Problem 1. Which one of the following set theory formulas holds for all subsets $A$, $B$ and $C$ of some universe $X$? Multiple choice question, wrong answer cancels a correct one.

a) $\overline{A} = A$.

b) $A \cup \overline{A} = \emptyset$.

c) $A \cup B = \overline{A} \cap \overline{B}$.

d) $A \cap A = A$.

Problem 2. Let $S = \{a, b, c\}$ be a sample space. Which of the statements are true? Multiple choice question, wrong answer cancels a correct one.

a) $S$ is an elementary event.

b) $a$ is an outcome.

c) $\{a, b\}$ is an event.

d) $\{a\}$ is an elementary event.

Problem 3. A parking lot has 10 reserved parking for executives of a certain company. The spaces closer to the office building are considered more desirable. 7 executives are to be assigned a parking space in the lot. How many ways are there to do the assignment?

a) $70$

b) $604800$

c) $7^{10}$

d) $10^7$

Problem 4. Given that $P$ is a function that assigns numbers to subsets of a sample space $S = \{a, b, c\}$, and that $P(\{a\}) = 1/2$ and $P(\{a, b\}) = 1/3$, which of the following can be said about $P$?

a) $P(A)$ is always non-negative.

b) $P(\{c\}) = 1/6$.

c) $P(S) = 1$.

d) $P$ does not satisfy axioms of probability.