Unit 5 – Quadratics 2nd Name: Hirsch

Standard Form

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

Leading Coefficient

* If (+): graph opens up
* If (-): graph opens down

Constant

If you substitute 0 in for x, this will tell you where the graph will cross the y-axis.. This is called the y-intercept.

Example 1. $f(x) = -8 + 2x + x^2$

Standard Form: $f(x) = x^2 + 2x - 8$

a = 1 b = 2 c = -8

Does it open up or down? up

y-intercept: (0, -8)

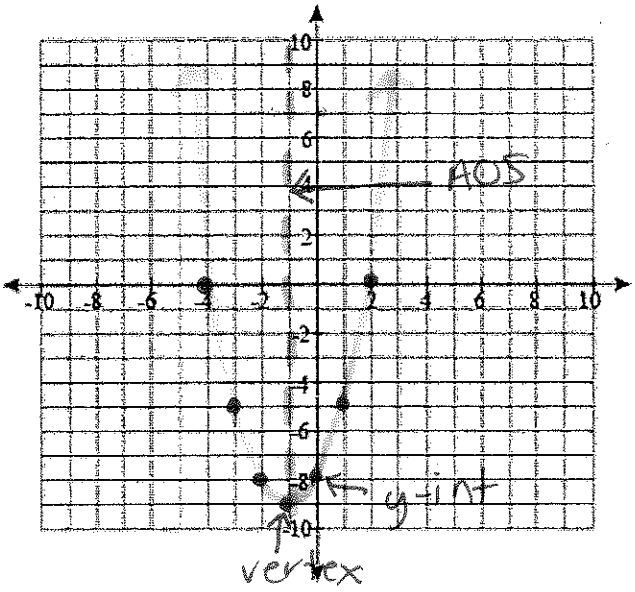
x-intercept(s): (-4, 0) and (2, 0)

Vertex: (-1, -9)

Axis of Symmetry: x = -1

Domain: $(-\infty, \infty)$ **Range:** $[-9, \infty)$

x	y
-4	0
-3	-5
-2	-8
-1	-9
0	-8
1	-5
2	0



Example 2: $f(x) = -12x - 2x^2 - 10$

Standard Form: $f(x) = -2x^2 - 12x - 10$

a = -2 b = -12 c = -10

Does it open up or down? down

y-intercept: (0, -10)

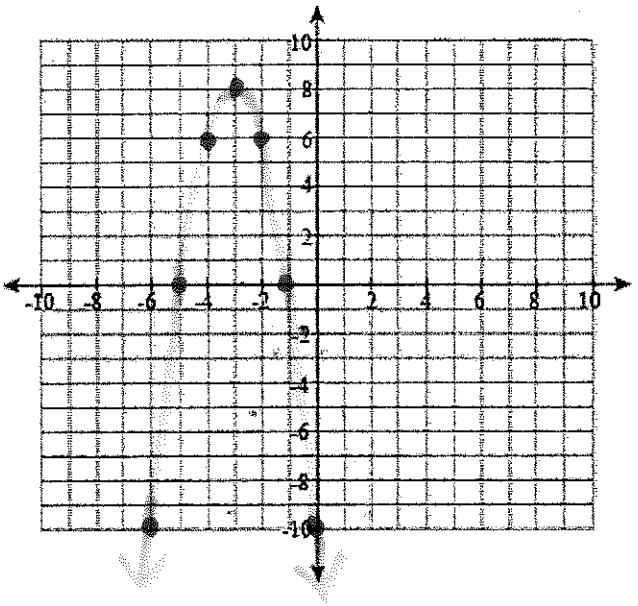
x-intercept(s): (-5, 0) & (-1, 0)

Vertex: (-3, 8)

Axis of Symmetry: x = -3

Domain: $(-\infty, \infty)$ **Range:** $(-\infty, 8]$

x	y
-6	-10
-5	0
-4	6
-3	8
-2	6
-1	0
0	-10



3. $f(x) = 4x^2 + 8x - 1$

Standard Form: $f(x) = 4x^2 + 8x - 1$

a = 4 b = 8 c = -1

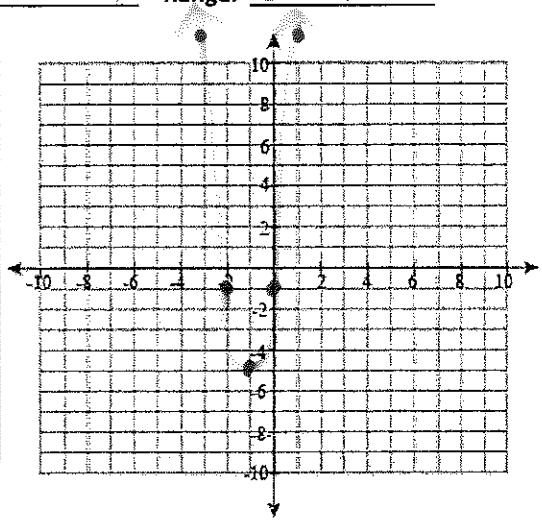
Does it open up or down? up

y-int: (0, -1) **x-int(x):** ≈ (-2.2, 0) & (.2, 0)

