

## Math 116: Written Homework Set 7

**This assignment is due on Wednesday, October 26<sup>th</sup> in class. Show all work where possible! Answers magically appearing will receive no credit.**

1. Which of the following sets are well-defined?
  - a.  $\{1, 2, 3, 4, 5\}$
  - b. The set of great cities in which to live.
  - c.  $\{x \mid x \text{ is a U.S. state}\}$
  - d.  $\{x \mid x \text{ is a fun game}\}$
2. Find the cardinality of the following sets.
  - a.  $\{A, B, C, D, E, F\}$
  - b.  $\{x \mid x \text{ is a U.S. state}\}$
3. State whether each of the pairs of sets are equal, equivalent, or neither.
  - a.  $\{1, 2, 3\}$  and  $\{3, 2, 1\}$
  - b.  $\{6, 8, 10, 12\}$  and  $\{1, 2, 3, 4\}$
4. Determine whether the following statements are true or false.
 

a. $b \in \{a, b, c\}$	e. $\{a, b, c\} \subseteq \{a, b, c\}$
b. $\{b\} \in \{a, b, c\}$	f. $\emptyset = \{ \}$
c. $\{b\} \subseteq \{a, b, c\}$	g. $\emptyset \subset \{a, b, c\}$
d. $\{a, b, c\} \subset \{a, b, c\}$	h. $\{1, 2\}$ and $\{1, 2, 3\}$ are both equal and equivalent
5. If the universal set is  $U = \{0, 1, 2, 3, 4, 5, 6, 7, 8, 9\}$ , find the complement of the following sets.
  - a.  $\{1, 3, 4, 8, 9\}$
  - b. The set of odd counting numbers less than 8.
6. Find the number and list all of the subsets of the following sets.
  - a.  $\{1, 2, 3\}$
  - b.  $\{h, e, l, p\}$

## Selected Answers

1. a. Is well-defined.  
b. Not well-defined. Not clear on what defines a great city.
2. a. 6
3. a. Both equivalent (both have 3 elements) and equal (have the exact same elements).
4. a. True  
d. False. Even though a set is a subset of itself, it is not a proper subset.  
g. True  
h. False. The sets are neither equal or equivalent.
5. a.  $\{0, 2, 5, 6, 7\}$
6. Since the set has  $n = 3$  elements, the set has  $2^3 = 8$  elements. The 8 subsets are

$\{\}, \{1\}, \{2\}, \{3\}, \{1, 2\}, \{1, 3\}, \{2, 3\}, \{1, 2, 3\}$