Assignment1

0. [1pt] What file format should assignments be submitted in? What are the consequences if it is not submitted in that format?

Please use the knowledge about **set theory** to solve the following problems.

1. [1 pts] $|\{\emptyset\}|$ = ___ .
2. [2 pts] Which of the following statement is **NOT** true? (Multiple choice, there may be more than one correct answer)
   A. If $\mathbb{N}$ is the set of Natural Numbers, then the size of $\mathbb{N}$ is ∞.
   B. A power set is a set of sets.
   C. For a finite set, the size of its power set is greater than its size.
   D. If S – P = Ø, then S = P (Both S and P are sets).
   E. The elements of a set can be the set
3. [2 pts] Let A = {0, 2, 4}, B = {1, 3, 5}, C = {3, 4, 5}. Find
   a) $A \cup (B - C)$
   b) $A \times (B - C)$
   c) $|\{P(A) - P(C)\}|$
   d) $P(A) \cap P(B - C)$
4. [2 pts] We use R_{LT5} to note the **"Less Than" Relation** on natural numbers smaller than **5.**
   (1) Please define R_{LT5} as the set of ordered pairs mathematically.
   Example: Addition Relation on natural numbers smaller than 2 is
   $AddR_2: N_2 \rightarrow N_2 =_{df} \{(0,0), (0,1), (1,0), (1,1)\}$
   (2) R_{LT5} is _____.
   a. Universal b. Identity c. Reflexive d. Irreflexive
   e. Symmetric f. Antisymmetric g. Connected h. Transitive
5. [2pt] Let $P = \{0, 1, 2\}$. $R = \{(0,0), (0,1), (1,0), (1,1), (2,2)\}$ is a relation on P.
   (a) (True or False) R is an equivalence relation.

(b) If (a) is true, find the equivalence class $[0]_{\equiv}$ and the quotient set of P defined by R. If (a) is not true, find a counterexample.