Problem 3

Suppose the monthly price evolution of Stock $S$ is given by $\Delta S_n = S_{n-1} \rho_n$, $n = 1, 2, \ldots$, where returns $\rho_n$ are i.i.d. with values $0.2$ and $-0.1$ with probabilities $0.4$ and $0.6$. Given $S_0 = 300$, find the predicted mean price of $S$ for next 3 months.

Problem 4

Consider a single-period $(B, S)$-market with $B_0 = 1$, $S_0 = 10$, $r = 0.2$ and

$$S_1(\omega_1) = 6, \quad S_1(\omega_2) = 12, \quad S_1(\omega_3) = 18$$

Find risk-neutral probability $P^*$.

Problem 5

An investor buys two European put options with strike price $40$ and one European call option with strike price $50$ on the same stock $S$ with the same expiry date $N$. The total price of these options is $10$. Write down the gain-loss function and discuss the possible outcomes.