MTH 9831 Assignment 9 (11/18/2015 - 11/25/2015).

(1) (Asian option, zero interest rate) Exercise 7.8.

(2) (Floating strike Asian option) Assume the BSM model ($r \neq 0$). Consider the floating strike Asian call option with payoff at time T given by

$$\left(\frac{1}{c} \int_{T-c}^{T} S(t)\, dt - S(T) \right)_+ .$$

Follow the methodology described in lecture notes or in Shreve II, pp. 324-329 to derive an analog of Theorem 1 on p. 11 of Lecture 8 (Theorem 7.5.3 in Shreve II) for this option. (Hint: the game here is to find explicitly the process $\gamma(t)$ and the portfolio process $X(t)$. The rest, as you will see, is just the repetition of the calculations done in the lecture.)

(3) (Laplace transform of τ_m) Read Theorem 8.3.2 and make yourself completely comfortable with its proof. This result was discussed earlier in the course. Compare to other theorems where we used an optional stopping theorem to compute probabilities and expectations (for a random walk). This method is very useful and I would like to insist that you learn it. [1]

(4) (Solving the linear complementarity conditions) Exercise 8.3.

(5) (Perpetual American put paying dividends) Exercise 8.5 ((i) and (ii) only).

[1] Clearly, there is nothing to submit for this problem. But this might be on the quiz.