REVIEW TEST 1 - Chapters 1, 2, 3, 4

CHAPTER 1

Handout: Review Chapter 1 – Exercises # 5, 12, 13   (see website for handout).

Homework #1: Textbook Review page 91 – Exercises #81 – 101 odd

CHAPTER 2
Functions and Algebra of Functions

1) Which of the following tables define the second variable as a function of the first variable? Explain why or why not.

X	t
-1	2
0	9
1	-2
0	-3
-1	5

Adjusted gross income (*I*)	Tax bracket (*T*)
0 – 2479	0%
2480 – 3669	11%
3670 – 4749	12%
4750 – 7009	14%
7010 – 9169	15%
9170 – 11,649	16%
11,650 – 13,919	18%

Temperature (T)	Humidity (h)
Jan.1 $34^o\,F$	42%
Jan.2 $36^o\,F$	44%
Jan 3 $35^o\,F$	47%
Jan 4 $29^o\,F$	50%
Jan5 $31^o\,F$	52%
Jan.6 $35^o\,F$	51%
Jan.7 $34^o\,F$	49%

2)
a) What is the definition of a function?
b) Give an example of a function (use function notation):
c) What is the domain of a function (the definition) ? In particular, what is the domain of your function (your example from part b) ?
d) What is the range of a function (the definition)? In particular, what is the range of your function (your example from part b)?

3) Let $f(x)=\dfrac{5}{(x-2)^2}$, $g(x)=\dfrac{1}{36x^3}$, $G(x)=\sqrt{7x-9}$, and $h(x)=\dfrac{7x+3}{4(1-x)}$.

Find the following and simplify (don't give approximate answers) :

a) The domain of each function.   b) $g(a+1)$, $g(a)+1$, $h\left(\dfrac{5}{7}\right)$, $f(x+2)$, and $h(x-1)$

4) Let $f(x)=\begin{cases}1-x^2, x\le 0\\ 2x+1, x>0\end{cases}$. a) Evaluate $f(-2)$ and $f(1)$.

**5)** If $f(x)=x^2+2x-1$ and $g(x)=2x-3$, find each of the following:
a) what is the domain of f and g;   b) What is the range of g?
d) $f\big(g(2)\big)$;   e) Find (f+g)(x)   f) (fg)(x)   g) (f-g)(3)

