Name: _____

MATH 100
Fall 2022
HW 4: Due 09/26

"For those who want some proof that physicists are human, the proof is in the idiocy of all the different units which they use for measuring energy."

– Richard Feynman

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

(a) 1400 m to cm

(b) 4,600 ft to km [1 ft = 0.3048 m]

(c) 55 mph to km per hour [1 mi = 5280 ft, 1 m = 3.28084 ft]

(d) 55 mph to ft per second [5280 ft = 1 mi]

(e) 1000 ft^3 to m^3 [5 m = 16.4042 ft]

Problem 2. (10pt) Tiffany's husband has to order a special paint she wants 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 144 ft^2. Each can of paint costs €23 and claims it can cover 4.5 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 = € 0.95]

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) You work at an international real estate company that helps people in the US purchase land in Japan. To help clients compare various options, you quote them the price that they are paying per square foot. Obviously, the prices in Japan are listed in Japanese Yen per square meter. If ¥ 1 is $0.0069 and 1 m is 3.28084 ft, what number do you multiply the cost in yen per square meter to convert it to USD per square foot for your US clients?

Problem 5. (10pt) One of your coworkers is commenting on how Karen just had her baby. She tells you that the baby was 19.5 in and 420 oz. If there are 16 oz in a pound, does this seem likely? Explain.

Problem 6. (10pt) Children with a certain respiratory issue are prescribed a daily dosage of 28 mg of a certain drug. Parents can refill the prescription up to three times. If each prescription contains 16 tablets and each tablet is 14 mg, how many daily doses can the parents give to their children?