Warm-up

$f(x) = -4x^2 + 8x + 5$

Find:

a) y-int
b) x-int(s)
c) vertex
d) axis of Symmetry
e) Domain
f) Range

a) $f(0) = -4(0)^2 + 8(0) + 5$

$f(0) = 5$

$(0, 5)$

b) $f(x) = -(2x + 1)(2x - 5) = 0$

$2x + 1 = 0$ $\quad$ $2x - 5 = 0$

$x_1 = -\frac{1}{2} = -0.5$ $\quad$ $x_2 = \frac{5}{2} = 2.5$

$(-\frac{1}{2}, 0)$ $\quad$ $(2.5, 0)$

c) Middle x-int: $\frac{x_1 + x_2}{2} = \frac{-0.5 + 2.5}{2} = 1$

$f(1) = -4(1)^2 + 8(1) + 5) = 9$

$(1, 9)$

d) x value of vertex: $x = 1$

e) $x \in \mathbb{R}$

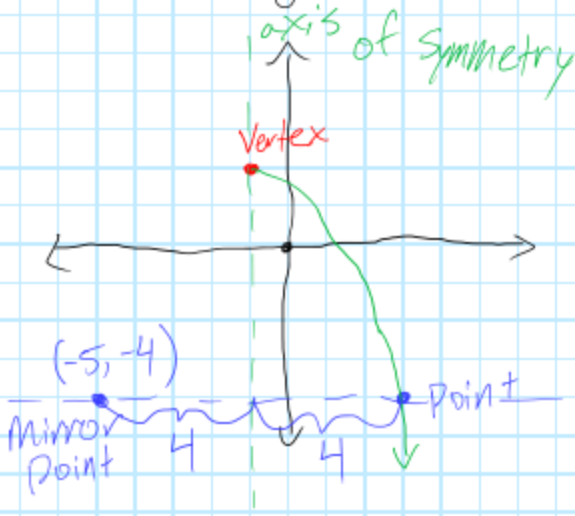
f) Facing down

$y \leq 9$

Ex 1 Vertex $(-1, 2)$

Point $(3, -4)$

What other point does it pass through?



Th: Go over quiz ⊕ work

Mon: Quiz 1.3/1.4

Wed: Review

Fri: Test Chp 1

Standard Form

There is another way to write quadratics so they are easier to graph

General Form

$f(x) = ax^2 + bx + c$

Standard Form

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

Same number

In Standard form, Vertex (h, k)

Find i) vertex ii) x-int(s)

iii) y-int

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

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

$h = 1$

$k = 4$

Vertex (h, k) $(1, 4)$

ii) x-int: $y=0$

$$f(x) = 0 = -\frac{1}{4}(x-1)^2 + 4$$

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

$$16 = (x-1)^2$$

Sq root

$$\pm 4 = x - 1$$

$$1 \pm 4 = x$$

$x_1 = 1+4 = 5$

$x_2 = 1-4 = -3$

iii) $f(0) = -\frac{1}{4}(0-1)^2 + 4$

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

$$= -\frac{1}{4} + \frac{16}{4} = +\frac{15}{4}$$

$$\left(0, \frac{15}{4}\right)$$

Ex 3 $f(x) = 3(x+1)^2 - 3$

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

$h = -1 \quad k = -3$

vertex $(-1, -3)$

ii) $f(x) = 0 = 3(x+1)^2 - 3$

$3 = 3(x+1)^2 \quad \div 3$

$\sqrt{1} = \sqrt{(x+1)^2}$ Sq root

$\pm 1 = x + 1$

$-1 \pm 1 = x$

$x_1 = -1 + 1 = 0$

$x_2 = -1 - 1 = -2$

iii) $f(0) = 3(0+1)^2 - 3$

$= 3(1)^2 - 3 = 3 - 3 = 0$

$(0, 0)$