



© 1997–2009, Millennium Mathematics Project, University of Cambridge.

Permission is granted to print and copy this page on paper for non-commercial use. For other uses, including electronic redistribution, please contact us.

December 2007

Features



An almighty coincidence

by John Haigh and Rob Eastaway



First note that there are 10^{10} possible combinations of the numbers from 1 to 10: there are 10 choices for the number that goes in the first position, 10 choices for the number that goes in the second position and so on. Since each digit is equally likely, each of these combinations is equally likely, so the chance of picking an individual combination is $1/10^{10}$.

How many combinations are there that have each digit appearing exactly once? Now there are 10 choices for the number that goes in the first position, 9 choices for the number that goes in the second position, since we can't pick the first one again, 8 choices for the third number, and so on. So there are $10 \times 9 \times \dots \times 2 \times 1 = 10!$ different combinations in this case.

Therefore, the chance of picking a combination with every number appearing exactly once out of all the possible combinations is $10!/10^{10}$.

[Return to main article](#)



Plus is part of the family of activities in the Millennium Mathematics Project, which also includes the [NRICH](#) and [MOTIVATE](#) sites.