Math 181 HW 7

1. Use the put-call parity relationship to derive, for a non-dividend-paying stock, the relationship between following greeks letters for a European put and for a European call:

- delta
- gamma
- vega
- theta
- rho

2. A financial institution has the following portfolio of over-the-counter options on sterling:

Type	Position	Delta of option	Gamma of option	Vega of option
Call	-1,000	0.50	2.2	1.8
Call	-500	0.80	0.6	0.2
Put	-2,000	-0.40	1.3	0.7
Call	-500	0.70	1.8	1.4

A traded option is available with a delta of 0.6, a gamma of 1.5 and a vega of 0.8.

- What position in the traded option and in sterling would make the portfolio both gamma neutral and delta neutral?
- What position in the traded option and in sterling would make the portfolio both gamma vega and delta neutral?

3. For the same portfolio as in the previous problem, suppose that a second traded option with a delta of 0.1, a gamma of 0.5 and a vega of 0.6 is available. How could the portfolio be made delta, gamma and vega neutral?