Name: _____

MATH 108
Spring 2022
HW 1: Due 02/07

"Leslie, I typed your symptoms into the thing up here and it says you could have network connectivity problems."
–Andy Dwyer, Parks and Recreation

Problem 1. (10pt) Compute the following:

(a) 36% of 657.30

(b) 97% of 450

(c) 154% of 78.56

(d) 220% of 11.2

Problem 2. (10pt) Compute the following:

(a) 54 increased by 75%

(b) 1640 decreased by 22%

(c) 81 increased by 280%

(d) 771 decreased by 95%

Problem 3. (10pt) Convert the following:

(a) €120 to USD [$1 USD = €0.88]

(b) 50 km/h to miles per second [1 km = 0.621371 mi]

(c) €5/m^2 to USD/ft^2 [$1 USD = €0.88; 1 m = 3.28084 ft]

Problem 4. (10pt) Given the following tables, do $f(x)$ and $g(x)$ represent functions? Explain.

x	$f(x)$
1	2
2	4
3	6
4	8
1	10

x	$g(x)$
3	3
4	0
6	4
7	5
8	6

Problem 5. (10pt) Is the relation $f(x) = 576.10 - 14.39x$ a function of x? Explain.

Problem 6. (10pt) Is the relation $f(x, y, z) = 45.1x - 36.0y + 1.2z$ a function of x, y, z? Explain.

Problem 7. (10pt) For each of the following, indicate whether the function is linear (T), or not (F).

(a) _____: $y = 4.4x + 50.9$

(b) _____: $f(x) = x^2 - 2x + 1$

(c) _____: $w = \frac{5}{6}p + 14$

(d) _____: $g(t) = \dfrac{t}{t+1}$

(e) _____: $r = 16.8(b + 8.3)$

(f) _____: $h(x) = 6.8x(2.2x + 4.8)$

Problem 8. (10pt) For each of the following, indicate whether the function is linear (L), affine linear (A), or neither (N).

(a) _____: $f(x, y, z) = 99.15x + 67.45y - 1.44z$

(b) _____: $g(x, y) = 45.34x^2 + 34.1y^2 + 16.1x - 96.0y$

(c) _____: $h(x_1, x_2, x_3) = 4.5x_1 + 6.1x_2 - 8.1x_3 + 8.9$

Problem 9. (10pt) Assume the numbers below represent the slope for some linear function. For each of the given slopes, indicate whether the function is increasing or decreasing and interpret the given slope in at least two different ways:

(a) $m = 5$

(b) $m = -3$

(c) $m = \frac{2}{3}$

(d) $m = -\frac{5}{6}$

(e) $m = 4.67$

Problem 10. (10pt) Jon is paid a base salary of $56,000 each year. However, he also earns a commission of 2% of the total amount of sales he makes each year.

(a) Explain why Jon's yearly income is a linear function of his sales.

(b) Find a function, $I(s)$, that gives Jon's yearly income, I, in terms of his total sales, s.

(c) What is the y-intercept for this function? What does it represent?

(d) What is the slope for this function? What does it represent?

Problem 11. (10pt) Aiyana is a statistician. She models that the number of traffic accidents at a particular city intersection can be modeled by $A(c) = 0.002c - 1.3$, where A is the number of accidents and c is the number of cars that pass through the intersection each month.

(a) Is the model $A(c)$ linear? Explain.

(b) Find the y-intercept for this function. If possible, interpret the intercept in context.

(c) Find the slope of $A(c)$. If possible, interpret this slope in context.

Problem 12. (10pt) Consider the linear function $\ell(x, y) = 56.4x - 5.6y$.

(a) Explain why this function is linear.

(b) Find $\ell(10.3, 7.1)$.

(c) What is the slope 'in the x-direction'? Interpret this slope and indicate whether ℓ is increasing or decreasing with respect to x.

(d) What is the slope 'in the y-direction'? Interpret this slope and indicate whether ℓ is increasing or decreasing with respect to x.