MA0301
ELEMENTARY DISCRETE MATHEMATICS
NTNU, SPRING 2022

SET 11

Deadline: Monday 04.04.2022, 23:59

Exercise 1. *Lewis, Zax: Exercise 9.12.*

Exercise 2. *Lewis, Zax: Exercise 12.2.*

Exercise 3. *Use induction to prove that* $\sum_{n=1}^{k} \frac{1}{(2n-1)(2n+1)} = \frac{k}{2k+1}$.

Exercise 4. *Define the function* $f(x) := 2x - 3$ *from* $\mathbb{R}$ *to* $\mathbb{R}$. *Show that* F *is surjective and injective. Find its inverse function* f^{-1}.

Exercise 5. *Let* X, Y, *and* Z *be sets. Prove that* $\overline{(X \cap Y \cap Z)} = \overline{X} \cup \overline{Y} \cup \overline{Z}$.

Exercise 6. *Use the binomial theorem to find the following:*

a) The expansion of $(x + y)^6$.
b) The coefficient of $x^{101}y^{99}$ *in the expansion of* $(2x - 3y)^{200}$.

Exercise 7. *Lewis, Zax: Exercise 19.1.*

Exercise 8. *Lewis, Zax: Exercise 19.3.*

Exercise 9. *Lewis, Zax: Exercise 19.5.*

Exercise 10. *Lewis, Zax: Exercise 19.8.*

Exercise 11. *Lewis, Zax: Exercise 23.15.*

Date: March 28, 2022.