Kristopher Gomez
MAT120, Ex. 1.1
M.W.. 10:30 Class

1a.) Height is the output, weight is the input.
b.) Yes, because the input of a function has exactly 1 output.
c.) Weight is the output, and height is the input.
d.) No, because there are multiple outputs for one input.
e.) No, because there are two students with a weight of 165lbs, each with differing heights.

2a.) Yes, this describes a function.
b.) No, this does not describe a function.

3a.) Yes, because a numerical grade leads to only one letter grade.
b.) No, because a letter grade can be multiple numerical grades.

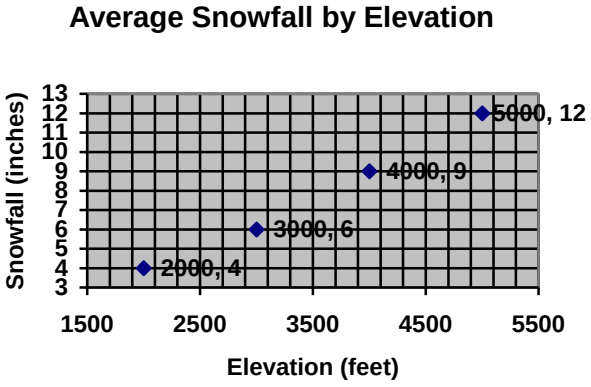
4a.) Yes, because every input will have only one output.
b.) Yes, because every input will have only one output.

5a.) Yes, because every input will have only one output.
b.) Yes, because every input will have only one output.

6.) Yes, because every input will have only one output.

7a.) Yes, because every input will have only one output.
b.) No, because the same input leads to different outputs.

8a.)



b.) $a(4000) = 9$ inches of snowfall.
c.) (5000, 12)
d.) At 5000ft, there occurs 12 inches of snowfall.

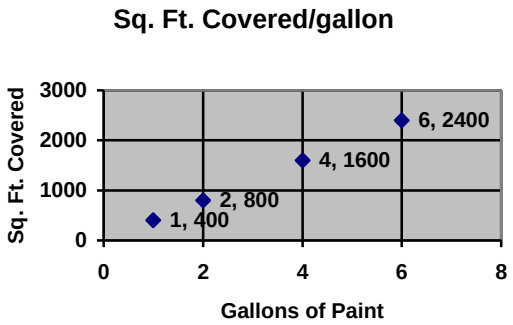
9a.) The output (y) is a function (g) of the input (x).
b.) The function (h) of the input (a) equals the output (b).

c.) The function (f) of the input (6) equals the output (3.527).
d.) The output (520) equals the function (*g*) of the input (*t*).
e.) Sales tax (output) is the function (*T*) of the input (price).

10a)

n, number of gallons of paint	1	2	4	6
s, square feet covered by the paint	400	800	1600	2400

b.)



c.) *f*(6) = 2400
d.) 4 gallons of paint covers 1600 sq. ft.

11a.) 2 cups of water (*w*) makes 1 serving of coffee (*c*). (1/2)w = c

- **i.)** Input = (*w*) divided by 2. Output = (*c*).
- **ii.)** It takes 2 cups of water for every serving of coffee.
- **iii.)** This is how much water to be used when making coffee. (?)

b.)

i.) The input is how much coffee to be put in, the output is how much water is extracted.
ii.) This is still a function; if only an unusual situation.

Kristopher Gomez
MAT120, Ex. 1.2
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1a.) (sales tax) = Output, (the price of the item) = Input
b.) $h(x)$
c.) $h(x) = x(0.08)+x$

2a.) *Celsius* = Input, *Fahrenheit* = Output.
b.) $g(C) = (F)$
c.) $(C)(9/5) + 32 = (F)$

3.) (-1), (-11.4), 1.2832, (undefined)
4.) (-36.3), (-176.8), (-121.4), (undefined)
5.) 4, 4, 4, (undefined)

6.)

x	$g(x)$
3	9
5	25
7	49
9	81

7.)

x	$h(x)$
10	.1
20	.05
30	.333333
40	0.025
50	0.02

8.)

