SKILLS PORTFOLIO A
FUNCTIONS AND LINEAR FUNCTIONS

Answer the following questions in your portfolio:

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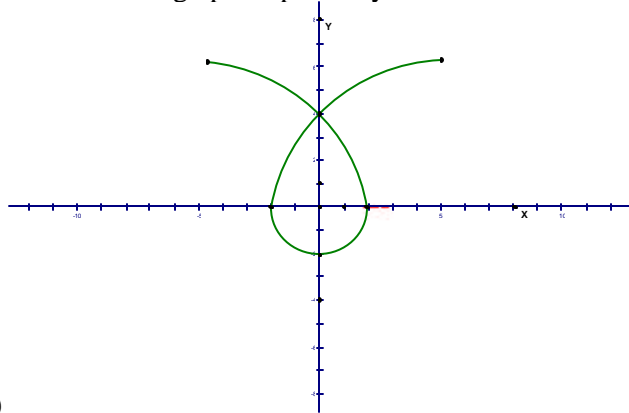
3) Let $f(x) = \dfrac{5}{(x-2)^2}$, $g(x) = \dfrac{1}{36x^3}$, $G(x) = \sqrt{7x-9}$, and $h(x) = \dfrac{7x+3}{4(1-x)}$.

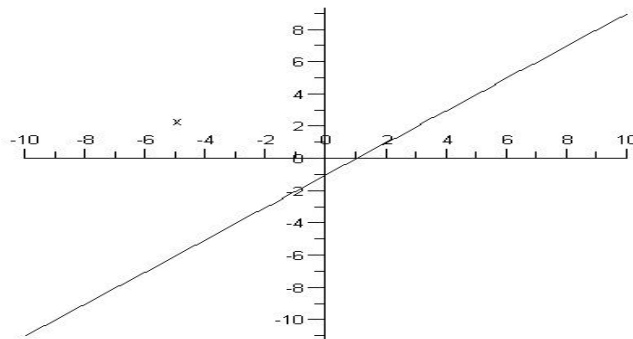Find the following and simplify (don't give approximate answers):
a) The domain of each function.

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 $f(1)$.
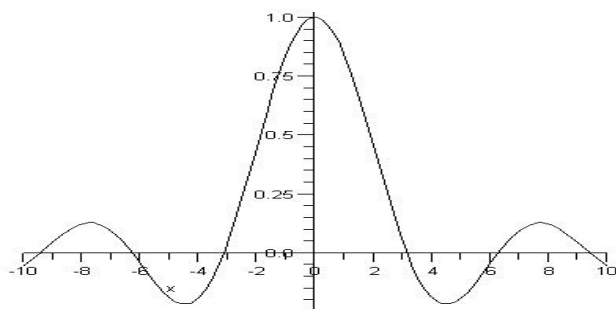
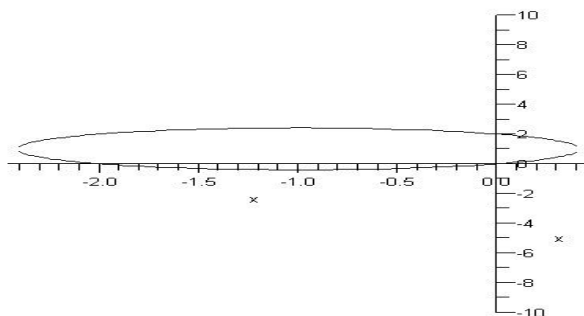**5)** Which of the graphs represent y as a function of x? Explain why or why not.
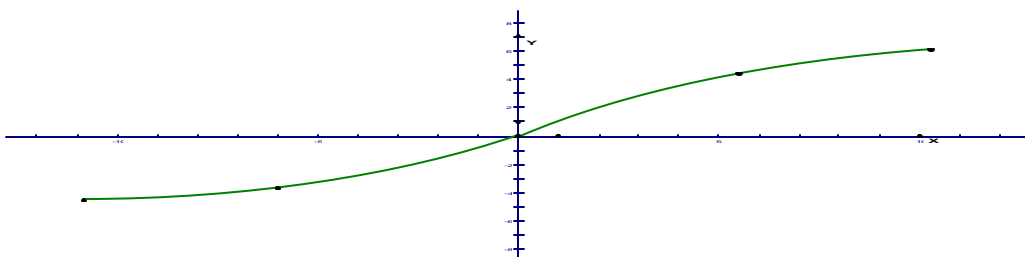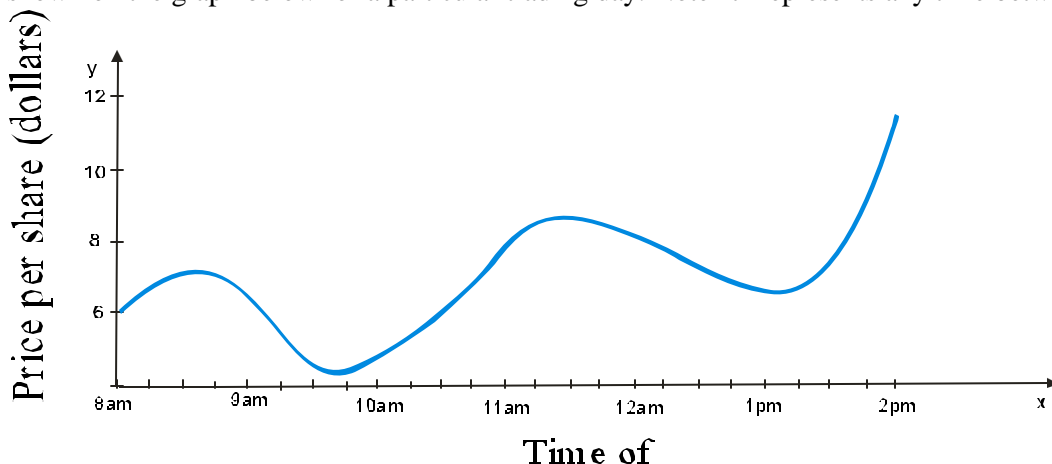

