MATH 2001
PROOFS

Homework. Due Friday, February 12 at 6pm.

- Complete Proof 2 (originally due today, but pushed back to Friday).
- Revise Proof 1.
- Add Exercise 1 on this worksheet in your Book Problems Overleaf file.
- Read sections 8.1 and 8.2 and definition 4.4. (Skip examples 8.3 and 8.7).

Definition (Subset)**.**

Definition (Union)**.**

Theorem. *If A and B are sets, then $A \subseteq A \cup B$.*

Proof.

□

Definition (Power set)**.**

Theorem. *If A and B are sets, then $\mathscr{P}(A) \cup \mathscr{P}(B) \subseteq \mathscr{P}(A \cup B)$.*

Definition (Divides)**.** Suppose $a, b \in \mathbb{Z}$, then a *divides* b if $ac = b$ for some $c \in \mathbb{Z}$.

Notation. We write $a \mid b$ (`a \mid b`) to denote that a divides b or that a is a *divisor* of b.

Exercise 1. Demonstrate why the statement is true or explain why the statement is false.

T	**F**	:	$4 \mid 20$	**T**	**F**	:	$0 \mid 0$
T	**F**	:	$3 \mid 11$	**T**	**F**	:	$\frac{1}{2} \mid 10$
T	**F**	:	$0 \mid 33$	**T**	**F**	:	$\frac{1}{3} \mid \frac{2}{3}$

Exercise 2. Prove that $\{x \in \mathbb{Z} : 55 \mid x\} \subseteq \{x \in \mathbb{Z} : 11 \mid x\}$.