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**MH1812 Discrete Mathematics: Quiz (CA) 2**

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Name:

Tutorial Group:

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*There are 3 (THREE) questions, please try all of them, and justify all your answers! Best of luck!*

**Question 1** (40 points)

- a) Let  $A, B, C$  be sets. Prove or disprove the following set equality (20 points):

$$A - (B \cup C) = (A - B) \cap (A - C).$$

- b) ~~If you~~ toss 3 fair coins, what is the probability of getting at least 2 heads? (20 points).

probability is not in the syllabus anymore

**Question 2** (40 points)

- a) Find  $a, b \in \mathbb{R}$  which satisfy the following equation (20 points):

$$-3 + a = \frac{4}{i} - i + ib$$

where  $i = \sqrt{-1}$ .

- b) Consider the following system of linear equations in  $\mathbb{R}$ . Write it in matrix form, and determine its solutions, if any (20 points):

$$\begin{cases} x_1 + 2x_2 &= 3 \\ 2x_1 + 4x_2 &= -1 \end{cases}$$

Complex numbers and linear algebra are not in the syllabus anymore.

**Question 3** (20 points)

Consider the following two recurrence relations:

$$a_n = 3a_{n-1}, \quad a_1 = 4$$

and

$$b_n = 4b_{n-1} - 3b_{n-2}, \quad b_1 = 0, \quad b_2 = 12.$$

Choose and solve ONE OF THE TWO (namely, pick the one you prefer and solve it, you do NOT need to solve both of them).