a)

b)

c)

d)

e)

6) 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?

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

a) $f(x) = \dfrac{1}{x+1}$, $g(x) = \dfrac{x}{x+1}$.;

b) $f(x) = x^3 + 2x^2, g(x) = 3x^2 - 1$

8) Complete the following ordered pairs to make solutions to the equation
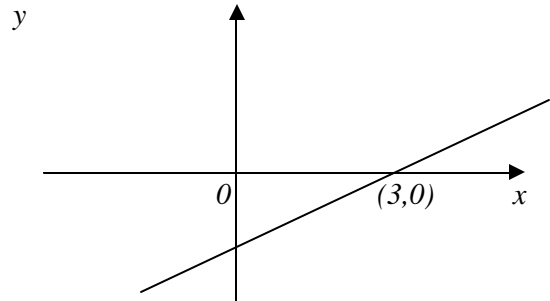$$x + 2y = 8: \quad (0,?),(?,0)\left(-\tfrac{4}{3},?\right)$$

9) Complete the table for the equation $y = \dfrac{2}{3}x$:

x	$3y2$
0	
	2
-1	

10) The graph of $2x - 3y = 6$ is given .

      a) Is $(0,0)$ a solution?

      b) Is $(3,0)$ a solution?

      c) Is *(-2,1)* a solution?
Prove algebraically and graphically.

11) A computer store budgets $12,000 to buy computers and laser printers. Each computer costs $650 and each printer costs $200.

      a) Write an equation that models the given situation.
      b) Sketch the graph. Be sure to label the axes clearly.
      c) What is the significance of the intercepts?
      d) If the store buys 4 computers, how many printers can they buy?

12) What is the equation of the

      a) horizontal line that passes through (2,3) ?
      b) vertical line that passes through (4,-3) ?
      c) *x*-axis?   d) *y*-axis?

13) Find an equation of the line satisfying each of the conditions:

      a) slope 4 and passing through $(-2,3)$;

      b) passing through $(-1,2)$ and $(3,-5)$.

      c) Passing through $(7,8)$ and x-intercept =3.

14) Are the lines given by these equations parallel, perpendicular or neither?

$$y - \frac{2}{3}x = 0; \ 3y = 2x + 1 .$$

15) Find an equation of the line that passes through the point (-1,2) and is

  a) perpendicular to $\ \frac{5}{18}x + \frac{1}{6}y = \frac{2}{3}$;   b) parallel to $\ \frac{5}{18}x + \frac{1}{6}y = \frac{2}{3}$.