

7.2

Foundations of Math II

p. 368 # 1-6, 11(i, ii)

1. a) equation of the axis of symmetry is the vertical line that goes through the vertex
 $x = 4$

b) vertex is lowest or highest point on the parabola
 $(4, -16)$

c) The domain of all quadratic functions is the same
 $\{x \mid x \in \mathbb{R}\}$
 the range is all the points above or below the vertex.
 $\{y \mid y \geq -16, y \in \mathbb{R}\}$

2. a) $f(x) = 2x^2 + 8x + 8$
 y-intercept $(0, 8)$

to find a point on the graph,
 select a value to replace x
 in the equation and solve to
 find y

$$f(3) = 2 \cdot 3^2 + 8 \cdot 3 + 8$$

$$f(3) = 18 + 24 + 8$$

$$f(3) = 50$$

point: $(3, 50)$

$$f(-1) = 2(-1)^2 + 8(-1) + 8$$

$$f(-1) = 2 - 8 + 8$$

$$f(-1) = 2$$

point: $(-1, 2)$

- b) $f(x) = 4x - x^2$
 y-intercept $(0, 0)$

$$f(2) = 4 \cdot 2 - 2^2$$

$$f(2) = 8 - 4$$

$$f(2) = 4$$

point: $(2, 4)$

← there is no constant
 so the y-intercept is 0

$$f(-3) = 4(-3) - (-3)^2$$

$$f(-3) = -12 - 9$$

$$f(-3) = -21$$

point: $(-3, -21)$

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3. x-intercepts → where parabola crosses x-axis
 y-intercepts → where parabola crosses y-axis
 equation of axis of symmetry → always a vertical line so always $x = \square$
 vertex → the highest or lowest point on a parabola
 domain → all possible x-values for the parabola
 range → all possible y-values for the parabola

	(a)	(b)
x-int	0, 2	-1, 6
y-int	0	4
ax of sym	$x=1$	$x=2.5$
vertex	(1, -2)	(2.5, 9.2)
domain	$\{x x \in \mathbb{R}\}$	$\{x x \in \mathbb{R}\}$
range	$\{y y \geq -2, y \in \mathbb{R}\}$	$\{y y \leq 9.2, y \in \mathbb{R}\}$

	(a)	(b)	(c)	(d)
ax of sym	$x=1$	$x=3$	$x=4$	$x=2.5$
vertex	(2, -1)	(3, -1)	(4, 28)	(2.5, -12)
domain	$\{x x \in \mathbb{R}\}$	$\{x x \in \mathbb{R}\}$	$\{x x \in \mathbb{R}\}$	$\{x x \in \mathbb{R}\}$
range	$\{y y \geq -1, y \in \mathbb{R}\}$	$\{y y \leq -1, y \in \mathbb{R}\}$	$\{y y \leq 28, y \in \mathbb{R}\}$	$\{y y \geq -12, y \in \mathbb{R}\}$

5. a) $f(x) = x^2 - 5x - 6$ graph 4d because it has a y-intercept of -6
- b) $f(x) = -x^2 + 8x + 12$ graph 4b because it has a y-intercept of 12
- c) $f(x) = -x^2 + 6x - 10$ graph 4c because it has a y-intercept of -10
- d) $f(x) = x^2 - 4x + 3$ graph 4a because it has a y-intercept of 3

p. 368 cont.

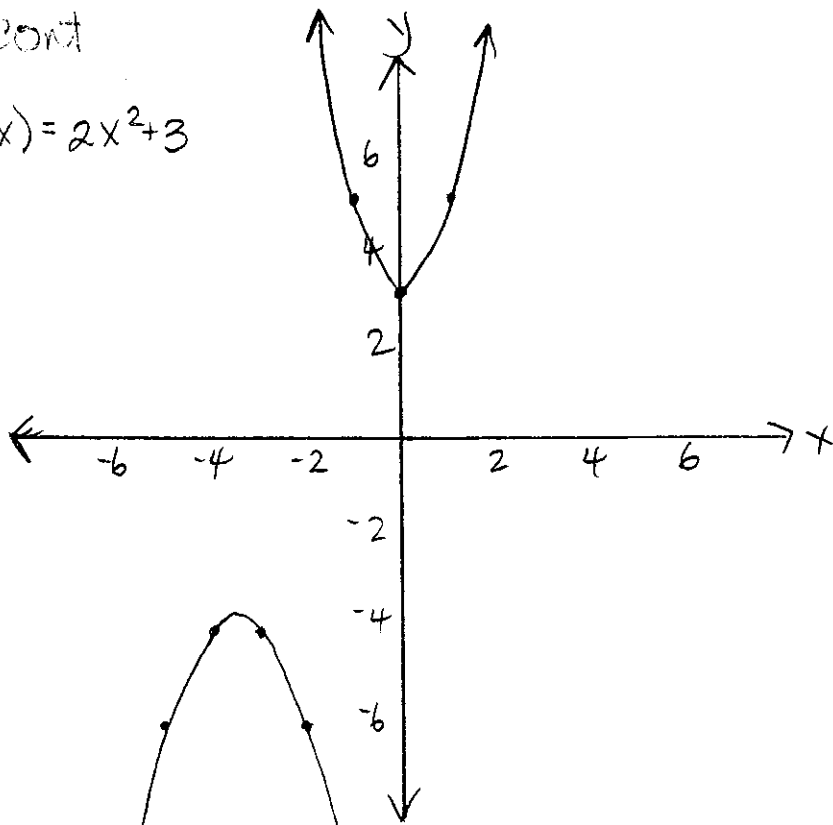
- b. a) opens down so there is a maximum
y-value of vertex is 4 so that is the maximum
- b) opens up so there is a minimum
y-value of vertex is -3 so that is the minimum
- c) opens down so there is a maximum
y-value of vertex is 2 so that is the maximum

