

TMA4140
DISKRET MATEMATIKK – DISCRETE MATHEMATICS
NTNU, HØST/FALL2020

EXERCISE SET 2 / ØVING 2

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: **Monday, 7 September, 1:00pm**
Innleveringsfrist: **Mandag 7. September, kl. 13:00**

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

Exercise/Oppgave

1. Section/Sektion 2.1: 7, 12, 26

Exercise/Oppgave

2. Section/Sektion 2.2: 20c,e, 36, 52

Exercise/Oppgave

3. Section/Sektion 2.3: 12, 40, 44

Exercise/Oppgave

4. We define the functions:

$$(1) \quad f_1: \mathbb{R} \rightarrow \mathbb{R}, \quad x \mapsto f_1(x) = x + 2$$

$$(2) \quad f_2: \mathbb{R} \rightarrow \mathbb{R}, \quad x \mapsto f_2(x) = \frac{x}{x^2 + 1}$$

1) Show that f_1 is injective and surjective. Determine its inverse.

2) Prove or disprove that f_2 is injective.

Exercise/Oppgave

5. Section/Sektion 2.4: 12d, 33b,d

Exercise/Oppgave

6. Section/Sektion 2.5: 16

Exercise/Oppgave

7. Use truth tables to determine which of the statements (if any) are tautologies, which are contradictions:

$$1) ((p \rightarrow q) \rightarrow p) \rightarrow p, \quad 2) \neg((p \wedge \neg p) \rightarrow q), \quad 3) p \vee (p \rightarrow \neg p)$$