- Let S be a subset of positive integers, and let $A = \sum_{x \in S} x^2$, $B = \sum_{x \in S, x^2 \in S} x$. What are the values of A and B if $S = \{1, 2, 4, 5\}$?

- Let M be an $n \times n$ matrix. Let M_{ij} denote the ij-th entry of M. If the total sum of the entries of M is 100, then what is the value of $\sum_{i=1}^{n} \sum_{j \in \{1,\ldots,n\} \setminus \{i\}} \sum_{r=1}^{n} M_{ir}$?

- Is it true that there are $\lceil \log_2 n \rceil$ digits in the binary representation of a positive integer n?

- What is $\sum_{n=0}^{k} 2^n$?

- Consider a sequence $S = (a_1, \ldots, a_n)$ of integers, and let E denote the set of even integers in $\{1, \ldots, n\}$. Let $A = \sum_{i \in E} a_i$. What is the value of A if $S = (1, 3, 2, 5, 4)$?

- Let $G = (V, E)$ be an undirected graph. Suppose that to every edge uv a positive integer c_{uv} is assigned. What does the following statement mean?

$$\exists c \forall u \in V, \qquad \sum_{uv \in E} c_{uv} = c.$$

- Let $G = (V, E)$ be an undirected graph where the degree of every vertex is 10. Suppose that to every vertex $u \in V$ a positive integer a_v is assigned. If $\sum_{v \in V} a_v = 5$, what is $\sum_{v \in V} \sum_{u \in V : uv \in E} a_u$?