

## Report on S15 (2007)

There were 30 candidates; mean 27.5, SD 7.46. Overall a much easier paper than previous years (which were probably too hard), and the marks reflect this.

Q1: 27 attempts, mean 13.8, SD 5.01. Popular, generally well done (it was similar to the corresponding question in 2004 which we had worked through in class), although quite a few students seemed determined to find a line of fixed points just like the 2004 solution, failing to appreciate I probably wouldn't set an identical question. A few failed to grasp the dynamics at all, and most didn't use the constraint "Assuming these conditions are satisfied...", which simplified the answer a lot. I didn't penalise them for doing unnecessary work – not sure what our policy is on this. Perhaps it should have been in bold face.

Q2: 24 attempts, mean 14.1, SD 3.35. Also popular, and generally well done, although remarkable numbers didn't want to iterate the map on their calculators, and even more couldn't manage the standard algebraic long-division exercise. None appreciated the simple substitution required to show that the 2-cycle is stable – perhaps we shouldn't have steered them towards a graphical argument, which was only needed if they hadn't managed to do the long-division properly.

Q3: No attempts despite being a beautiful and elegant question that would have taught them lots about stochastic processes and Brownian motion.

Q4: 9 attempts, mean 12.6, SD 5.35. Mixed marks including one perfect solution (or at least a solution I had to give 25 marks to given the marking scheme). Reasonable grasp of computing the Jacobian, but lots of algebraic errors. Even elementary linear algebra is clearly a challenge.