1A LOGIC WORKSHEET 8

NAME: CLASS: TUTOR:

5 Excellent
4 Good
3 Satisfactory
2 Weak
1 Very poor

Reading
Steinhart, *More Precisely* Ch. 1, 2.

SECTION A
Define: union, intersection, subsethood, power set and Cartesian product. Let M and F be the sets of all males and of all females. Let *Rxy* be the relation *x is older than y* and let j denote Johnny.

(a) Use set-theoretic notation to write down expressions for the following sets:

1. The set of all people
2. The set of all females younger than Johnny
3. The set of all sets of males younger than Johnny
4. The set of all males younger than every female
5. The set of all possible marriages
6. The set of all possible marriages involving Johnny
7. The set of all possible marriages not involving Johnny

(b) What are the members of $\wp(\wp(\varnothing))$?

(c) True or false? $\wp(X) = \wp(Y)$ iff X = Y. Say briefly why.

(d) Write down the axiom of extensionality. Say briefly why it follows from the axiom that at most one set is empty.

SECTION B (for discussion in class)
Say which of the following relations are symmetric, transitive, or reflexive (over some domain of people in which siblings share both parents):

1. Most people prefer x to y
2. x and y are distinct siblings
3. x is a brother of y
4. x and y are both alive and x is at least one year older than y
5. x and y are both alive and x is at least 150 years older than y
6. x and y were once married
7. x wrote *Waverley* iff y wrote *Persuasion*

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