6) Which of the graphs represent y as a function of x? Explain why or why not. Give the domain and range for each function.
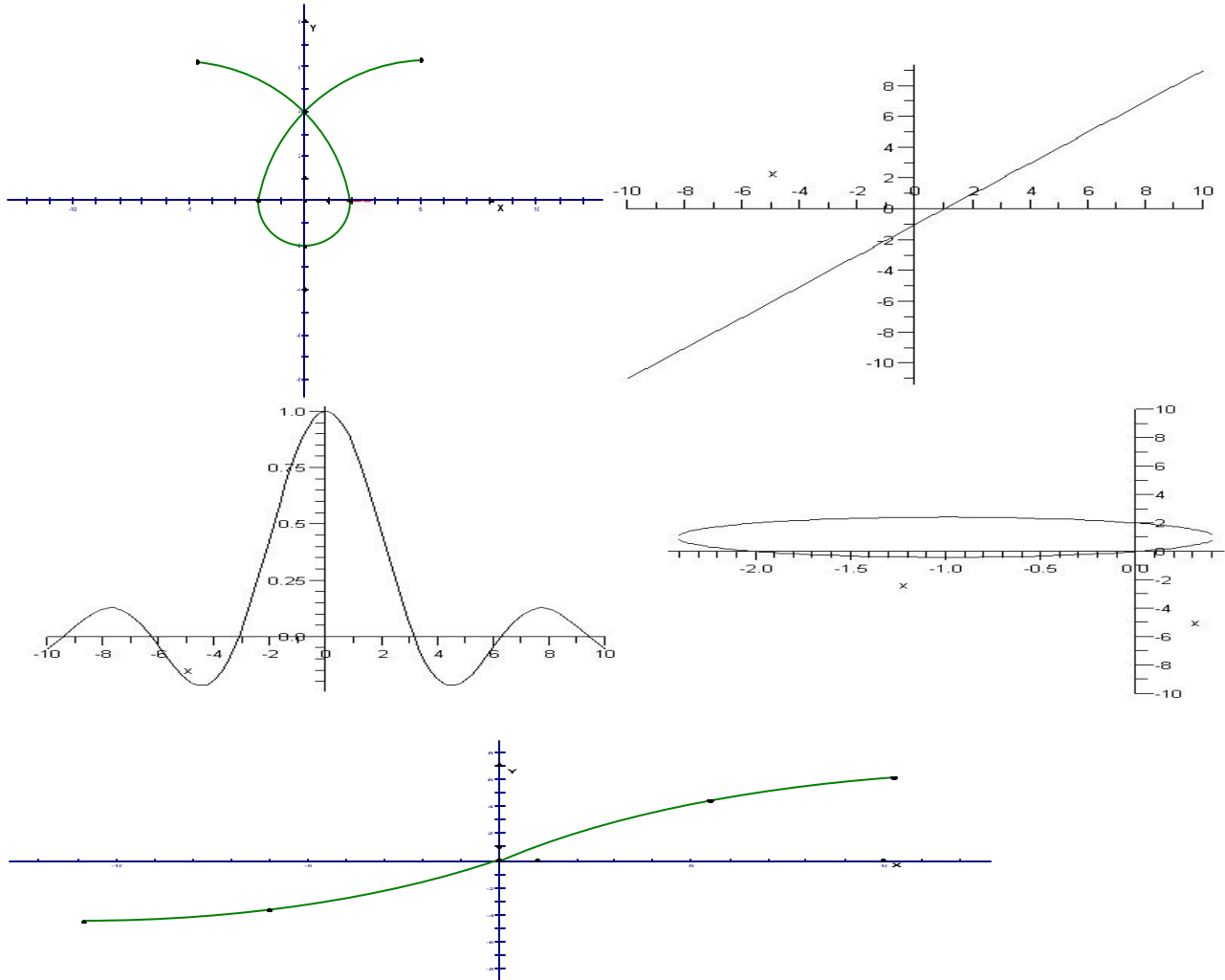
7) The value of a stock varies during the course of any trading day. The price per share "P" of a certain stock is shown on the graph below for a particular trading day. Note "t" represents any time between 8 am and 2 pm.
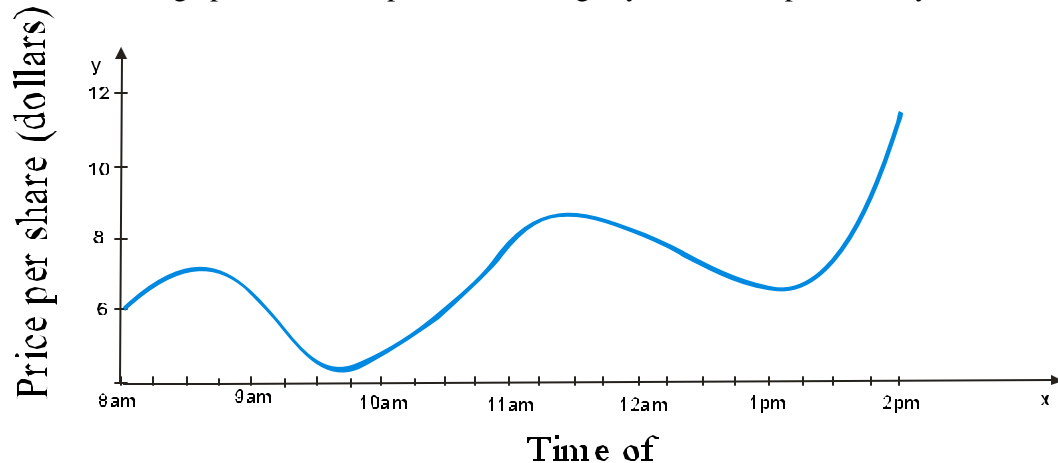
a) Is "t" (the time of the day) a function of "P" (the price per share)? Is "P" a function of "t"? Explain using the definition of function.

Using the graph, estimate the answers to the following questions (Use the correct units).

b) What is the domain? What is the range?

c) For what value(s) of "t" does P(t)=8 and what does it mean in practical terms?

d) What is P(11) and what does it mean in practical terms?

e) For what value(s) of "t" is P(t) >5.50?

