

MATH 170: MIDTERM 1

GOOD LUCK!

There are three questions. Make sure you justify all your work for complete credit.

Rules

- You have 50 minutes to complete your work and 10 minutes to upload your work.
- Open notes (you can use your notes freely).
- No use of internet, textbooks, computer algebra systems, calculators.
- No collaboration.

Questions

1. Let A, B be sets. Determine whether the followings are true or false via the Venn diagram.
 - (a) Let $X = A \cup B$. Write the following in terms of A and B only
$$A \setminus (X \cup B).$$
 - (b) Use the Venn diagram to determine if
$$A \setminus (X \cup B) = \emptyset.$$
2.
 - (a) Give an example of a function $f : X \rightarrow Y$ that $f \circ f = id_X$.
 - (b) Describe the graph of this function in set builder notation.
3. Prove by induction that $\forall n \in \mathbb{N}$,