Mth 111 **Practice for Exam 1** ***Franz Helfenstein*** **Name**

1) Find the equation of the line that passes through (-44, 87) & (64, 27)

2) Solve for x: $8 - 7 \cdot \frac{5 - 3x}{2} = 2 - \frac{2x}{3}$

3) Solve for y: $\frac{3x - 2y}{5} = 10 - \frac{5x - y}{4}$

4) Solve for y: $c(x + y) = ay + b$

5) Solve for x: $2x(x + 1) = 3(x + 5)$

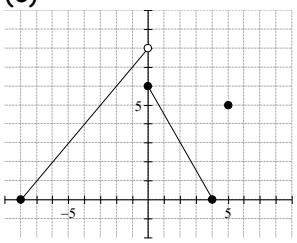
6) Which of these are functions and which are not? Explain your reply. For those which are functions, give the domain.

(a) The frequency (y) of each letter (x) in the Declaration of Independence is tabulated.

(b)

Absences	
M = 1	12
Tu = 2	4
W = 3	4
Th =4	5
Fr = 5	16

(c)



(d) $x^2 + y^2 = 16$

(e) $2x + 3y = 24$

(f) $y = \begin{cases} x+1, x \le 0 \\ x-1, x \ge 0 \end{cases}$

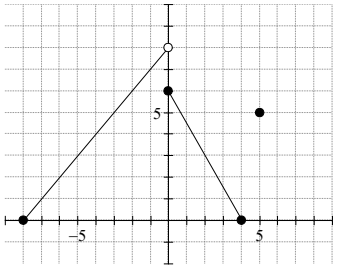
(g) $f(x) = \frac{\sqrt{x + 20}}{(x + 2)(x - 4)}$

7) $f(x) = \frac{5x^2 - x}{x - 1}$ Compute the following and simplify where reasonable:

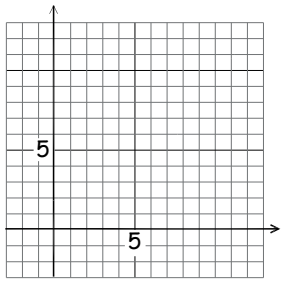
(a) f(3) =	(b) f(1) =	(c) f(0) =	(d) f(a + b) =	(e) f(x + 1) =	(f) $f(x^2)$ =

8) A function with the number of accidents by time of day (for a specific date) is known. Let t = time of day, a = accidents. Which is the independent variable? How would one interpret f(2) = 5? Which is correct: y = f(t), y = f(t), y = f(x), a = f(t), t = f(a)?

9) $y = \begin{cases} \\ \\ \end{cases}$



10) $y = \begin{cases} 6 - x, & -2 \le x \le 0 \\ 8 - 2x/3, & 0 < x < 6 \\ 10.5, & x = 8 \end{cases}$



11) Let $f(x) = 3x^2$, $g(x) = \sqrt{x + 1}$ compute and simplify:

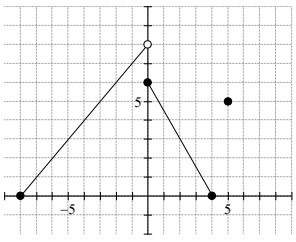
(a) (fg)(x) =	(b) f(g(x)) =	(c) the difference quotient $\frac{f(x + h) - f(x)}{h}$

12) Give the average rate of change for each of these from $x_1 = -2$ to $x_2 = 2$

(a)

X	Y1
-2	-.16
0	0
2	.16
4	1.28
6	4.32
8	10.24
10	20

(b)



(c) $y = 2x^2 - 5$

13) Describe the modification to f(x) by $y = -2f(x - 3) + 5$.

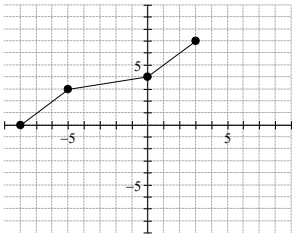
14) The pollution level is tabulated by time of day. Run the appropriate regression to determine the time of day when the pollution was likely the worst.

Time	8 am	10 am	11 am	5 pm
ppm	80	90	95	75

15) Give the inverse for each of these functions.

(a)

X	Y1
[redacted]	-.16
0	0
2	.16
4	1.28
6	4.32
8	10.24
10	20

(b) 

(c) $y = \frac{3x - 10}{7}$

ANSWERS

1) $y = -(5/9)x + 563/9$

2) 69/67

3) $y = \frac{37x - 200}{13}$

4) $y = \frac{cx - b}{a - c}$

5) $2x^2 - x - 15 = 0$, $x = -5/2, 3$

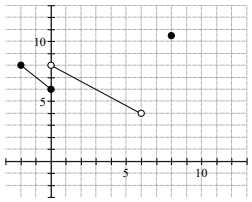
6) (a) Function, D: All letters of the alphabet that occur
(b) Function, D: D: {M,Tu, W, Th, F} or {1,2,3,4,5}; (c) Function, D: D: $-8 \le x \le 4 \cup 5$
(d) Not a Function; (e) Function, D: All Reals; (f) Not a Function
(g) Function, D: D: $x \ge -20$, $x \neq -2$, $x \neq 4$ => $x \in [-20,-2) \cup (-2,4) \cup (4,\infty)$ (interval notation) or
$-20 \le x -2 \cup -2 < x 4 \cup 4 < x < \infty$

7)

(a) f(3) =	(b) f(1) =	(c) f(0) =	(d) f(a + b) =	(e) f(x + 1) =	(f) $f(x^2)$ =
21	∅	0	$\frac{5(a+b)^2 - (a+b)}{(a+b) - 1}$	$\frac{5(x+1)^2 - (x+1)}{(x+1) - 1}$	$\frac{5x^4 - x^2}{x^2 - 1}$

8) Independent variable = t, f(2) = 5 => at 2 am, there were 5 accidents. a = f(t).

9) $$y = \begin{cases} x+8, -8 \le x < 0 \\ -3x/2 + 6, 0 \le x \le 4 \\ 5, x = 5 \end{cases}$$

10) 

11)

(a) (fg)(x) = $3x^2\sqrt{x+1}$	(b) f(g(x)) = 3(x + 1)	(c) the difference quotient $\frac{f(x+h) - f(x)}{h}$ = 6x + 3h

12) (a) m = 0.08, (b) m = -3/4, (c) m = 0

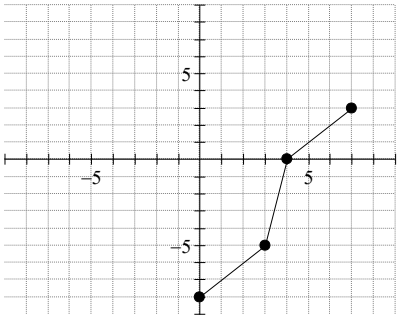
13) Function is shifted 3 to the right, then stretched vertically by a factor of 2, then rotated over the x-axis and finally shifted up by 5.

14) Worst pollution is at 12:12 pm

15) (a)

Inverse

x	y
-0.16	-2
0	0
0.16	2
1.28	4
4.32	6
10.24	8
20	10

(b) 

(c) $y^{-1} = \frac{7x + 10}{3}$