2

8) Find $f + g$, $f - g$, fg, and f/g:

a) $f(x) = \dfrac{1}{x+1}$, $g(x) = \dfrac{x}{x+1}$.; b) $f(x) = x^3 + 2x^2$, $g(x) = 3x^2 - 1$

Handout Sections 2.1 & 2.2 - Exercises # 1, 2, 3, 6 – 11

Handout: Sections 2.3 & 2.4 – Exercises # 4, 5, 7, 8, 9, 10, 11, 12, 15

Homework #1: Section 2.1 # 9, 14, 15, 18, 37 – 59, 64 – 68, 71 – 74, 87 – 90
Section 2.2 # 1, 4, 7, 10, 13, 34, 41, 49 – 52, 61 – 69
Section 2.3 # 41, 44 (use the intercepts to graph the lines), 44, 45, 51. 55, 59, 61, 65, 73 – 76 ,
81, 82, 113
Section 2.4 # 9, 15, 18, 25, 27, 50, 52

CHAPTER 3
Systems of Linear Equations

Homework #2: Section 3.1 # 57, 65, 83
Section 3.3 - # 17, 19, 21, 23, 29, 41, 45, 46
Mid-chapter check page 204 - # 7, 8, 11, 17, 18

CHAPTER 4
Inequalities and Problem Solving

1) Solve the following inequalities; graph the solution set; write the solution set in interval notation.

a) $-\dfrac{2}{3}(2x + \dfrac{3}{2}) \geq 14$; b) $-\dfrac{2}{5} < \dfrac{x-4}{3} \leq 4$; c) $\dfrac{1}{2}x - 3 > 2x + 3(x - \dfrac{1}{3})$;

d) $2(x+2) \geq \dfrac{1}{5} + 2x$ e) $\dfrac{2x+3}{3} + \dfrac{3x-4}{2} > \dfrac{x-2}{2}$

2) Solve the following:

a) $\left|3x + \dfrac{1}{2}\right| = \dfrac{5}{3}$, b) $\left|x - \dfrac{1}{4}\right| = |x + 2|$, c) $\left|2x + \dfrac{4}{7}\right| + 1 = 2$, d) $|2x+1| < -2$; i) $3|2x+5| > 9$

e) $\left|\dfrac{3}{5}x - 2\right| - \dfrac{1}{2} \geq 4 + \dfrac{1}{2}$, f) $|x-1| + 4 \leq 11$, g) $|x| + 7 \geq 7$, h) $-|3x+2| - \dfrac{1}{2} > 2$, J) $\left|\dfrac{x+1}{x+8}\right| = \dfrac{2}{3}$

3) For what values of k does $|x| + k = 0$ have:

a) exactly one solution; b) exactly two solutions; c) no solution. Provide an example for each case.

4) Maria is investing in the hotel business. She has bought two hotels and will expand her investment when her total profit from the two hotels is at least $10,000.
a) Write an inequality to model the problem.
b) Graph the solutions set.
c) What does (-1000, 12,000) mean in the context of the problem?
d) What does (5000, 4000) mean in the context of the problem?

Homework #2: Section 4.3 # 7, 17, 27, 37, 41, 51, 59, 73, 75, 77
   Mid- Chapter Review page 271 # 19, 21
   Section 4.4 # 27, 43, 45, 51 (find the coordinates of the vertices),   63

ANSWERS:

Chapter 2:

(1) 2nd; (3) a) $D_g = \mathbb{R}\setminus\{0\}$, $D_h = \mathbb{R}\setminus\{1\}$; b) $g(a)+1 = \dfrac{1+36a^3}{36a^3}$, $g(a+1) = \dfrac{1}{36(a+1)^3}$;

(4) $f(-2) = -3$, $f(1) = 3$; (5) a) all real numbers; b) all real numbers; d) 1. (6) 2nd, 3rd, and 5th represent y as a function of x.

Chapter 4: (1) a) $x \le -\dfrac{45}{4}$; b) $\dfrac{14}{5} < x \le 16$; d) $x \in \mathbb{R}$; e) $x > 0$; (2) a) $x \in \left\{\dfrac{7}{18}, \dfrac{-13}{18}\right\}$; b) $x = -\dfrac{7}{8}$; c) $x \in \left\{\dfrac{3}{14}, -\dfrac{11}{14}\right\}$; d) $x \in \varnothing$; e) $x \ge \dfrac{35}{3}$ or $x \le -5$; f) $-6 \le x \le 8$; g) $x \in \mathbb{R}$; h) $x \in \varnothing$; i) $x > -1$ or $x < -4$.