

# MTH 3318 - Test #3

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