Test 1

Name:

Derived points:

Problem 1. Consider the Black-Scholes model and the derivative asset:

$$X = \begin{cases} K - S_T & 0 < S_T \leq K, \\ S_T - K & K < S_T. \end{cases}$$

Replicate this derivative using portfolio consisting of bond, asset S and European call option. Find the arbitrage free price for X.

Problem 2. Consider the standard Black-Scholes model. Find the arbitrage free price for $X = (S_T)^\beta$ where T is a maturity date.

Problem 3. What is the value of portfolio consisting of two assets in the Black-Scholes model?

Problem 4. Assume that price of the European call option with maturity T is C, risk-free interest rate - r, present asset price - S. Give the price of European put option if K is a strike price?

Problem 5. Find the arbitrage free price of $X = \mathbf{1}_{\{S_T > S_T^0\}}$ for Black-Scholes market with maturity $T > 1$ where S_t^0 is a risk-free instrument.