Vertex: (-1, -5) **AOS:** $x = -1$

Domain: $(-\infty, \infty)$ **Range:** $[-5, \infty)$

x	y
-4	31
-3	11
-2	-1
-1	-5
0	-1
1	11
2	31



4: $f(x) = 4x + x^2 - 3$

Standard Form: $f(x) = x^2 + 4x - 3$

a = 1 b = 4 c = -3

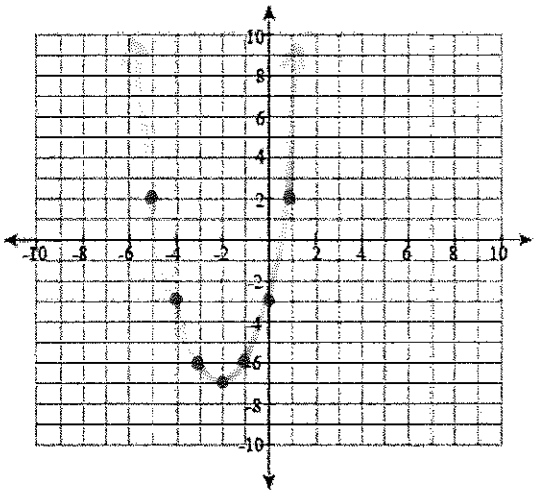
Does it open up or down? up

y-int: (0, -3) **x-int(x):** ≈ (-4.5, 0) & (.5, 0)

Vertex: (-2, -7) **AOS:** $x = -2$

Domain: $(-\infty, \infty)$ **Range:** $[-7, \infty)$

x	y
-5	2
-4	-3
-3	-6
-2	-7
-1	-6
0	-3
1	2



5. $f(x) = 5 - 2x - x^2$

Standard Form: $f(x) = -x^2 - 2x + 5$

a = -1 b = -2 c = 5

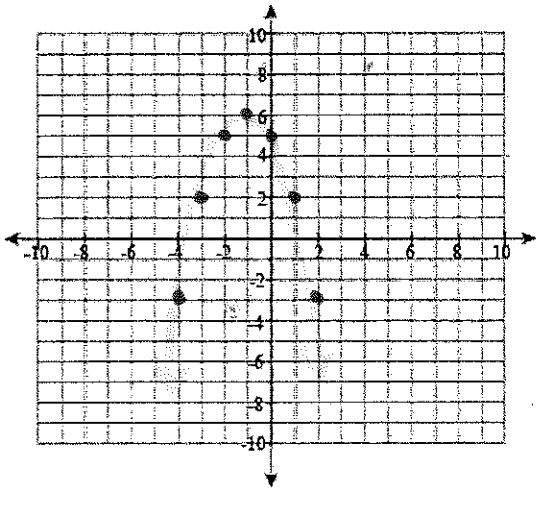
Does it open up or down? down

y-int: (0, 5) **x-int(x):** ≈ (-3.5, 0) & (1.5, 0)

Vertex: (-1, 6) **AOS:** $x = -1$

Domain: $(-\infty, \infty)$ **Range:** $(-\infty, 6]$

x	y
-4	-3
-3	2
-2	5
-1	6
0	5
1	2
2	-3



6: $f(x) = -8 + 2x^2$

Standard Form: $f(x) = 2x^2 - 8$

a = 2 b = 0 c = -8

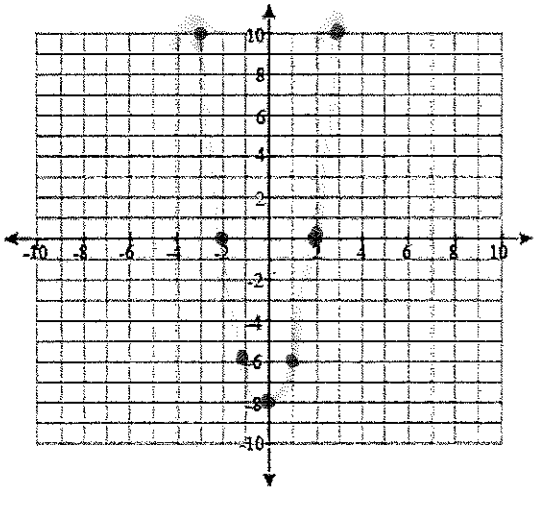
Does it open up or down? up

y-int: (0, -8) **x-int(x):** (-2, 0) & (2, 0)

