TMA4140
DISKRET MATEMATIKK – DISCRETE MATHEMATICS
NTNU, HØST/FALL2020

EXERCISE SET 8 / ØVING 8

The solutions must be submitted via OVSYS (to the assigned group/TA).
Løsningene må sendes inn via OVSYS (til den tildelte gruppen/TA).

Deadline for submission: **Friday, 23 October, 4:00pm**
Innleveringsfrist: **Fredag, 23. Oktober, kl. 16:00**

Textbook: K. H. Rosen, *Discrete Mathematics and Its Applications*, 8. edition

Exercise/Oppgave

1. *i) How many ways are there to select 12 cars if Fords, BMWs, and Fiats are available?*
ii) How many if at least 1 car of each type must be selected?
iii) If at least 3 Fiats have to be selected?
iv) If at least 1 car of each type and at least 4 BMWs have to be selected?

Exercise/Oppgave

2. *How many distinct non-negative integer solutions has the equation*

$$x_1 + x_2 + x_3 + x_4 = 12.$$

Exercise/Oppgave

3. *Show that* $f \in \Omega(g)$ *for* $f(n) = 3n^2 - 5$ *and* $g(n) = n(n+2)$.

Exercise/Oppgave

4. Section/Sektion 5.1: *4, 6, 9, 10, 14*

Exercise/Oppgave

5. *Use induction to show that for all natural numbers* m

$$\sum_{i=1}^{m}(4i^3 + 24i^2 + 32i) = m(m+5)(m+4)(m+1).$$

Exercise/Oppgave

6. *Determine the smallest non-negative integer such that* $\frac{1}{n+1}\binom{2n}{n} > n + 2$. *Show by induction that the formula holds in general for non-negative integers larger than this integer.*

Exercise/Oppgave

7. Section/Sektion 5.2: *4, 7, 14, 19, 23*

Exercise/Oppgave

8. Section/Sektion 5:3 *12, 13, 14, 15, 18*

Date: October 12, 2020.