

# PRACTICE FINAL EXAM

MSF 503 Modeling 1

## Problems: 5 points each

1. Write a VBA *sub-routine* that will put a random stock price path (i.e. 1000 random stock prices) into column A assuming  $S_0 = 50$ ,  $\mu = .0001$ , and  $\sigma = .01$ .

2. Assuming  $\gamma = .01$ ,  $\alpha = .1$  and  $\beta = .89$ , calculate to  $t = 1$  forecast of volatility using GARCH(1,1) if  $r_0 = .01$  and  $\hat{\sigma}_0^2 = .0001$ .

3. Given the following price data:

	Open	High	Low	Close
Day 1	50	52	49	51
Day 2	51	55	48	49

Estimate the Day 2 volatility using the close-to-close, Parkinson, and Garman Klass methods.

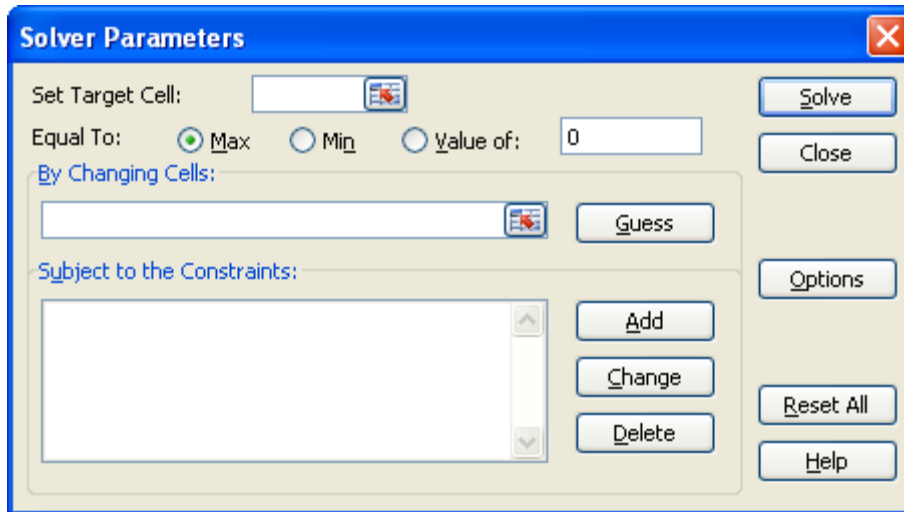
4. If a call option with a strike price of 40 is trading at 4.56, what is the price of the put option with the same strike if the stock price is 42,  $r = .05$  and  $t = .5$ ?

5. Given the following optimization problem, draw a graph that shows the feasible region.

$$\begin{aligned}
 \text{Maximize:} & \quad 3x_1 + 2x_2 \\
 \text{Subject to:} & \quad 2x_1 + x_2 \leq 100 \\
 & \quad x_1 + x_2 \leq 80 \\
 & \quad x_1 \leq 40 \\
 & \quad x_1, x_2 \geq 0
 \end{aligned}$$

6. Given the optimization problem above, set up Excel and Solver to find the solution.

	A	B	C	D	E	F	G
1							
2							
3							
4							
5							
6							
7							



7. Six months from now, the price of stock ABC could be 49, 52, 53, 54 or 57. What is the price of a call option on ABC if the strike price is 50 and  $r = .05$ ?
8. Given the following information:  $\mu_1 = 2$ ,  $\mu_2 = 5$ ,  $\sigma_1 = 1$ ,  $\sigma_2 = 3$ , and  $\rho_{1,2} = .5$ . Generate  $z_1$  and  $z_2$  given  $z_{s(1)} = .485$  and  $z_{s(2)} = -.705$ . —
9. Write a VBA function that will return a linearly interpolated value given two points.
10. Given the following data:

1	8	0	2	3	1
5	6	9	9	9	6
2	2	3	1	8	6
9	3	0	7	1	1
8	2	0	7	8	1

Draw a histogram using bins 0-9.