Mathematics 10D

2 – Zeros/Factored Form

Mr. D. Hagen

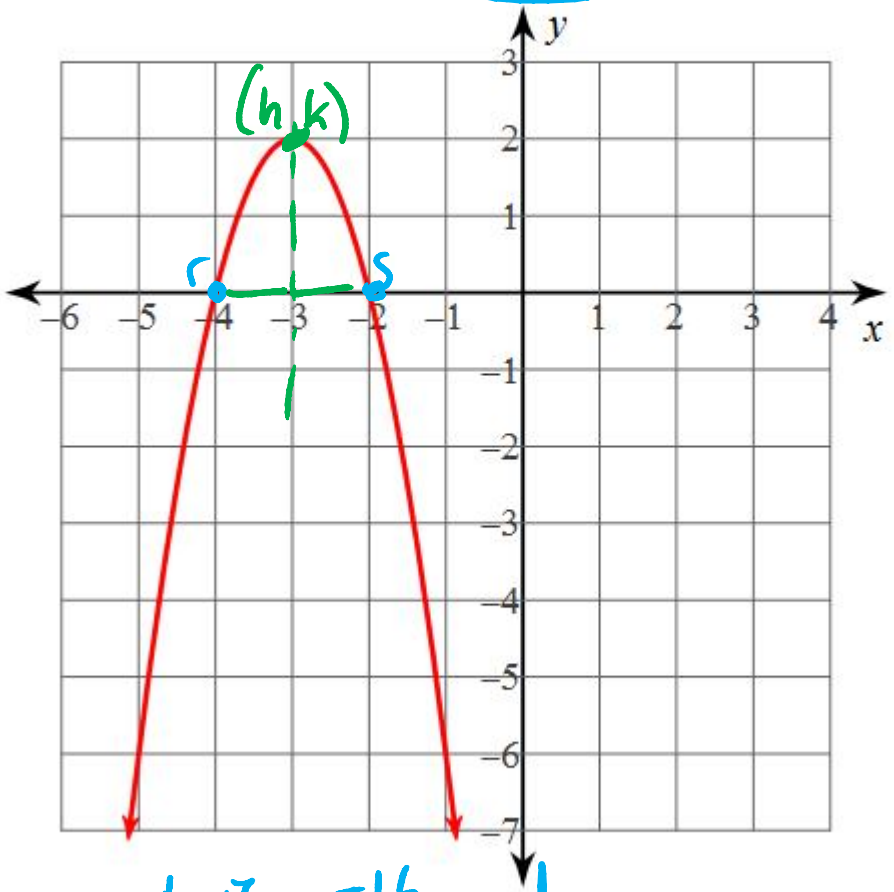
Standard: $y = ax^2 + bx + c$ y-int

Factoring

Zeros/Factored: $y = a(x - r)(x - s)$

x-ints / zeros / solutions / roots

$y = -2x^2 - 12x - 16$



y-int is -16

zeros are $x = -4$, $x = -2$

vertex is $(-3, 2)$

$y = -2(x^2 + 6x + 8)$ (÷8, ÷6)

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

$x+2 = 0$, $x+4 = 0$

- Zeros: $x = -2$ and $x = -4$
- $h = \frac{-2 + -4}{2} = \frac{-6}{2} = -3$
- $k = -2(-3)^2 - 12(-3) - 16$

  $k = -18 + 36 - 16$

  $k = 2$

$\therefore$ vertex is $(-3, 2)$

$y = a(x - r)(x - s)$

Given the standard form, find the zeros, then the vertex.

$y = 3x^2 + 15x - 18$

$y = 3(x^2 + 5x - 6)$ (x) -6, (+) 5 → +6, -1

$y = 3(x - 1)(x + 6)$

$x - 1 = 0$ $\quad x + 6 = 0$

zeros: $x = 1$ and $x = -6$

$h = \frac{1 + -6}{2} = \frac{-5}{2} = -2.5$

$k = 3(-2.5)^2 + 15(-2.5) - 18$

$k = 18.75 - 37.5 - 18$

$k = -36.75$

∴ vertex is $(-2.5, -36.75)$

a minimum

Given the standard form, find the zeros then the vertex.

