Review 2 - Unit 1

P. 290-293 (1, 3, 4, 7-11, 15, 17, 21, 23, 29, 31, 32, 53)

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

$f(0) = 1$

$f(2) = 3$

$f(-2) = 7$

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

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

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

$= x^2 + 2x + 1 - x - 1 + 1$

$= x^2 + x + 1$

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

$= 4x^2 - 2x + 1$

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

$= 2x^2 - 2x + 2 - 2$

$= 2x^2 - 2x$

3. a) $f(-2) = -1$

$f(2) = 2$

b) $[-4, 5]$

c) $[-4, 4]$

d) $(-4, -2) \cup (-1, 4) \rightarrow$ increasing

$(-2, -1) \cup (4, 5) \rightarrow$ decreasing

e) omit

omit 1-1 questions

4. a) no - not a function

b) yes

c) yes

d) no

7. $(-\infty, \infty)$

8. $2x - 1 \neq 0$

$2x \neq 1$

$x \neq \frac{1}{2} \Rightarrow (-\infty, \frac{1}{2}) \cup (\frac{1}{2}, \infty)$

9. $x + 4 \geq 0$

$x \geq -4 \Rightarrow [-4, \infty)$

10. $x+1 \geq 0$ $\quad x+1 \neq 0$

$x \geq -1$ $\quad x \neq -1$

$(-1, \infty)$

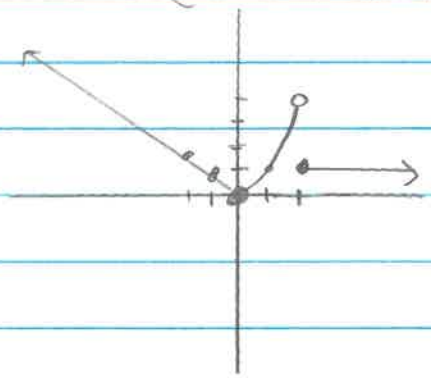
11. $x \neq 0$ $\quad x+1 \neq 0$ $\quad x+2 \neq 0$

$x \neq -1$ $\quad x \neq -2$

$(-\infty, -2) \cup (-2, -1) \cup (-1, 0)$

15, 17, 21, 23, 29, 30, 31 → see next sheet

32. $f(x) = \begin{cases} -x & \text{if } x < 0 \\ x^2 & \text{if } 0 \leq x < 2 \\ 1 & \text{if } x \geq 2 \end{cases}$ $\quad \circ (0,0)$ $\quad \bullet (0,0)$ $\quad \circ (2,4)$ $\quad \bullet (2,1)$



53. a) up 8

b) left 8

c) vertical stretch of 2, up 1

d) right 2, down 2

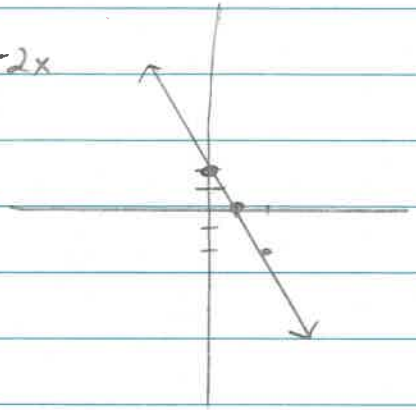
e) reflection across y-axis

f) reflection across x + y axis

g) reflection across x-axis

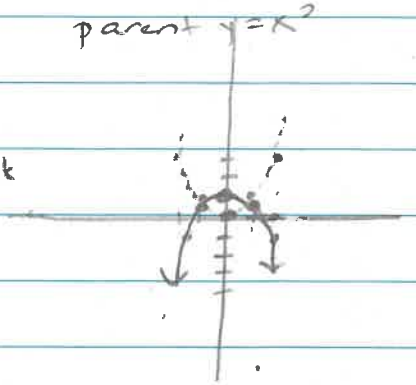
h) omit

(15) $f(x) = 1 - 2x$



(17) $1 - \frac{1}{2}t^2$

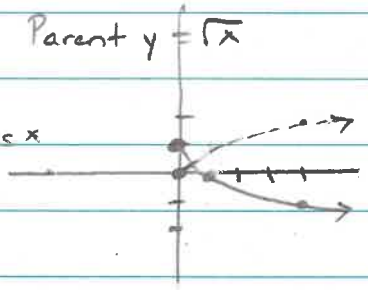
- reflection across x
- vertical shrink by $\frac{1}{2}$
- up 1