x	$f(x)$
0	10
5	9.7468
10	9.4868
15	9.2195
20	8.9443

9a.) *distance = 3/hr* Therefore, if I maintain the current speed and heading for 3 hours, I would have traveled 9 miles.
b.) The Input is time (in this case, hours), and the output is distance (in this case, miles).
c.) $h(t) = t3$
d.) *Distance traveled* would be dependent.
e.) $h(4) = 12$ miles
f.) $h(7) = 21$, because in 7 hours I would have covered a distance of 21 miles. (7, 21)
g.) Domain: IR≥0, Range: IR≤0

h.) The practical (subjective to me) would be Domain: ≥0, ≤5; Range: ≥0, ≤15
i.)

x	$g(x)$
0	0
.5	1.5
1	3
1.5	4.5
2	6
2.5	7.5
3	9

10a.) Domain = (-2, 0) ~ (3, 0), Range = (0,-1 ~ 0,2)
b.) Domain = (∞, 0) ~ (∞, 0), Range = (0,2 ~ 0,2)
c.) Domain = (∞, 0) ~ (∞, 0), Range = (0,0 ~ 0, ∞)
d.) (-2, 0) ~ (2, 0), Range = (0,0 ~ 0, 2)

11a.) (-2, 0) ~ (8, 0), Range = (0,3 ~ 0, 11)
b.) (-6, 0) ~ (3, 0), Range = (0,5 ~ 2, 5)

12a.) {0 ~ 157200}
b.) {0 ~ $56592}

13a.) {0C ~ 100C}
b.) {32F ~ 212F}

Kristopher Gomez
MAT120, Ex. 1.3
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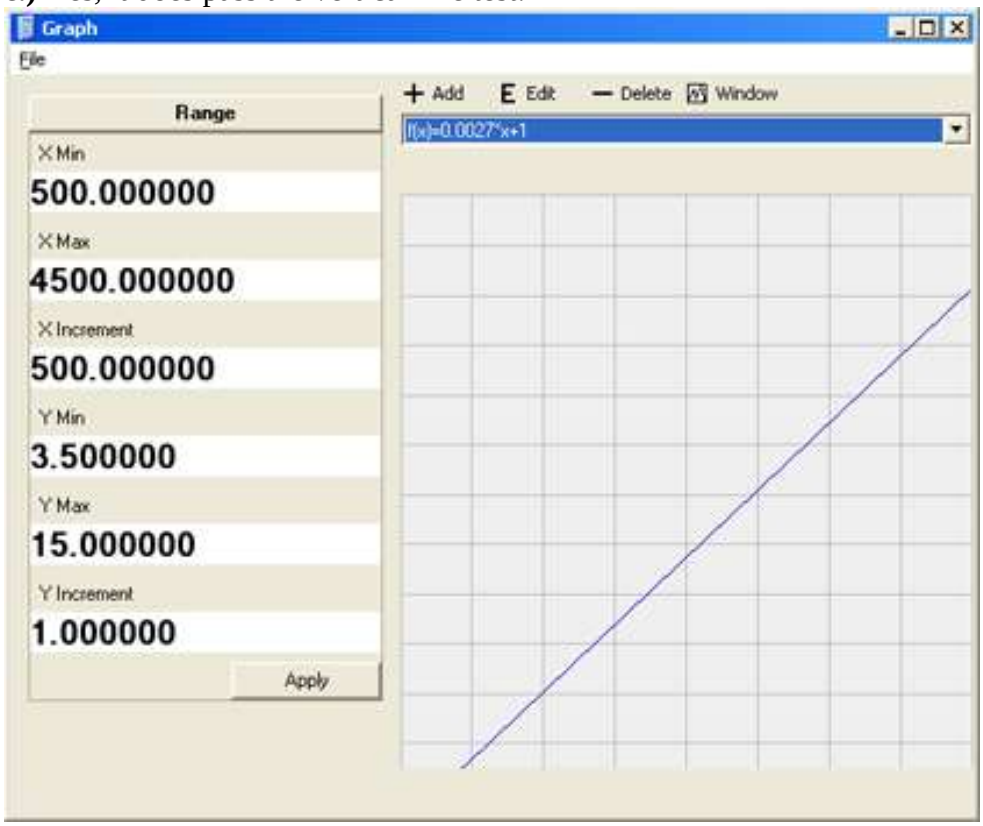
1a.)

Elevation (x)	1000	2000	3000	4000
$f(x)$	3.7	6.4	9.1	11.8

b.) f(2500) = 7.75. This means that at 2500 ft, there would have been 7.75 inches of snow.
c.) f(-2000) = -4.4. This might be a speculation of how much snowfall would have occurred 3000 ft. below the initial data (1000 ft) shows.
d.) *Xmin* = 500*; Xmax* = 4500*; Xscl* = 500*; Ymin* = 3.5*; Ymax* = 15*; Yscl* = 1*; Xres* = 1
e.) Yes, it does pass the vertical line test.



