

### Numerical Answers to 3E3 Modelling Risk

- 1(a)(i) The forecast for month 8 is 31.33 or 32 houses.  
1(a)(ii) The forecast for month 8 is 28.666 or 29 houses.  
1(a)(iii) The regression equation is  $y = 71.37 - 6.84x$ .  
1(a)(iv)  $y = 40.59$  (41 house sales)  
1(a)(v) ...

- 1(b)(i) ...  
1(b)(ii) The variance of the equally weighted portfolio is 1.26.

2(a) ...

- 2(b)(i)  $L = 27/13$ ,  $L_q = 7/13$ .  
2(b)(ii)  $E$  (number of customers served) =  $20/13$ .  
2(b)(iii)  $W = 9/13$ ,  $W_q = 7/39$ .  
2(b)(iv)  $\mu = 39/20$ ,  $\rho = 10/13$ .

- 2(c)(i)  $P_1(15) = 0.205$ .  
2(c)(ii) In 15 minutes we should expect 2.5 applicants to arrive.

2(d) ...

2(e) ...

3(a) ...

3(b) Maximax would suggest that manufacturing systems in-house will give the highest payoff (£55k) in the best case. Maximin suggests that buying abroad is a low risk strategy giving the highest payoff (£10k) in the worst case, and minimax regret suggests buying locally (maximum regret £15k).

3(c) European call option: 22.286, European put option: 7.410.

- 3(d)(i) 7.21M, 7.92M. It's better to scale down operations in 3 months.  
3(d)(ii) ...

4(a) ...

- 4(b)(i) ...  
4(b)(ii)  $S_2 = [0.53025, 0.4015, 0.01575, 0.0525]$

- 4(c)(i)  $\pi_1 = 9/16$  and  $\pi_2 = 7/16$   
4(c)(ii) Average payoff = -0.2406. 74.1% customer satisfaction is needed to break-even.

4(d) ...