Name: _____
MATH 308
Fall 2021
HW 16: Due 12/10

"Real knowledge is to know the extent of one's ignorance."

– Confucius

Problem 1. (10pt) There are 37 small sized cars, 122 medium sized cars, and 48 large sized cars available for sale at a car dealership. If a buyer will purchase one of the cars in the lot, how many possible selections does the customer have? How many possible selections does the customer have if they will purchase two cars? Phrase your answer in the language of combinatorics.

Problem 2. (10pt) A sandwich shop offers 5 varieties of bread, 6 varieties of meat, and 16 different toppings. A customer will order a sandwich consisting of a bread and meat, possibly including toppings. How many possible sandwich orders are possible? How many possible sandwich orders are possible if the customer wishes to order two distinct sandwiches? Phrase your answer in the language of combinatorics.

Problem 3. (10pt) Local US telephone numbers contain 7 digits and cannot start with 0, 1, or the digits 555. How many US telephone numbers are possible? How many numbers are possible if the local number is to be proceeded by 3 digits (an area code) that cannot begin with a 0? Phrase your answer in the language of combinatorics.

Problem 4. (10pt) How many integers from 1 to 10,000 are divisible by 7, 11, or 13? Phrase your answer in the language of combinatorics.

Problem 5. (10pt) Prove that given any four integers that either one of the integers is divisible by 4 or that two of the numbers have a difference divisible by 4. Phrase your answer in the language of combinatorics.