(image from Power Toy Calc. on Windows XP)

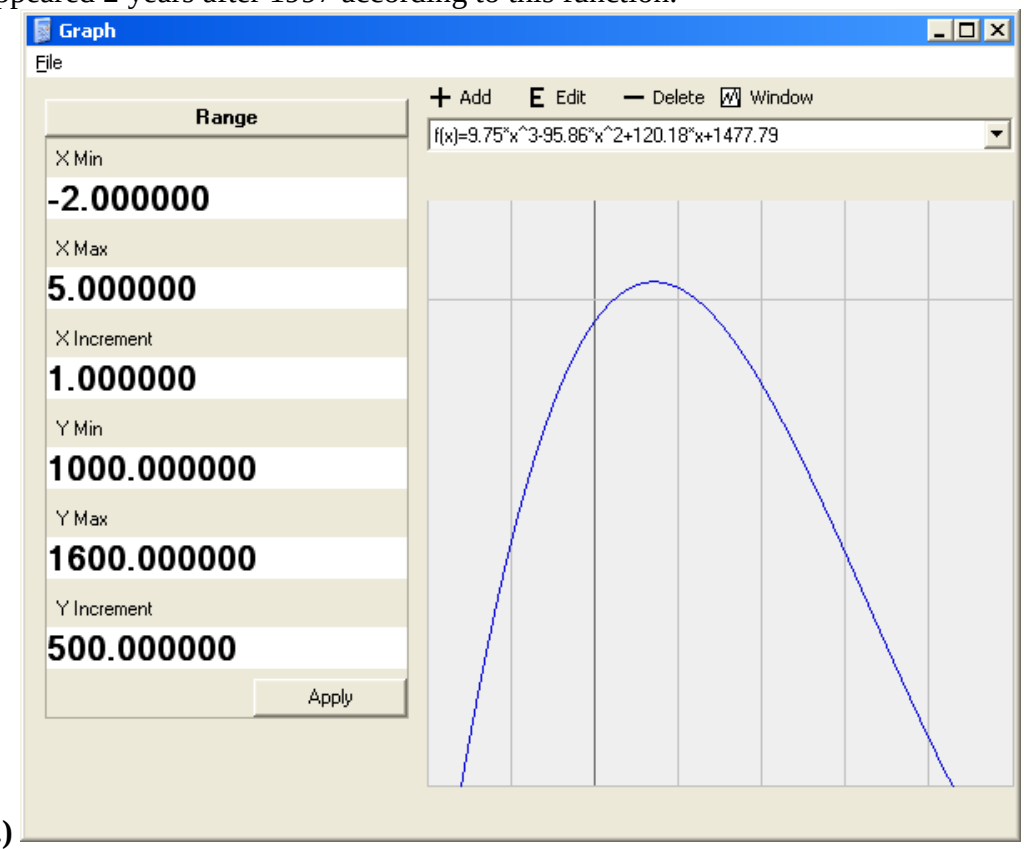
f.) The graph shows the function to be increasing.
g.) Yes; the *y* value shows 7.75.

2a.)

Year	1997	1998	1999	2000	2001
x, years after 1997	0	1	2	3	4
$h(x)$, the number of new hotels	1477.79	1511.86	1412.71	1238.84	1048.75

b.) $h(2) = 1412.71$. This would indicate that approximately 1413 new hotels would have appeared 2 years after 1997 according to this function.

c.)



