

MTH 3318 - Test #2

FALL 2022

Pat Rossi

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

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. $U^c = \emptyset$

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. $A \not\subseteq B \Rightarrow (A \cup B) \neq B$

Remark 6 *Disprove both problems 12 and 13 by providing a counter-example.*

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

13. $\sqrt{x+y} = \sqrt{x} + \sqrt{y}$