

Homework 5

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Question 1

- A) 2
- B) 4
- C) 1
- D) $1/2$
- E) -5
- F) 1, 2, 3
- G) 2
- H) 0, 1, 8
- I) $\{1\}$
- J) There are no members of the set \emptyset
- K) $\{1, 3\}$
- L) $\{0, 1, 8\}$
- M) $\{\{1\}, \{1, 2\}\}$
- N) $A \supseteq C$
- O) $\{1, 2\}$
- P) $\{0, 1, 8, 27\}$

Question 2

- A) False
- B) True
- C) True
- D) False
- E) True
- F) False
- G) True
- H) True
- I) False
- J) False
- K) True
- L) False
- M) True
- N) True
- O) False

- P) True
- Q) False
- R) False
- S) True
- T) False
- U) False

Question 3

- A) Yes, this statement is true because $5 \in A$ and $6 \in B$, which combined, as P required, equal 11.
- B) No, this statement is false because $5 \in A$, which is the largest value in A, and $8 \in B$ (largest value in b), which combined, equal 13, one less than 14 as required.
- C) False. $1 \in D$; however, $1 \notin S$
- D) True. The order of the members of the set does not matter, and all of the members are the same in C and as defined as $\{3, 5, 1\}$
- E) True. As stated in the above letter, the order of the members of the set does not matter, but the amount of times a member appears in the set also does not matter.
- F) False. $\emptyset = \{\}$, so $\emptyset \neq \{\emptyset\}$
- G) False because \emptyset is a member of B but not A.
- H) True because the members of C (1, 3, 5) all are members of X
- I) False because 5 is a member of C, but not a member of Y
- J) True because all the members of the empty set appear in B
- K) True because $\{1\}$ and $\{2, 1\}$ appear in S
- L) False because $\{1, 2\}$ is a member in S
- M) False because 1 does not appear in the powerset of S
- N) false because $\{1\}$ does not in the powerset of S
- O) True because $\{\{1\}\}$ does appear in the powerset of S
- P) False because $\{\{\{1\}\}\}$ does not appear in the powerset of S

Question 4

- A) $\overline{B} = \{1, 3, 5, 7, 9, 10\}$
- B) $\overline{C \cup D} \cap \{2, 3, 4\} = \{4\}$
- C) $\overline{\emptyset} = \{0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10\}$
- D) $\overline{\{0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10\}} = \{\}$
- E) $(A \setminus B) \cap D = \{1, 3\}$
- F) $A \cap C = \{1, 3, 5\}$
- G) $A \cup C = \{1, 2, 3, 4, 5\}$
- H) $A \setminus C = \{2, 4\}$
- I) $C \setminus A = \text{None}$
- J) $B \cup C = \{\}$
- K) $B \setminus C = B$
- L) $\wp(C) = \{\{1\}, \{3\}, \{5\}, \{1, 3\}, \{1, 5\}, \{3, 5\}, \{1, 3, 5\}, \{\}\}$

Question 5

$$B = \{x \mid x \in \mathbb{N} \wedge x \text{ is even} \wedge x \leq 8\}$$

Question 6 (Bonus)

$$B = \{x \mid x \in \mathbb{N} \wedge x \text{ is not odd} \wedge x \leq 8\}$$

Question 7

- A) $|B| = 5$
- B) $|S| = 4$
- C) $|\{x \mid x \in \mathbb{N} \wedge x \leq 4\}| = 5$
- D) $|\{x \mid x \in \mathbb{N} \wedge x \leq 1000\}| = 1001$
- E) $|\emptyset| = 0$
- F) $|Q| = \text{Infinite}$
- G) $|\wp(C)| = 8$
- H) $|\wp(A)| = 32$
- I) $|\wp(Q)| = \text{Infinite}$