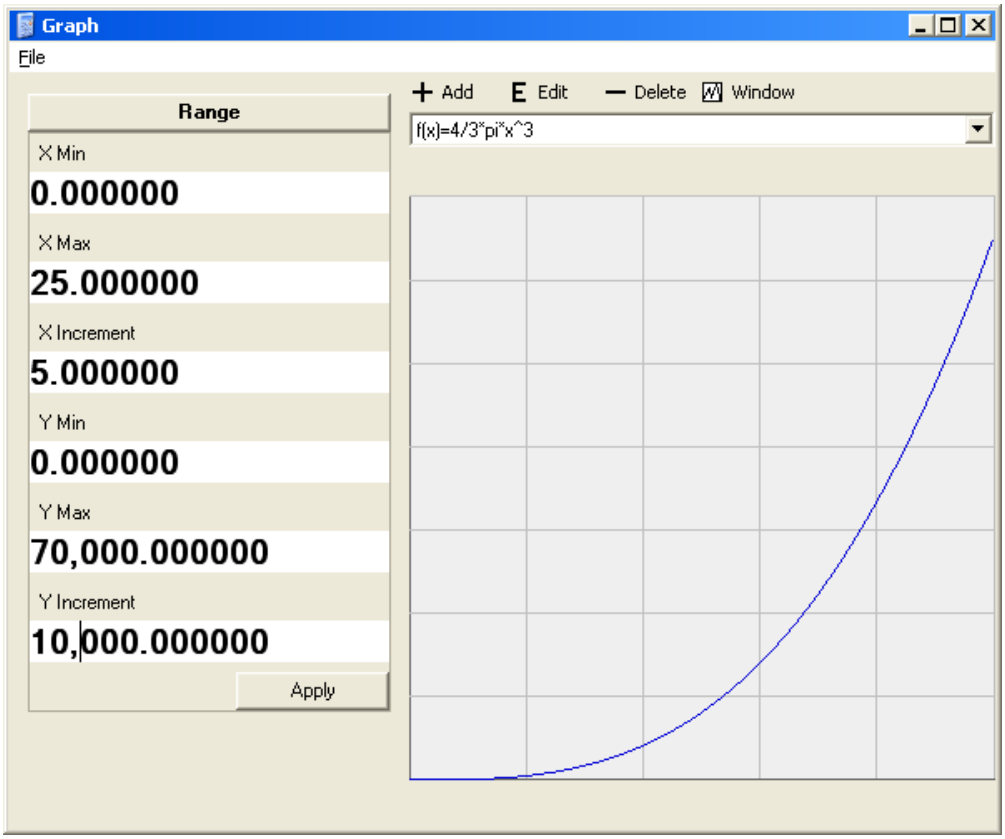
d.) Yes. Although this graph both increases and decreases on the y axis, it still passes the vertical line test.
e.) Yes, it matches.

3a.)

Radius of the Balloon (cm)	12	14	16	18
Helium Needed (cubic cm)	7238.23	11494.04	17157.28	24429.02

b.) The output is the amount of helium needed, and the input is the desired size of the balloon.
c.) The practical domain would be 0, 0 ~ 15; range would be 0 ~ 65449.85.
d.) You would need approximately 1,413,716.69 cubic cm of helium gas.
e.) $f(r) = (4/3)\pi r^3$
f.) $f(20) = 33510.32$ (20, 33510.32)

g.)