$y = 5x^2 + 8x - 4$

$\otimes$ -20
$\oplus$ 8
$10, -2$

$y = 5x^2 + 10x - 2x - 4$

$y = 5x(x+2) - 2(x+2)$

$y = (x+2)(5x-2)$

$x+2 = 0$ $\quad 5x-2 = 0$

Zeros: $x = -2$ and $x = \frac{+2}{5} = +0.4$

$5x + 2 = 0$
$5x = -2$
$x = \frac{-2}{5} = -0.4$

$h = \frac{-2 + 0.4}{2} = \frac{-1.6}{2} = -0.8$

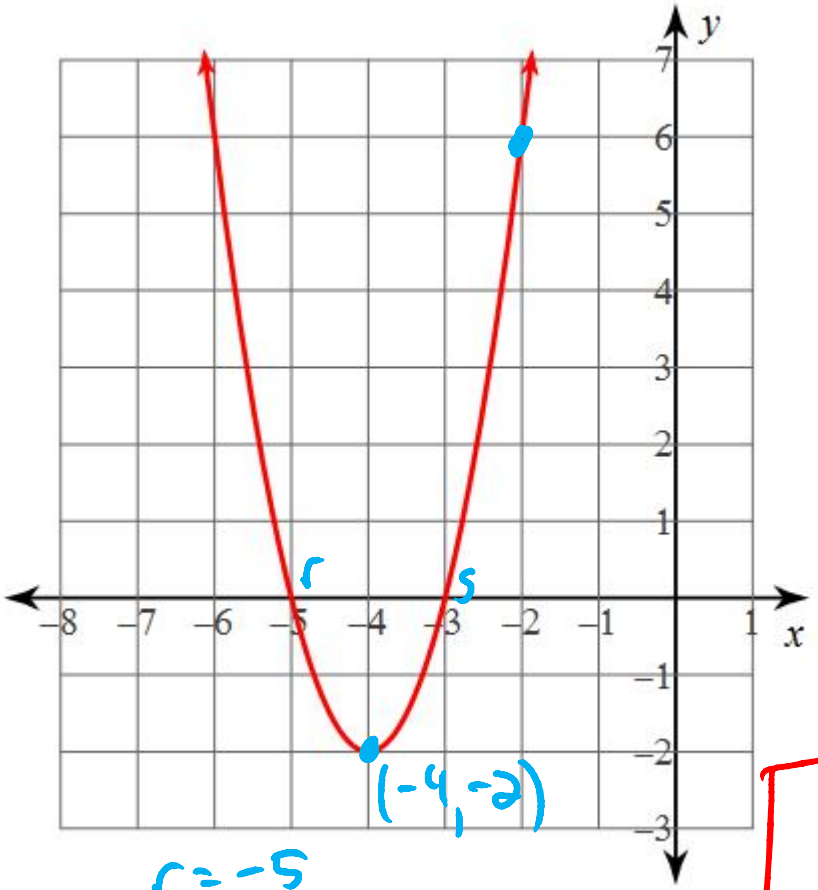
$k = 5(-0.8)^2 + 8(-0.8) - 4$

$k = 3.2 - 6.4 - 4$

$k = -7.2$

$\therefore$ vertex is $(-0.8, -7.2)$

Given the graph, state the equation of the parabola in both zeros form and standard form, then state the y-intercept.



$y = a(x-r)(x-s)$

$-2 = a(-4+5)(-4+3)$

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

$-2 = a(-1)$

$2 = a$

$r = -5$

$s = -3$

$x = -4$

$y = -2$

$x = -2$

$y = -6$

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

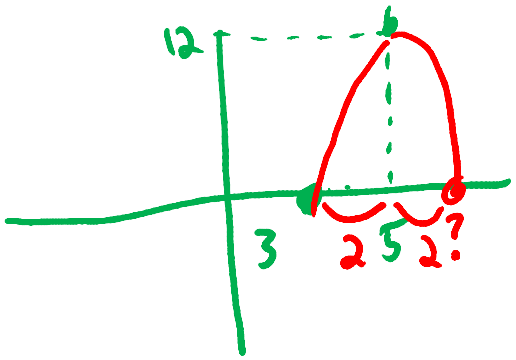
$y = 2(x^2+3x+5x+15)$

$y = 2(x^2+8x+15)$

$y = 2x^2+16x+30$

y-int = 30

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



$r=3, s=7$

$x=5, y=12$

$y=a(x-r)(x-s)$

$12=a(5-3)(5-7)$

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

$12=a(-4)$

$-3=a$

$\therefore y=-3(x-3)(x-7)$