MA0301
ELEMENTARY DISCRETE MATHEMATICS
NTNU, SPRING 2021

SET 8

Deadline: Wednesday 24th March, 2021, 23:59.

Exercise 1. *During a local campaign, eight Republican and five Democratic candidates are nominated for president of the school board.*

a. If the president is to be one of these candidates, how many possibilities are there for the eventual winner?
b. How many possibilities exist for a pair of candidates (one from each party) to oppose each other for the eventual election?

Exercise 2. *Buick automobiles come in four models, 12 colors, three engine sizes, and two transmission types.*

a. How many distinct Buicks can be manufactured?
b. If one of the available colors is blue, how many different blue Buicks can be manufactured?

Exercise 3. *Patter's Pastry Parlor offers eight different kinds of pastry and six different kinds of muffins. In addition to bakery items one can purchase small, medium, or large containers of the following beverages: coffee (black, with cream, with sugar, or with cream and sugar), tea (plain, with cream, with sugar, or with cream and sugar, with lemon, or with lemon and sugar), hot cocoa, and orange juice. When Carol comes to Patter's, in how many ways can she order:*

a. One bakery item and one medium sized beverage for herself?
b. One bakery item and one container of coffee for herself and one muffin and one container of tea for her boss, Ms. Didio?
c. One piece of pastry and one container of tea for herself, one muffin and a container of orange juice for Ms. Didio, and one bakery item and one container of coffee for each of her two assistants, Mr. Talbot and Mrs. Gillis?

Exercise 4. *How many permutations are there of the 8 letters a, c, f, g, i, t, w, x?*

Exercise 5. *Evaluate each of the following:*

a. $P(7, 2)$
b. $P(8, 4)$

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c. $P(10, 7)$
d. $P(12, 3)$

Exercise 6. *Evaluate each of the following:*

a. $C(10, 4)$
b. $C(12, 7)$
c. $C(14, 12)$
d. $C(15, 10)$

Exercise 7. *A computer science professor has seven different programming books on a bookshelf. Three of the books deal with C++, the other four with Java. In how many ways can the professor arrange these books on the shelf if:*

a. there are no restrictions?
b. the languages should alternate?
c. all the C++ books must be next to each other?
d. all the C++ books must be next to each other and all the Java books must be next to each other?

Exercise 8. *A committee of 12 is to be selected from 10 men and 10 women. In how many ways can the selection be carried out if:*

a. there are no restrictions?
b. there must be 6 men and 6 women?
c. there must be an even number of women?
d. there must be more women than men?
e. there must be at least 8 men?

Exercise 9. *How many distinct four-digit integers can one make from the digits 1, 3, 3, 7, 7, and 8?*

Exercise 10. *Determine the coefficient of* x^9y^3 *in the expansions of:*

a. $(x + y)^{12}$
b. $(x + 2y)^{12}$
c. $(2x - 3y)^{12}$