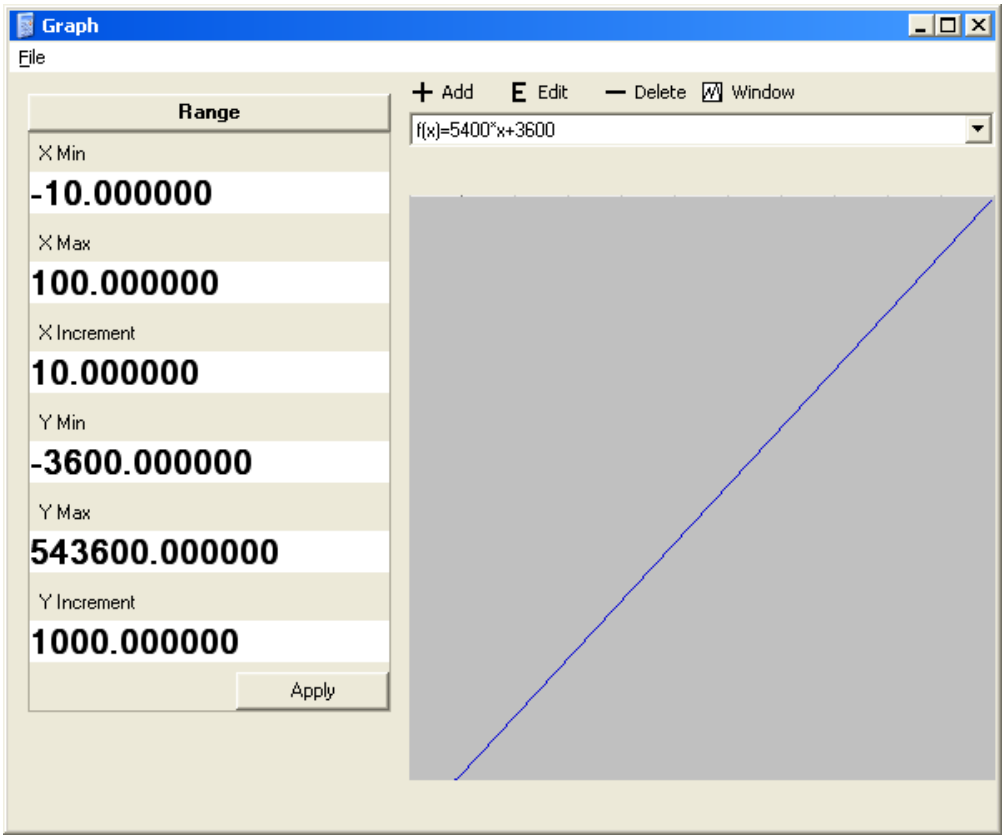


h.) The graph is increasing, as it scales in increasing *x* and *y* values.
i.) Because it seems to pass the vertical line test.
j.) Yes, it checks.

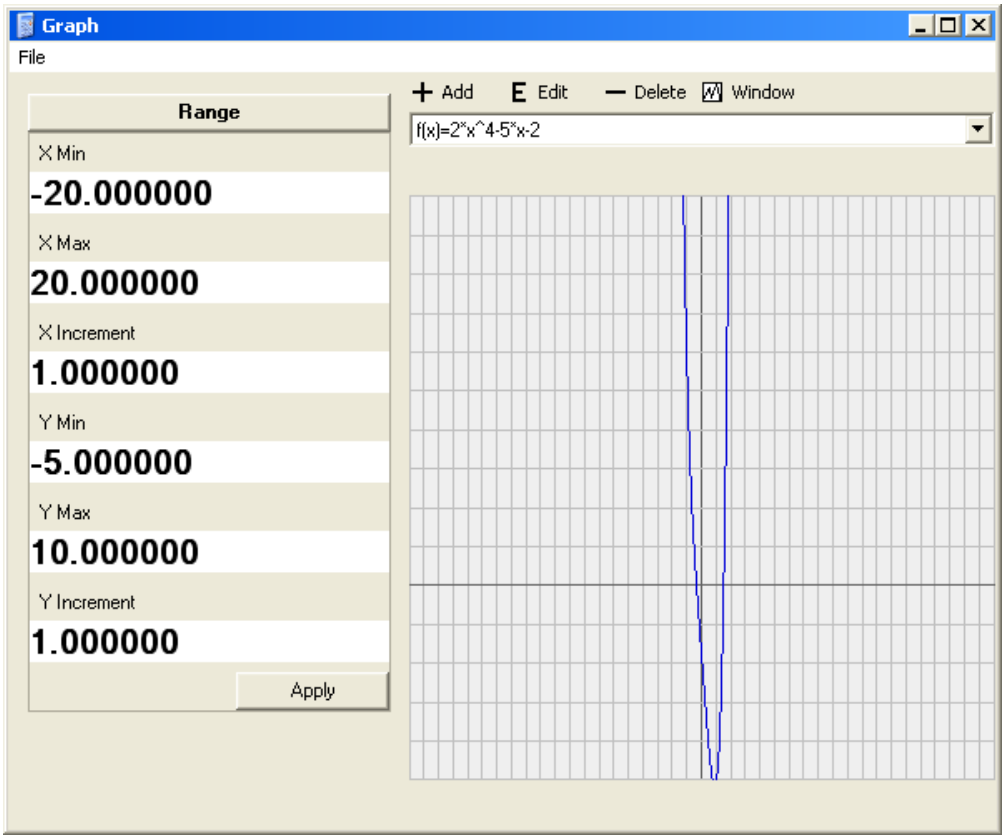
4a.) (the graph shown to the right of this question in the workbook is an "everywhere decreasing" graph, where the *x* and *y* values are consistently decreasing in a top-to-bottom, right-to-left fashion.
b.) This graph line would be level and perfectly horizontal.

5a.) Yes, this graph passes the vertical line test and is therefore a function.
b.) No, this graph does not pass the vertical line test and is therefore not a function.

6.)


