Name: _____

MATH 101
Fall 2022
HW 5: Due 10/03

"Between two evils, I always pick the one I never tried before."

–Mae West

Problem 1. (10pt) Showing all your work, convert the following indicated units to the units indicated in brackets using the given information:

(a) 518.3 m to cm

(b) 5,100 ft to km [1 ft = 0.3048 m]

(c) 60 mph to km per hour [1 mi = 5280 ft, 1 m = 3.28084 ft]

(d) 45 mph to ft per second [5280 ft = 1 mi]

(e) 2000 ft^3 to cm^3 [5 m = 16.4042 ft]

Problem 2. (10pt) Avery's husband has to order a special paint they want for their patio. The paint has to be shipped from Europe. He wants to be sure that he orders enough paint to paint the patio, which is 240 ft^2. Each can of paint costs €29 and claims it can cover 2.6 m^2.

(a) How many square feet can the paint cover? [3.28084 ft = 1 m]

(b) How many cans should he order?

(c) What is the cost of the paint in Euros per meter squared?

(d) What is the cost of the paint in USD per square foot? [$1 = € 0.98]

Problem 3. (10pt) Aliens arrive on Earth and try to communicate with humans. Being intelligent beings, they first try to understand our mathematical systems. Aliens measure speed in blips per flarg. They claim to have traveled to Earth at 587 blips per flarg. We discover that in their units, 1 blips is 800 bloop and 465 bloop is 1,000 miles. We discover also 1 flarg is 8.2 s. What speed (in miles per second) did they travel to Earth? If the speed of light is 186,282 miles per second, what percent of the speed of light did they travel?

Problem 4. (10pt) Alden drives to visit his family. On the outgoing trip, he runs into no traffic and is able to drive at 55 mph the entire way, completing the trip in only a few hours. However, on the return trip he runs into construction on the highway and is only able to drive 35 mph. It takes him 2 hours longer on the return trip than on the original trip. How many miles is his home from his family's home?

Problem 5. (10pt) Water is flowing into a large vat that can contain 587 ft^3 of water. Suppose that water is flowing it at a rate of 43.7 gallons per minute.

(a) Find the rate at which the water is flowing in ft^3 per minute. [1 gallon = 0.134 ft^3]

(b) How long does it take to fill the whole tank?

(c) Assuming the tank begins empty, how much of the tank is unfilled after 10 minutes?

(d) If the tank started with 250 ft^3 of water, what volume remains unfilled in the tank one hour after the water begins filling the tank?

Problem 6. (10pt) Ann Velope is stuffing envelopes for an upcoming charity event. Counting, she has been able to stuff 116 envelopes in the last 20 minutes.

(a) What is her rate in envelopes per hour?

(b) How long will it take for her to fill 1,200 envelopes?

(c) If her coworker helps her and he can stuff 250 envelopes per hour, how long would it take both of them to stuff 2,000 envelopes?

(d) Suppose instead that Ann can stuff some large number of envelopes in 4 hours, while her coworker can do the same task in 6 hours. Suppose that the coworker starts stuffing envelopes, then an hour later Ann joins them to help speed things up. Assuming they work at their usual speeds, how long will it take them to stuff all the envelopes?