(21) $y = 1 - \sqrt{x}$

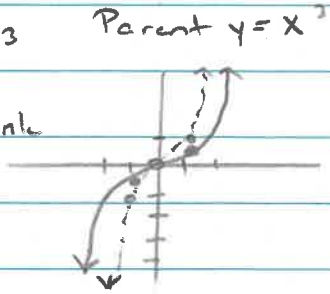
reflection across x

up 1



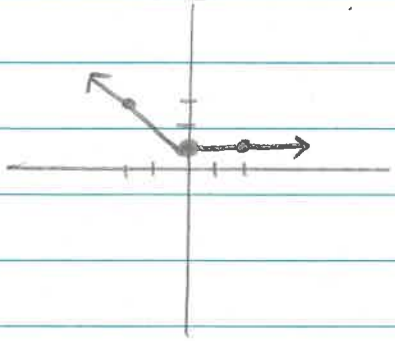
(23) $y = \frac{1}{2}x^3$

Vertical shrink by $\frac{1}{2}$



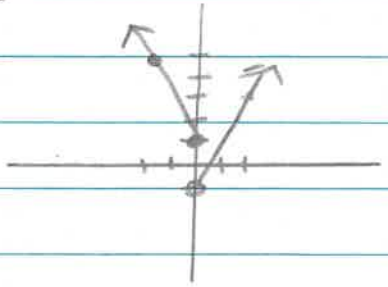
(29) $f(x) = \begin{cases} 1-x & \text{if } x < 0 \\ 1 & \text{if } x \geq 0 \end{cases}$

x	y
-2	3
0	1
0	1
2	1



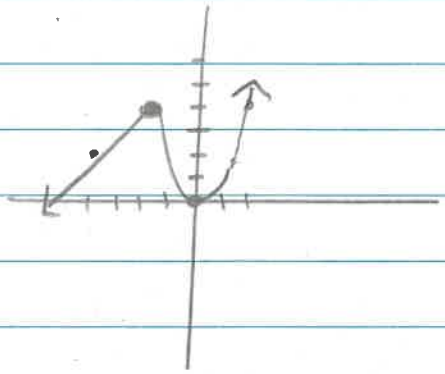
(30) $f(x) = \begin{cases} 1-2x & \text{if } x \leq 0 \\ 2x-1 & \text{if } x > 0 \end{cases}$

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



(31) $f(x) = \begin{cases} x+6 & \text{if } x < -2 \\ x^2 & \text{if } x \geq -2 \end{cases}$

x	y
-4	2
-2	4
-2	4
0	0
2	4

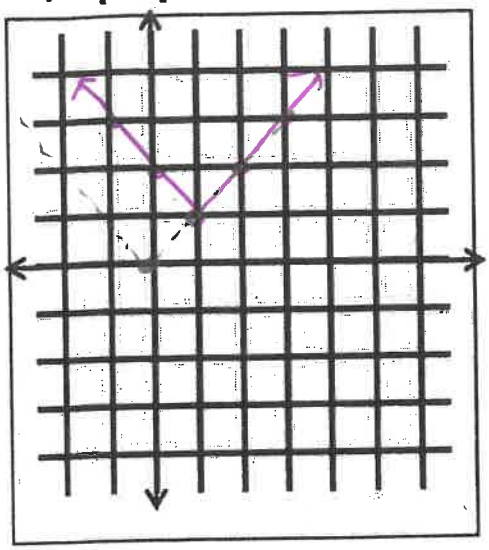


(32) on previous sheet

Part 2:

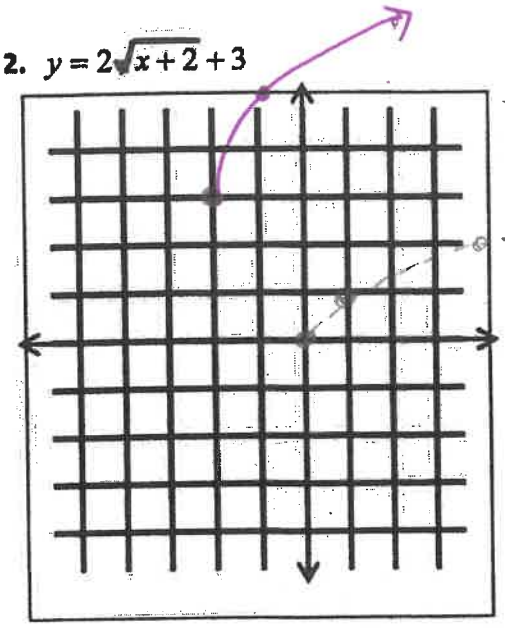
I. Graph

1. $y = |x-1|+1$



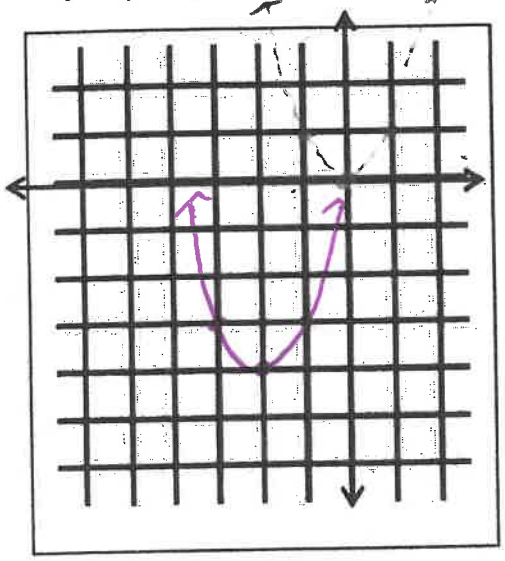
right 1
up 1

2. $y = 2\sqrt{x+2}+3$



Vertical stretch by 2
left 2, up 3

3. $y = (x+2)^2 - 4$



left 2
down 4

State the domain (using interval notation) for the following:

4. $f(x) = \frac{2x+1}{x}$

$x \neq 0$

$(-\infty, 0) \cup (0, \infty)$

5. $f(x) = \sqrt{3x-5}$

$3x - 5 \geq 0$

$3x \geq 5$

$x \geq 5/3$

$[5/3, \infty)$

6. $f(x) = \frac{x-2}{\sqrt{x+4}}$

$x+4 \geq 0 \quad x+4 \neq 0$

$x \geq -4 \quad x \neq -4$

$(-4, \infty)$

7. $f(x) = \frac{3}{x^2-36}$

$(x+6)(x-6) \neq 0$

$x \neq -6 \quad x \neq 6$

$(-\infty, -6) \cup (-6, 6) \cup (6, \infty)$

8. **Given the following, describe the transformations to their parent graph.**

a. $y = -|x+4| - 5$

reflection across x-axis
left 4, down 5

b. $y = \frac{1}{4}(-x)^2 + 1$

Vertical shrink by 1/4
Reflection across y-axis
up 1

c. $y = -3(x-1)^3 - 4$

Reflection across x-axis
right 1
down 4

9. **Dan works at a clothing store for men. He earns $8.00 an hour plus 50¢ for every item over 25 items that he sells. He works 40 hours a week. Write a function that represents how much money he will make as a function of the number of items he sells.**

$8 \times 40 \rightarrow$ base salary

$$f(x) = \begin{cases} 320 & 0 \leq x \leq 25 \\ 320 + .5(x-25) & x > 26 \end{cases}$$