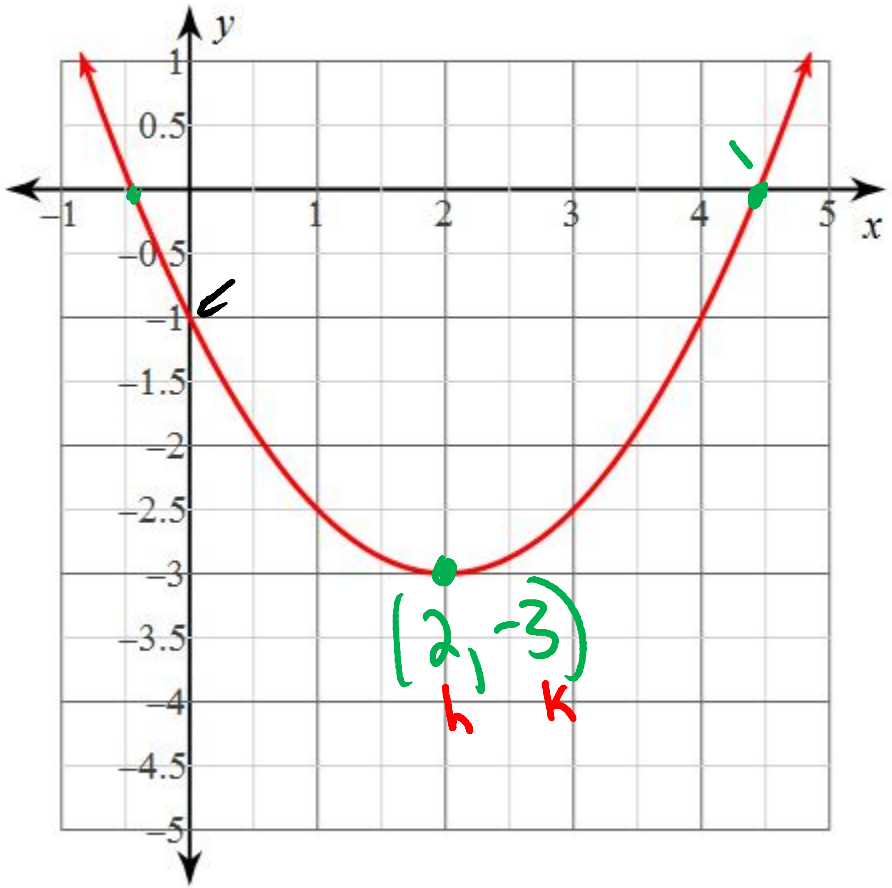
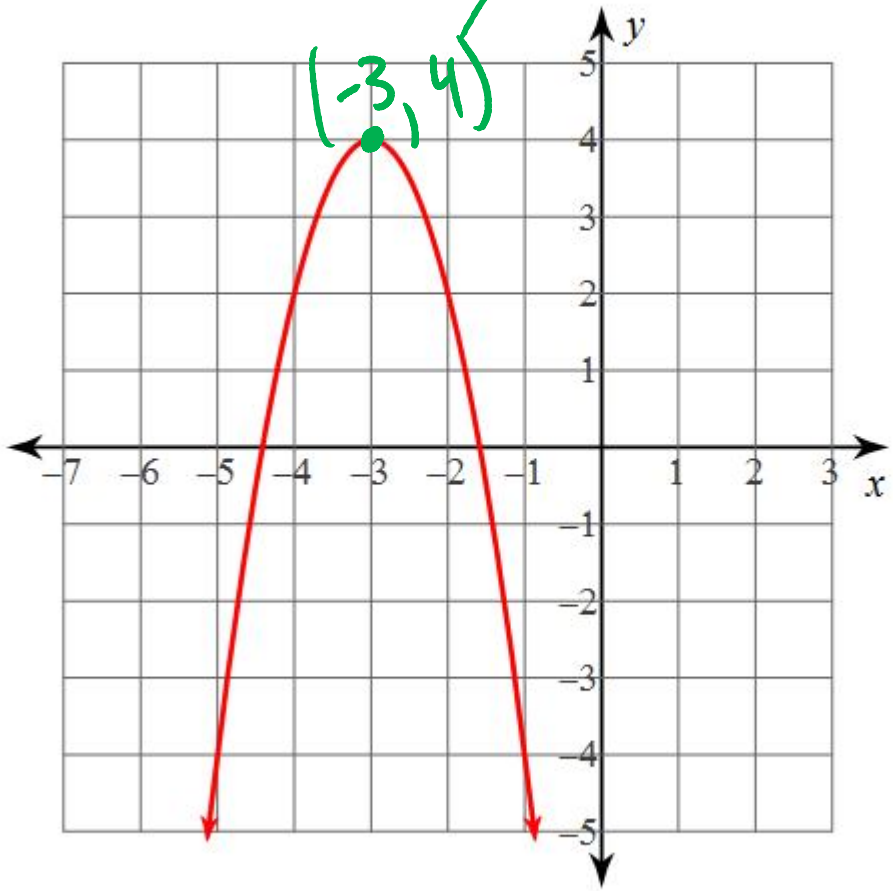
$y = \frac{1}{2}(x - 2)^2 - 3$ k

