Math 55 Quiz 9
October 26, 2016

This quiz will be graded out of 15 points; the True/False question is worth 3 points, and the exercise is worth 12 points. Please read the instructions carefully.

True or False. Mark the following statements as either true or false, or leave a blank if you don't know. A correct answer is worth +1 point, a blank is worth 0 points, and an incorrect answer is worth -1 points, so be smart about guessing!

a. F — In the Monty Hall Three-Door Puzzle, choosing to not switch doors after the host reveals an empty door will maximize your chance of winning the prize.

b. T — There is a closed form expression for the number of ways to place n indistinguishable objects into m distinguishable boxes.

c. F — When two dice are rolled, there is a 1/8 probability that the sum of the numbers on the two dice is 7.

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Exercise. A San Francisco bakery has 6 kinds of bagels for sale: plain, wheat, everything, cinnamon raisin, blueberry, and their specialty for the urbanite on the go, Espresso Mocha Latte bagels with Coffee Sprinkles™. Your mother wants you to go to the store to pick up a baker's dozen of bagels (that is, 13 of them) so that at least 4 but not all are specialty Espresso Mocha Latte bagels. How many different selections of bagels are there that will do the trick?

We can first assume that 4 bagels are EML, and then choose the types of the remaining bagels freely. This is an instance of "dogs and biscuits", using the 6 types of bagels as the dogs, and the 9 bagels as the biscuits. Thus the total number of possibilities is $\binom{6+9-1}{6-1} = \binom{14}{5}$. However, this includes the "all EML" possibility, which is just too much caffeine, so we have to subtract this possibility to get

$$\binom{14}{5} - 1.$$