Graph
File
Range
X Min
-10.000000
X Max
100.000000
X Increment
10.000000
Y Min
-3600.000000
Y Max
543600.000000
Y Increment
1000.000000
Apply
Add
Edit
Delete
Window
f(x)=5400*x+3600

7.)


Graph
File
Range
X Min
-20.000000
X Max
20.000000
X Increment
1.000000
Y Min
-5.000000
Y Max
10.000000
Y Increment
1.000000
Apply
Add
Edit
Delete
Window
f(x)=2*x^4-5*x-2

Kristopher Gomez
MAT120, Ex. 1.5
M.W.. 10:30 Class

1a.) The average median age has increased over this time period by .0825 per year.
b.) This means that the average median lifespan has increased over this time frame.

2.) The average median age over this time period has decreased by 0.05 per year.

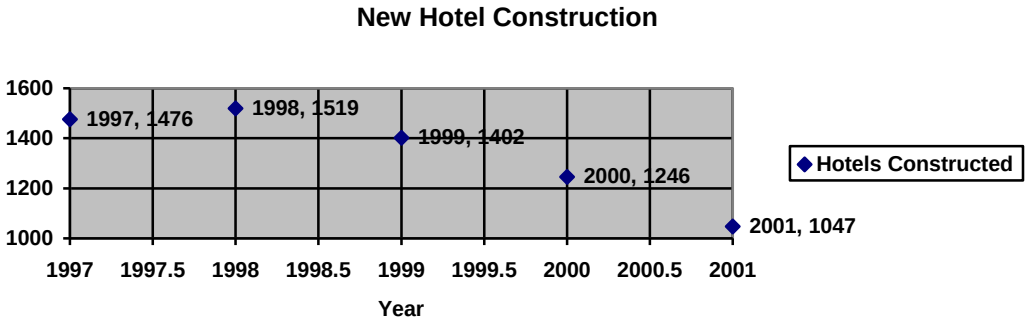
3.) The average median age has increased by 0.019 per year.

4.) The 10-year period where the average median age increased the most was between 1970 and 1980. At that time, the average median age had increased by 0.15 per year.

5a.) If the average rate of change were negative, that would mean that the average median age is lowering during a given time period.
b.) Between the years of 1920 and 1930. The average rate of change was -0.03 per year.
c.) The graph would lead to the bottom-right corner of the screen; or, down.

6a.) Yes, between the years of 1930 and 1940.
b.) An average rate of change of 0 would indicate no change.
c.) The graph would show a horizontal line.

7.)



8a.) The average rate of change was an increase of 43 new hotels per year.
b.) The average rate of change was a decrease of 117 new hotels per year.
c.) The difference is -160, where there were 160 *less* hotels built in the year of 1998 to 1999 compared to the number of hotels built in the year of 1997 to 1998.
d.) When we see a negative value on the *x* axis, the graph will be declining. A decline on this graph would indicate less hotels being built.

9a.) The average rate of change is +9.7 gallons per year during this time period.
b.) During this time period, we observe a decrease in the gallons of gas consumed by 4.93 per year.
c.) During this time period we observe an increase in the gallons of gas consumed by 4 gallons per year.
d.) During this range of years we observe a decrease in the amount of gas used per year, in gallons by 2.97.
e.) The result indicates that the vehicles are consuming less gas, or their respective drivers are driving more efficiently.

Kristopher Gomez
MAT120, Ex. 1.6
M.W.. 10:30 Class

1a.) Yes, linear. Average rate of change is 1/10.
b.) –(12/4) Linear.
c.) –(9/4) Linear.