11. see graph paper

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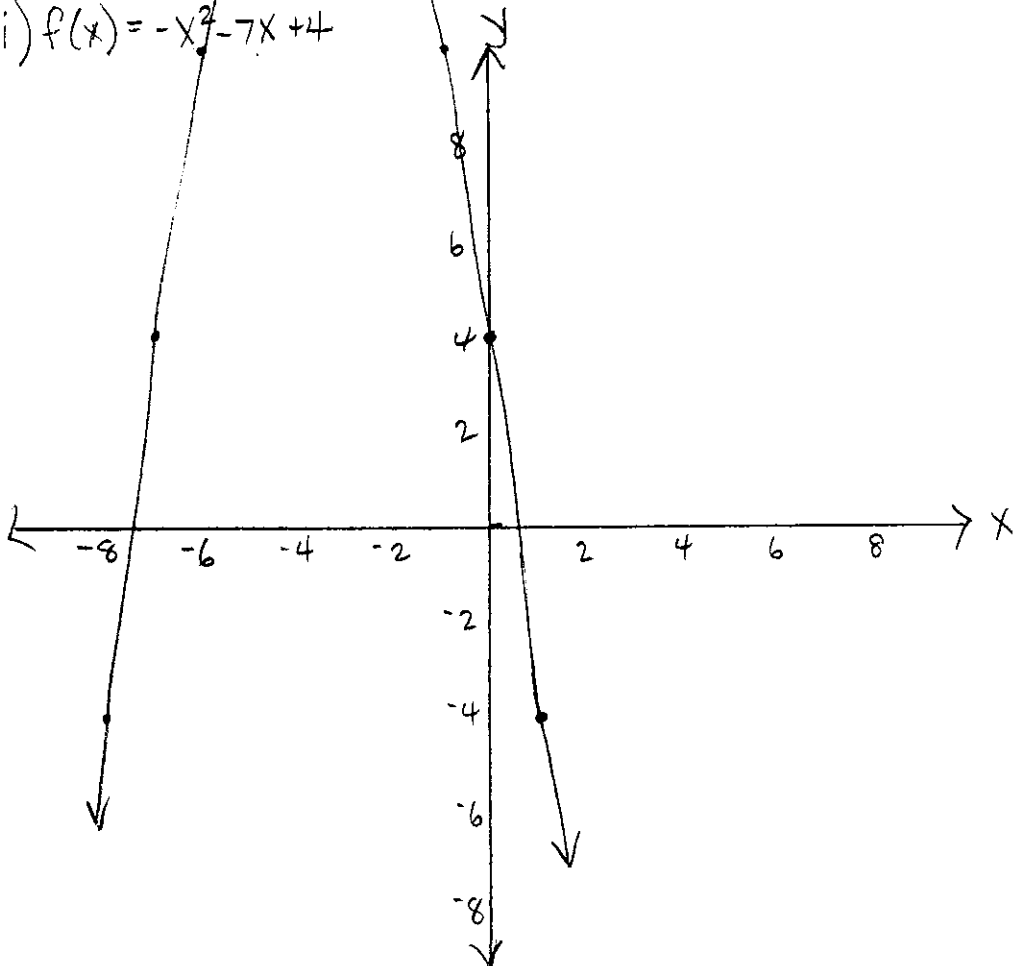
11. a) i) $f(x) = 2x^2 + 3$

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



b) ii) $f(x) = -x^2 - 7x + 4$

x	y
0	4
1	-4
2	-14
-1	10
-2	14
-3	16
-4	16
-5	14



finish the rest using symmetry.