

MTH 3318 - Test #3

SPRING 2024

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Name _____

Instructions. Show your work completely. Document your work well.

Remark 1 For problems 1 - 3, prove one.

1. $A \cap B = A \Rightarrow A \subseteq B$

2. $(A \cup B) = B \Rightarrow A \subseteq B$

3. $A \subseteq B \Rightarrow B^c \subseteq A^c$

Remark 2 For problems 4 - 6, prove one.

4. $(A \cap B)^c = A^c \cup B^c$

5. $A \subseteq B \Rightarrow (A \cap B) = A$

6. $(A \cup B)^c = A^c \cap B^c$

Remark 3 Prove problem 7.

7. $A \cap B = \emptyset \Leftrightarrow (B \cap A^c) = B$

Remark 4 For problems 8 - 9, prove either one by contradiction.

8. $(A \cap B) \subseteq A$

9. $(A \cap B) = \emptyset \Rightarrow A \subseteq B^c$

Remark 5 For problems 10 - 11, prove either one, by proving the contrapositive.

10. $A \subseteq B \Rightarrow (A \cap B) = A$

11. $(A \cup B) = B \Rightarrow A \subseteq B$

Remark 6 *Disprove problem 12 by providing a counter-example.*

12. $(A \cup B)^c = A^c \cup B^c$