

## MATH 3200 – Homework #4

posted February 24, 2020; due at the **start of class** on March 4, 2020

All numbering corresponds to the course textbook, *A TeXas-Style Introduction to Proof*. Assignments are expected to be **neat** and **stapled**. **Illegible work may not be marked.** Assume — unless explicitly told otherwise — that **you are expected to include clear and concise explanations of your reasoning, expressed in complete sentences.**

1. Exercise 4.15. [Explain your answer to (d); for the other parts, the answer alone is sufficient.]
2. Statement 4.25.
3. Exercise 4.31. [No justification required.]
4. Statement 4.40. Use element-chasing!
5. Exercise 4.42. [No justification necessary.]
6. Statement 4.67(b). Use element-chasing!
7. Use element-chasing to prove that  $(A \setminus B) \setminus C = A \setminus (B \cup C)$ .
8. Prove or disprove: Let  $A, B$ , and  $X$  be sets. If  $X \subseteq A \cap B$ , then  $X \subseteq A$  and  $X \subseteq B$ .
9. Suppose  $A, B, C$  are subsets of a universal set  $U$ .  
Use the “beyond element-chasing method” to prove that  $A \cap (A \cap B)^c = A \setminus B$ . Indicate whenever you use the Commutative Property, the Associative Property, the Distributive Property, and de Morgan’s laws.
10. Suppose  $A, B, C$  are subsets of a universal set  $U$ .  
Use the “beyond element-chasing method” to prove that  $A \cap (B \setminus C) = (A \cap B) \setminus (A \cap C)$ . Indicate whenever you use the Commutative Property, the Associative Property, the Distributive Property, and de Morgan’s laws.
11. Statement 4.88. Use element chasing!