Vertex: (0, -8) **AOS:** $x = 0$

Domain: $(-\infty, \infty)$ **Range:** $[-8, \infty)$

x	y
-3	10
-2	0
-1	-6
0	-8
1	-6
2	0
3	10



7. $f(x) = x^2 + 5x + 6$

Standard Form: $f(x) = x^2 + 5x + 6$

a = 1 b = 5 c = 6

Does it open up or down? up

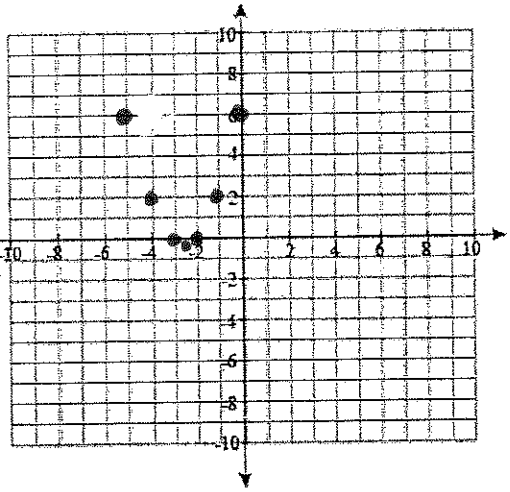
y-int: (0,6) x-int(x): (-3,0) & (-2,0)

Vertex: (-2.5, -.25) AOS: $x = -2.5$

Domain: $(-\infty, \infty)$ Range: $[-0.25, \infty)$

V=

x	y
-5	6
-4	2
-3	0
-2.5	-0.25
-2	0
-1	2
0	6



8: $f(x) = x^2 + 7 - 8x$

Standard Form: $f(x) = x^2 - 8x + 7$

a = 1 b = -8 c = 7

Does it open up or down? up

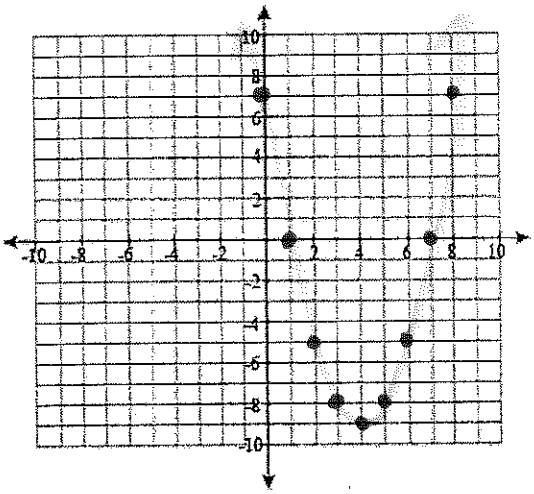
y-int: (0,7) x-int(x): (7,0) & (1,0)

Vertex: (4,-9) AOS: $x = 4$

Domain: $(-\infty, \infty)$ Range: $[-9, \infty)$

V=

x	y
1	0
2	-5
3	-8
4	-9
5	-8
6	-5
7	0



9. $f(x) = 12x - 9 - 3x^2$

Standard Form: $f(x) = -3x^2 + 12x - 9$

a = -3 b = 12 c = -9

Does it open up or down? down

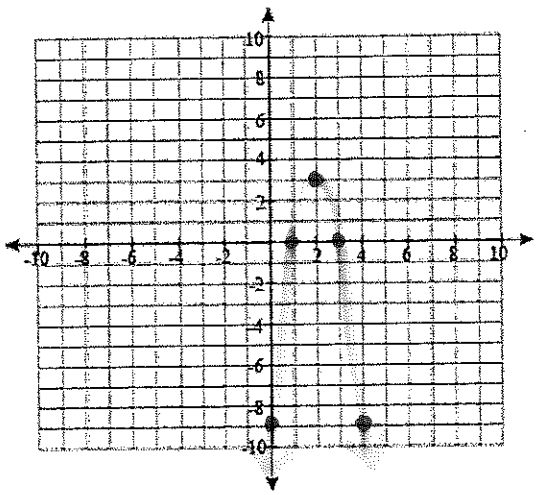
y-int: (0,-9) x-int(x): (1,0) & (3,0)

Vertex: (2,3) AOS: $x = 2$

Domain: $(-\infty, \infty)$ Range: $(-\infty, 3]$

V=

x	y
-1	-24
0	-9
1	0
2	3
3	0
4	-9
5	-24



10: $f(x) = 16 + x^2 + 8x$

Standard Form: $f(x) = x^2 + 8x + 16$

a = 1 b = 8 c = 16

Does it open up or down? up

y-int: (0,16) x-int(x): (-4,0)

Vertex: (-4,0) AOS: $x = -4$

Domain: $(-\infty, \infty)$ Range: $[0, \infty)$

V=

x	y
-7	9
-6	4
-5	1
-4	0
-3	1
-2	4
-1	9