QF602 - Homework 2

Question 1

- Suppose that Tesla is trading at \$750 per share. What does it cost to construct a derivative security that pays \$100 when Tesla hits \$1000 for the first time? Note that this security has no maturity. Assume no dividend, zero interest rate, you can trade any amount of Tesla share and no transaction cost.

Question 2

- The table below shows the put option prices for various maturities and strikes for the same underlying. Assume the interest rate is 0. What is the range of x and y such that there is no arbitrage?

Maturity/Strike	**90**	**100**	**110**
1	5	x	10
2	y	9	12

Question 3

- Assume $S_0 = 100$, dividend yield is 0% and risk free rate is 0%; a term-structure of implied vol $\Sigma(1) = 0.3, \Sigma(2) = 0.2$, the strikes are 100. Is there any arbitrage in the market? What's the minimum value of $\Sigma(2)$ such that there is no arbitrage?