**Math 116: Written Homework Set 7**

**This assignment is due on Monday, February 18th 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* | *x* is a U.S. state}

 d. {*x* | *x* is a fun game}

2. Find the cardinality of the following sets.

 a. {A, B, C, D, E, F}

 b. {*x* | *x* 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\}⊆\{a, b, c\}$
 b. $\{b\}\in \{a, b, c\}$ f. $∅=\{ \}$
 c. $\{b\}⊆\{a, b, c\}$ g. $∅⊂\{ a,b c \}$
 d. $\{a, b, c\}⊂\{a, b, c\}$ 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

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