h



$(x - -3)^2$

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



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

Convert from Vertex form to Standard form

$y = \frac{1}{2}(x-2)^2 - 3$ (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 → put into zeros form

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

$y = 4(x^2 + 6x - 16)$ ② -16 ④ $+6$ $+8, -2$

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

zeros: $x = 2$ and $x = -8$

$h = \frac{2 + -8}{2} = \frac{-6}{2} = -3$

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

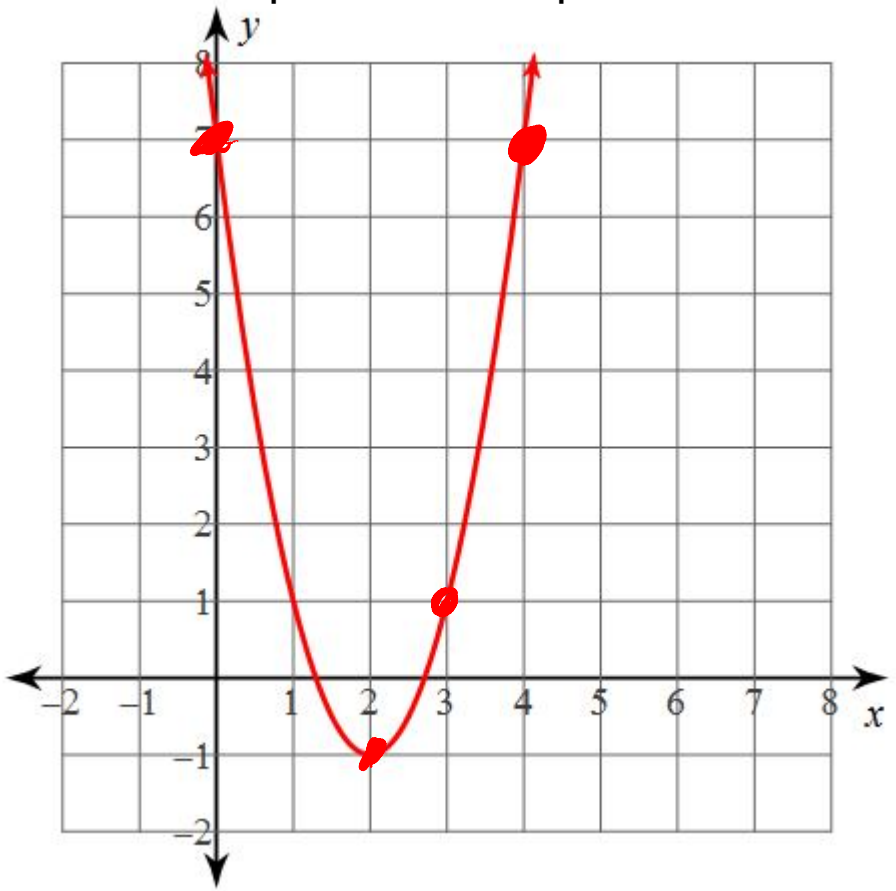
$k = 36 - 72 - 64$

$k = -100$

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

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

Write the equation of the parabola in vertex form



$h = 2$

$k = -1$

$x = 4$

$y = 7$

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

$7 = a(4-2)^2 - 1$

$8 = a(2)^2$

$8 = a(4)$

$2 = a$

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

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.

$h = 5$

$k = 12$

$x = 3$

$y = 0$

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

$0 = a(3-5)^2 + 12$

$-12 = a(-2)^2$

$-12 = a(4)$

$-3 = a$

$\therefore y = -3(x-5)^2 + 12$

$-2^2 = -4$

$(-2)^2 = 4$

↑

we want