

Pre-Calculus Math II

page 157 part 1 #1-4, 6, 7

1. a) $f(x) = 7x^2$

opens up (positive 7)

minimum (opens up)

range: $y \geq 0$ (vertex is at origin, shape goes up)

$(0,0)$ on the graph

Note: the range in the text is:

$\{y \mid y \geq 0, y \in \mathbb{R}\}$

brackets are used to show this is a set of numbers

this tells us we are looking at "range"

answer!!

the answer is part of the set of real numbers

b) $f(x) = \frac{1}{6}x^2$

opens up (positive $\frac{1}{6}$)

minimum (opens up)

range: $y \geq 0$ (vertex is at origin, shape goes up)

c) $f(x) = -4x^2$

opens down (negative 4)

maximum (opens down)

range: $y \leq 0$ (vertex is at the origin, shape goes down)

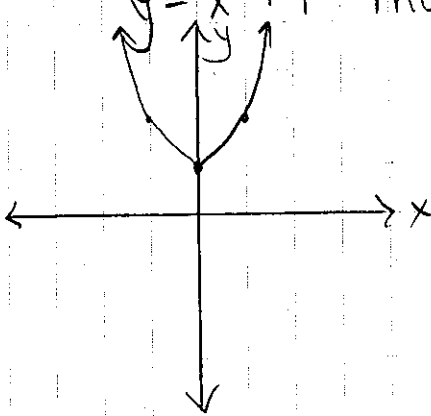
d) $f(x) = -0.2x^2$

opens down (negative 0.2)

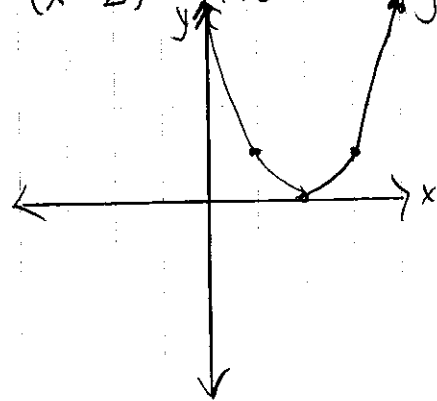
maximum (opens down)

range: $y \leq 0$ (vertex is at the origin, shape goes down)

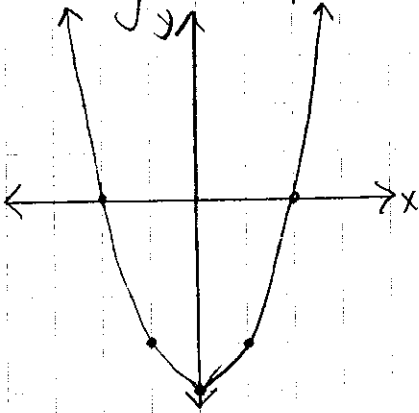
2. a) $y = x^2$
 $y = x^2 + 1$ moved up 1



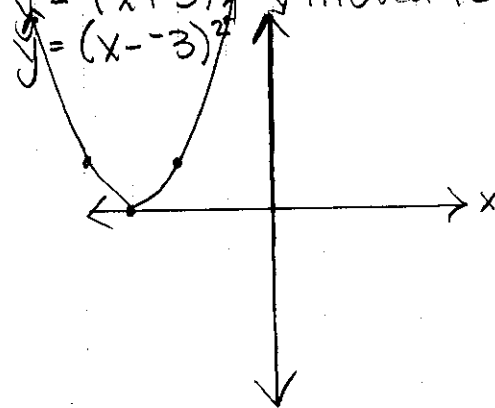
b) $y = x^2$
 $y = (x-2)^2$ moved right 2



c) $y = x^2$
 $y = x^2 - 4$ moved down 4



d) $y = x^2$
 $y = (x+3)^2$
 $y = (x-(-3))^2$ moved left 3



	vertex
a)	(0, 1)
b)	(2, 0)
c)	(0, -4)
d)	(-3, 0)

equation of axis of symmetry
 $x = 0$

$x = 2$

$x = 0$

$x = -3$

domain
 ARN

ARN

ARN

ARN

range
 $y \geq 1$

$y \geq 0$

$y \geq -4$

$y \geq 0$

intercepts
 $x = \text{none}$

$y = 1$

$x = 2$

$y = 4$

$x = -2, 2$

$y = -4$

$x = -3$

$y = 9$

$y = (0+3)^2$
 $y = 3^2$
 $y = 9$

to find the y-intercept, replace x with 0

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3. a) $f(x) = (x+5)^2 + 11$
 $f(x) = (x-(-5))^2 + 11$

- ① place vertex at $(-5, 11)$
- ② parabola opens up
- ③ regular shape

c) $f(x) = 5(x+20)^2 - 21$
 $f(x) = 5(x-(-20))^2 - 21$

- ① place vertex at $(-20, -21)$
- ② parabola opens up
- ③ y-values for shape are multiplied by 5

6. $f(x) = 5(x-15)^2 - 100$

a) vertex: $(15, -100)$

b) equation of axis of symmetry
 $x-15=0$ or $x=15$

c) opens up (5 is positive)

d) minimum: $y = -100$ (y-value of vertex)

e) domain: \mathbb{R}
range: $y \geq -100$

f) 2 x-intercepts (vertex is at $y = -100$ and opens up)

