Definition 1. Let S and T be sets. We say that S is a *subset* of T, and we write $S \subseteq T$, if every x that is in S is also in T. We also say that T is a *superset* of S and write $T \supseteq S$.

We write 2^S for the set whose elements are all of the subsets of S and call it the *powerset* of S.

Problem 2. How many subsets does $\{\varnothing\}$ have?
A) 0 B) 1 C) 2 D) 3 E) 4

Solution. C) $\square$

Problem 3. Which of the following statements are true?
A) $\mathbb{N} \subseteq \mathbb{Z}$ B) $\mathbb{N} \in \mathbb{Z}$ C) Both D) Neither

Solution. A) $\square$

Problem 4. Which of the following statements are true *for every set* S?
A) $S \subseteq 2^S$ B) $S \in 2^S$ C) Both D) Neither

Solution. B) $\square$

Problem 5. If a set S has n elements, how many subsets does S have?
A) 0 B) 1 C) n D) n^2 E) 2^n

Solution. E) $\square$

Problem 6. Which of the following are true?

A) The empty set is an element of every set.
B) The empty set is a subset of every set.
C) Both of the above.
D) None of the above.

Solution. B) $\square$

Problem 7. How many finite sets possess an odd number of subsets?
A) 0 B) 1 C) Infinitely many

Solution. B) $\square$