

CSc 245 Discrete Structures - Summer 2021

Quiz #7

Due: August 3rd, 2021 by 11:59 pm (MST)

[Solutions](#)

1. (5 points) A coffee shop has 3 categories of item on their menu: coffee drinks, tea drinks, and pastries. They have 6 coffee drinks, 4 tea drinks and 7 pastries. Assume that there are no items that fall into more than 1 category.

- (a) (1 points) State the principle that is used when determining how many ways someone could choose a coffee drink, a tea drink **and** a pastry.

[Multiplication Principle](#)

- (b) (1 points) State the principle that is used when determining how many ways someone could choose a coffee drink, a tea drink **or** a pastry.

[Addition Principle](#)

- (c) (3 points) How many ways can someone select 2 items from the menu where each item is from a different category? Give your answer as both an expression and an integer.

$$6 \cdot 4 + 6 \cdot 7 + 7 \cdot 4 = 94$$

2. (3 points) A US phone number consists of 10 digits where the first 3 digits are an area code corresponding to the owner's residence. Assume any 3 digit number is a valid area code (including those with leading zeros such as 000). At least how many people must someone have in their cell phone contacts to guarantee that two of their contacts have the same area code? **And** what principle did you use?

[There are \$10^3 = 1000\$ possible area codes.](#)

[We must have at least 1001 contacts to guarantee that we have two from the same area code.](#)

[This uses the Pigeonhole Principle.](#)

3. (2 points) Rosie is having a movie marathon this weekend. She has 9 movies she wants to watch and she wants to watch 5 of them on Saturday and the remaining 4 on Sunday. How many ways can she **choose** which movies to watch on Saturday and Sunday? Note, we do not care about the different possible orders in which Rosie could watch the movies each day. Give your answer as both an expression and an integer.

$$\binom{9}{5} \binom{4}{4} = 126.$$

[\(If on the left they just put \$\binom{9}{4}\$ or \$\binom{9}{5}\$ without \$\binom{5}{5}\$ or \$\binom{4}{4}\$ that is fine\).](#)