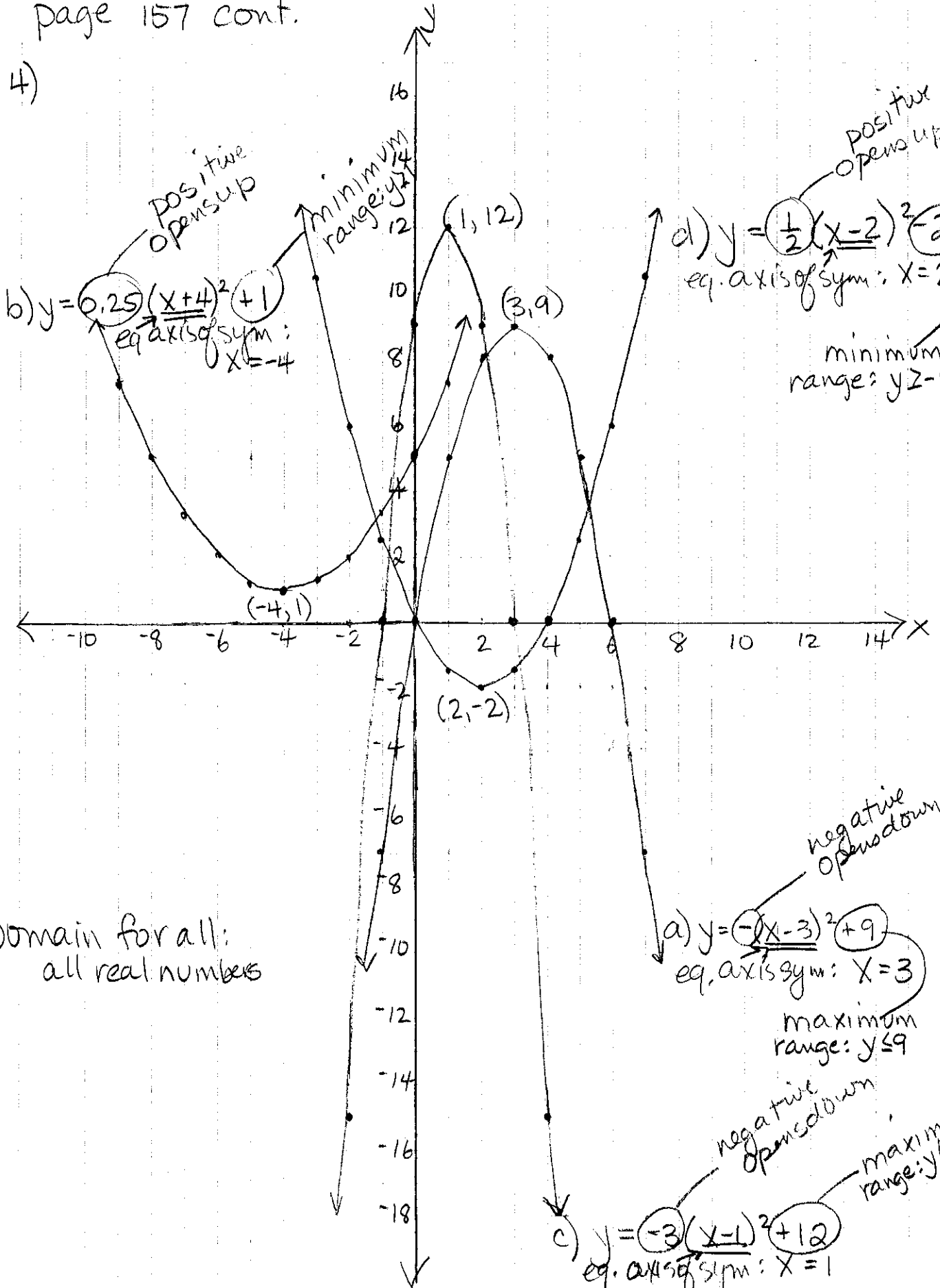
b) $f(x) = -3x^2 - 10$

- ① place vertex at $(0, -10)$
- ② parabola opens down
- ③ y-values for shape are multiplied by 3

d) $f(x) = -\frac{1}{8}(x-5.6)^2 + 13.8$

- ① place vertex at $(5.6, 13.8)$
- ② parabola opens down
- ③ y-values for shape are multiplied by $\frac{1}{8}$

4)



Domain for all:
all real numbers

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7. a) $y = -4x^2 + 14$
 $y = -4(x-0)^2 + 14$

c) $y = 6(x-7)^2 + 0$

b) $y = 1(x+18)^2 - 8$
 $y = 1(x-(-18))^2 - 8$

d) $y = -\frac{1}{9}(x+4)^2 - 36$
 $y = -\frac{1}{9}(x-(-4))^2 - 36$

	a	b	c	d
vertex	(0, 14)	(-18, -8)	(7, 0)	(-4, -36)
eq. of axis of symmetry	$x-0=0$ $x=0$	$x+18=0$ $x=-18$	$x-7=0$ $x=7$	$x+4=0$ $x=-4$
opens	down	up	up	down
max/min value	max 14	min -8	min 0	max -36
domain	ARN	ARN	ARN	ARN
range	$y \leq 14$	$y \geq -8$	$y \geq 0$	$y \leq -36$
number of x-intercepts	2	2	1	0