

sexy maths

A calculating approach to love

JOE McLAREN



Remember your first boyfriend or girlfriend? You probably thought that he or she was amazing. Perhaps you even talked romantically of spending your lives together. But then came that nagging feeling that maybe you could do better. There were many more fish in the sea, and perhaps someone else out there was really “the one”. The trouble is, if you were to dump your partner, there is generally no going back. So at what point should you just cut your losses and settle for what you’ve got?

The same dilemma arises in many decisions we have to make. Hunting for a flat is one example. How many times do you see a fantastic one on your first viewing, but then feel that you need to see more before committing yourself — only to risk losing that first flat?

Amazingly, mathematics can help you to maximise your chances of landing the best partner, or the best flat. Even the game show *Deal or No Deal* works on similar principles: once you have opened boxes, you cannot go back to them. So at some point you need to assess when to take the deal and go with what the banker is offering you. And the secret formula for determining this depends on e — not the drug, but the number.

Probably the second most famous number in mathematics — pipped to the post by the enigmatic π — e has a value of 2.71828... and crops up wherever the concept of growth is important. It is, for example, intimately related to the way in which the interest in your bank account accumulates. Suppose that you are looking at different interest-rate packages being offered by banks to invest £1. One is

offering to pay 100 per cent interest after one year. That would increase your investment to £2 at the end of one year, which is not too bad. But another bank is offering to pay 50 per cent interest every half-year. That would give you £1.50 after six months, and after a year would increase to $£1.50 + £0.75 = £2.25$ — making it a better deal than that offered by the first bank. And the third bank is offering 33.3 per cent, added every third of a year. You do the calculations and find that this bank will give you $£(1.333)^3 = £2.37$. And as you divide the year into smaller and smaller chunks, the compounding of the interest works increasingly to your advantage. The mathematician in you has, we hope,



THE CONUNDRUM

A woman has two lovers, whom she visits by train. One lives at the eastern end of the line, the second to the west. Trains arrive every ten minutes in each direction. She can never decide whom to visit so leaves it to chance, jumping on whichever train arrives first. Explain the circumstances by which she ends up seeing the lover to the east nine times more often than the one to the west.
Answer on page 23

realised that the bank which you really want is Bank Infinity (fortunately unaffected by the credit crunch), which divides the year into infinitely small chunks. The maximum balance that you can possibly achieve from this bank is £2.71828 — the same as the magic number e .

As well as maximising your bank balance, e is also the key to helping you to find the best partner. The process of selecting someone with whom to spend the rest of your life may seem like playing life's lottery but, as we discovered in last week's column, mathematics can help you to maximise your Lotto winnings. As with picking out the box with the biggest prize in *Deal or No Deal*, your decision needn't be made completely randomly: there is a mathematical way to optimise your chances of being lucky in love.

Without overcomplicating matters, mathematical analysis suggests that you should survey the scene for 37 per cent ($1/e$ equals roughly 0.37) of the way through the period that you have set yourself to find a partner. Supposing that you start dating at the age of 16 and aim to find the best partner by the time you reach 60, this would take you to about the age of 32. Then you must choose the next partner who beats all the people you've dated up to that point. It's not going to guarantee you success, but this strategy maximises your chances. Just be sure not to show the formula to your new spouse: it never looks good to be too calculating when it comes to love. ●

Marcus du Sautoy

The third episode of Marcus du Sautoy's series The Story of Maths is on BBC Four at 9pm on Monday.