MH1812 Discrete Mathematics: Quiz (CA) 2

Name: Tutorial Group:

NTU Email:

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:

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

and

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

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).