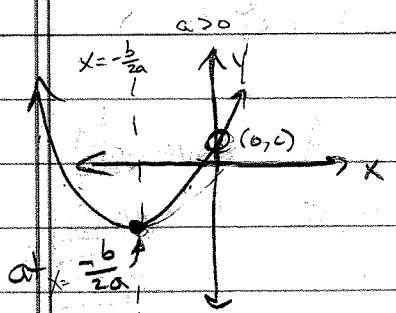
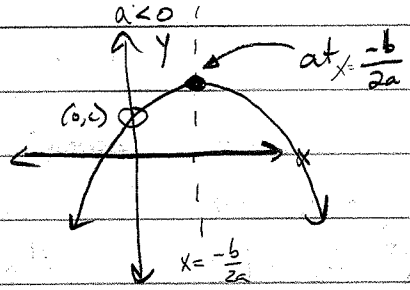
4.1b Vertex

$y = ax^2 + bx + c$





Characteristics:

- Opens upward if $a>0$ & downward if $a<0$
- Vertex is at $\frac{-b}{2a}$ for x coordinate
- Line of symmetry is $x = \frac{-b}{2a}$
- y-intercept is at $(0,c)$
- The vertex is a minimum if opens up, maximum if opens down

Graph $y = 2x^2 - 8x + 6$

1st - Find a, b & c

$a = 2 \quad b = -8 \quad c = 6$

2nd - Find vertex

is at $x = \frac{-b}{2a}$, $b = -8 \quad a = 2$

$x = -\frac{-8}{2(2)} = \frac{8}{4} = 2$

$y = 2(2)^2 - 8(2) + 6$

$= 2(4) - 16 + 6$

$= -2$

Vertex at $(2, -2)$

3rd - Find y-intercept

$y = c$ or at $(0,c)$ ... $x = 0$

$y = 2(0)^2 - 8(0) + 6$

$y = 6$

at $(0,6)$

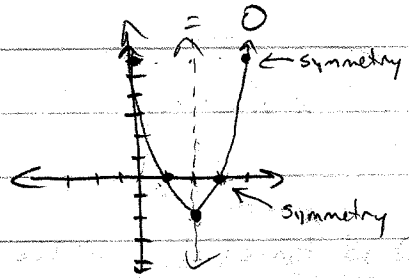
4th - Find one more point (near vertex)

$(1, y)$

$y = 2(1)^2 - 8(1) + 6$

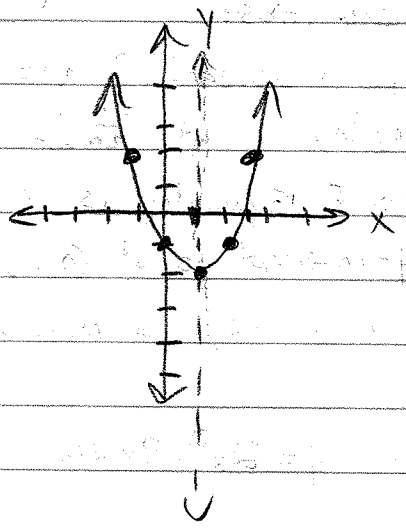
$= 2 - 8 + 6$

$= 0$ $(1,0)$



5th - plot & connect

Graph $y = x^2 - 2x - 1$



1st - $a = 1, b = -2, c = -1$

2nd - Vertex $\frac{-b}{2a}$

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

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

$= 1 - 2 - 1 = -2$

$(1, -2)$ (minimum)

3rd - y-int

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

$y = -1$ $(0, -1)$

4th - One more pt

$(-1, y)$

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

$= 1 + 2 - 1$

$= 2$ $(-1, 2)$

p240: 22, 23, 27, 33, 34