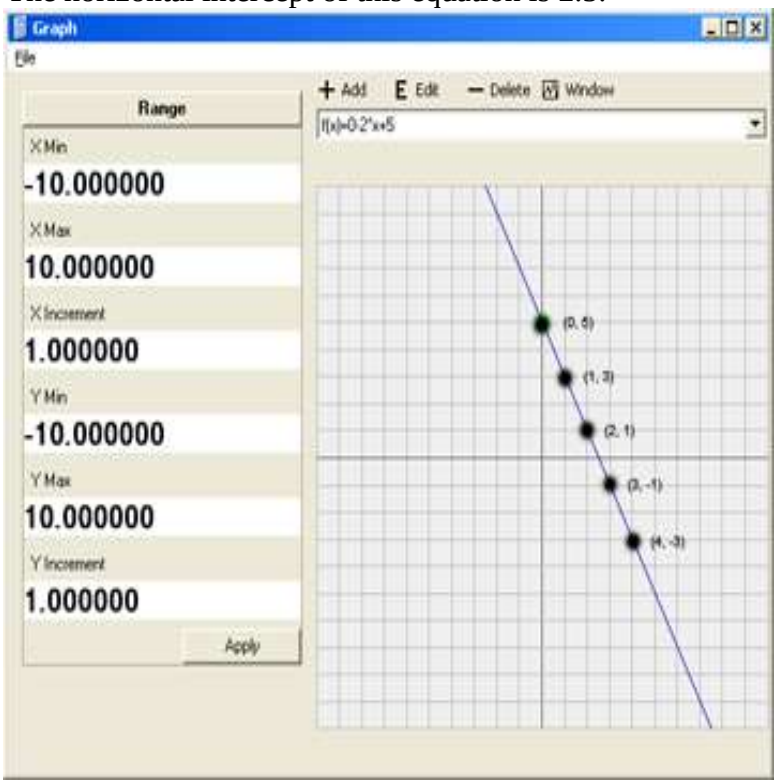
2a.) Linear. The graph would be constantly increasing.
b.) Not linear. The graph would be curved.
c.) Linear, because the line is straight.

3a.) Linear. This person is losing 3lbs/week.
b.) Not linear, because this person doesn't lose the same amount of weight each week.
c.) Linear, because this person loses the same amount of weight on any given week.

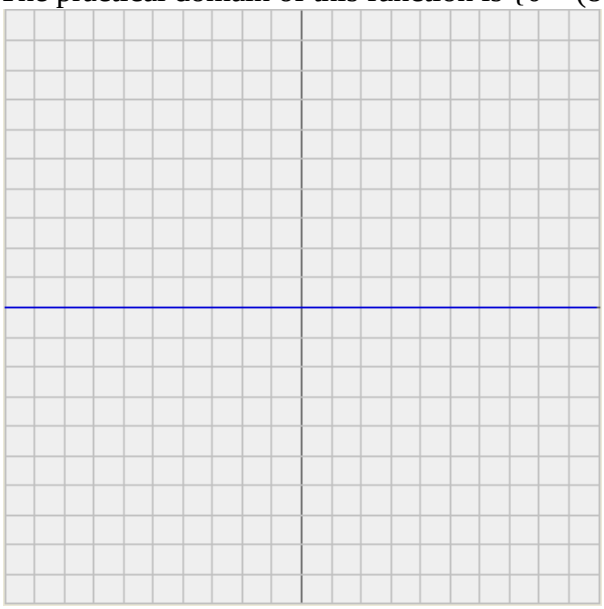
4a.)

5	3	1	-1	3	-5
0	1	2	3	4	5

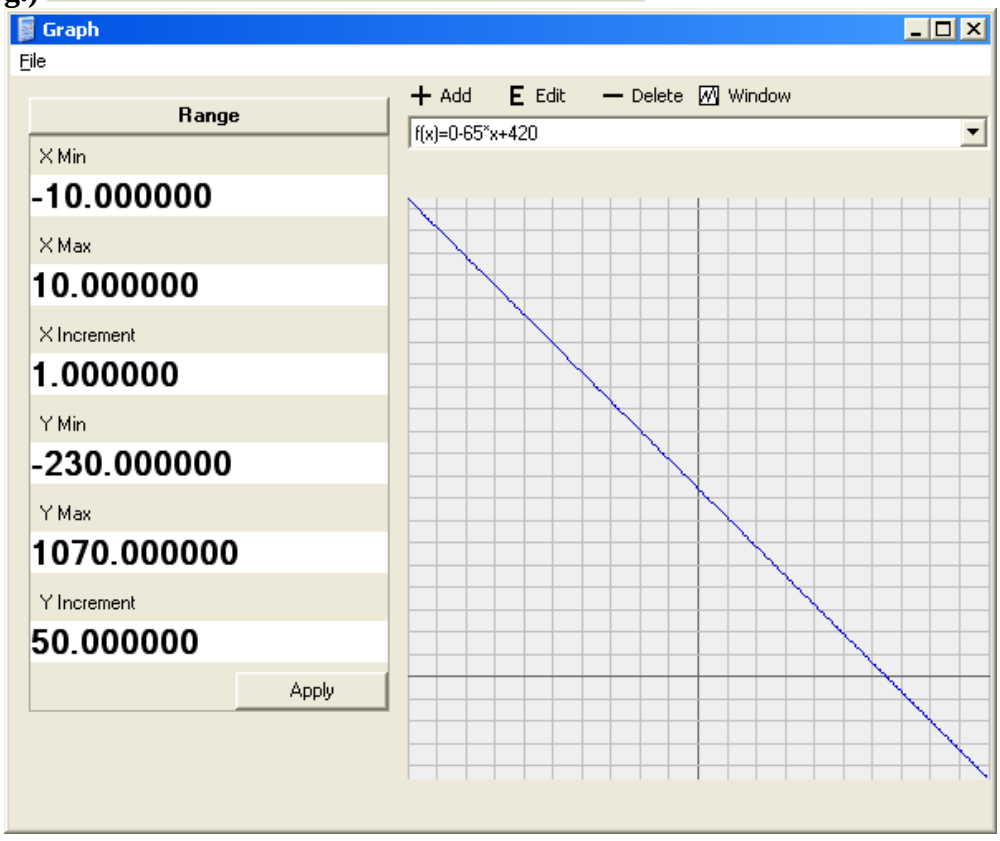
b.) The slope of this line is (1/-2).
c.) The vertical intercept of this equation is 5.
d.) The horizontal intercept of this equation is 2.5.
e.)



