Tutorial letter 101/0/2024

Linear Algebra II

MAT2611

Year Module

Department of Mathematical Sciences

TUTORIAL RESOURCE FOR MAT2611

IMPORTANT INFORMATION:
This tutorial letter contains Assignment 1 for the module MAT2611

BAR CODE

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Instructions for the Assignments
Take care to explain all your arguments.
Only PDF files will be accepted.

ASSIGNMENT 01
Due date: Friday, 19 April 2024

Note: This assignment is related to Addendum A of Tutorial Letter 101/0/2024.

Problem 1. (a) Give an example of a set A such that there is a set B with $B \in A$ but $B \nsubseteq A$.
(b) Give an example of a set A such that there is a set B with $B \subseteq A$ but $B \notin A$.

[10 marks]

Problem 2. Calculate the following powersets:
 (1) $P(\{\emptyset\})$.
 (2) $P(\{\emptyset, \{\emptyset\}\})$.
 (3) $P(\{\{\emptyset\}\})$.
 (4) $P(P(\emptyset))$.
 (5) $P(P(\{\emptyset\}))$.

[10 marks]

Problem 3. For each of the following functions determine the image of $S = \{x \in \mathbb{R} : 4 \leq x^2\}$.
 (a) $f : \mathbb{R} \to \mathbb{R}$ defined by $f(x) = 3x + 1$.
 (b) $g : \mathbb{R} \to \mathbb{R}$ defined by $g(x) = e^{2x}$.

[10 marks]

Problem 4. Consider the following two functions:
 (1) $f : \mathbb{R} \to \mathbb{R}$ defined by $f(x) = 3x - 4$.
 (2) $\mathsf{g} : \mathbb{R} \to \mathbb{R}$ defined by $\mathsf{g}(\mathsf{x}) = 4\mathsf{x}^2$.
Determine whether the given functions are one-to-one correspondences.

[10 marks]

[Total: 40 marks]

– End of assignment –