

HW 2

Introduction to Mathematical Proof, MTH 301

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Points: 50

In Class problems based on problems assigned. See next page

1. Decide by looking at examples whether the statement:

$$\mathcal{P}(A \cup B) = \mathcal{P}(A) \cup \mathcal{P}(B)$$

is true or false. If it is true, give an informal explanation. If it is false, give a specific counterexample.

2. Is it possible for something to be both an element and a subset of the same set?
In other words, can you create an example of two “things”— V and W —such that “ $V \in W$ ” and “ $V \subseteq W$ ” are *both* true statements?

1. Read Section 2.1
2. Do GYHD 2 on page 42
3. Read Cartesian Products on Page 43
4. Do GYHD 3 on page 43
5. Do the following problems

6. (Exploration 1) Examine each of the following formulas about sets and set operations. Decide by looking at examples whether the statement is true or false. (Venn diagrams are hard to use for problems involving power sets or Cartesian products.) If it is true, give an informal explanation. If it is false, give a specific counterexample.
- a) $\mathcal{P}(A \cup B) = \mathcal{P}(A) \cup \mathcal{P}(B)$.
 - b) $\mathcal{P}(A \cap B) = \mathcal{P}(A) \cap \mathcal{P}(B)$.

On Wednesday at the beginning of the class I will assign a couple of problems from above to be handed in. That will count for HW 2.

Do not submit anything on Brightspace.