6a.) The vertical intercept of this equation is 420 (miles).
b.) The practical meaning of the vertical intercept in this situation is the distance left to travel.
c.) The slope of the line represented by this equation is (-65x/1y).
d.) The practical meaning of the slop in this situation is how much the car's distance is reduced per hour.
e.) The horizontal intercept of the line represented by this equation ≈ 6.46.
f.) The practical domain of this function is {0 ~ (84/13)}.



g.)



7a.) Yes, this appears to be a function as it appears to not fail the vertical line test.
b.) $m = -500$.
c.) Naming the slope gives it meaning and differentiates the variable from the other variables in the function.
d.) This line would intersect the vertical axis at $0t$ (seconds).
e.) $y = -100t + 3500h$
f.) This line would intersect the horizontal axis at $35t$.

Kristopher Gomez
MAT120, Ex. 1.7
M.W.. 10:30 Class

1a.) $y = .5x + 35$

x (in miles)	c (in dollars)
0	35
100	40
200	45

The vertical intercept is 35 (dollars). I know this because that is where the fees (c) begin.
b.) The slope is 5/100. This means, in this situation, that every hundred miles driven costs $5.
c.) $c = .5x + 35$

2a.) m = 35. This means that every 1 hour "sailed" (assuming it's a boat), it travels 35 miles away from the marina.
b.) $d = 35t + b$

3a.)

x	y
2	0
0	-2
-2	-4

i.) The slope is -1.
ii.) The y intercept is $-2x$.
iii.) $y = x - 2$

b.)

x	y
0	1
2	2
4	3
6	4

i.) The slope is .5.
ii.) The y intercept is $.5x$.
iii.) $y = .5x + 1$

c.)

x	y
0	6
1	4
2	2

i.) The slope is -2.
ii.) The y intercept is $6x$.
iii.) $y = -2x + b$

d.)

x	y
2	0
1	-3
0	-6

i.) The slope is -3.
ii.) The y-intercept of this line is 6x.
iii.) $y = 3x + (-6)$

4.)

c	t
0	25
1	75
2	125

a.) The car is traveling at 75/mph.
b.) The vertical intercept is 25x.
c.) $y = 50x+25$

5a.) $y = (1/2)x-1$
b.) $y = -(1+(1/3)) + 1$
c.) $y = 1.5x + 3$
d.) $y = 3x – 11$

7.)

r (radius in feet)	0	5	10	15
C (circumference in feet)	0	31.42	62.83	94.25

a.) m = 6.28
b.) 0
c.) $y = 6.28x + 0$
d.) $r2\pi$
e.) Yes it does. Multiplying the radius by 2 and then again by π approximates it well.

8.)

Sales per Day @ 400	13
Sales per Day @ 450	8

a.) (400, 5200) and (450, 3600)
b.) $f(x) = (price)x$
c.) (need help with this question)

10.)

# of Years (x)	**0**	**1**	**4**	**5**
Value ($)	**18000**	**14700**	**4800**	**1500**

a.) $y = 18000-3300x$ **b.)** $1500

Kristopher Gomez
MAT120, Ex. 1.9
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1.a.)