
Contents

Biographical information	vii
Thanks	ix
Foreword	xi
Chapter 1. The Cauchy-Schwarz inequality	1
§1. Notes, remarks and difficult questions	6
Chapter 2. Projections in \mathbb{R}^3 —the elephant makes an appearance!	9
§1. Notes, remarks and difficult questions	16
Chapter 3. Projections in four dimensions	17
§1. Notes, remarks, and difficult questions	24
Chapter 4. Projections and Cubes	27
§1. Notes, remarks and difficult questions	36
Chapter 5. Incidences and matrices	39
§1. Notes, remarks and difficult questions	43
Chapter 6. Basics of grids over finite fields	47
§1. Notes, remarks and difficult questions	51

Chapter 7. Besicovitch-Kakeya conjecture in two dimensions	53
§1. Notes, remarks and difficult questions	56
Chapter 8. A gentle entry into higher dimensions	59
§1. Notes, remarks and difficult questions	64
Chapter 9. Some basic counting, probability and a few twists	65
§1. Notes, remarks and difficult questions	85
Chapter 10. A more involved taste of probability	87
§1. Notes, remarks and difficult questions	94
Chapter 11. Oscillatory integrals and fun that lies beyond	97
§1. Notes, remarks and difficult questions	108
Chapter 12. Integer points and a crash course on Fourier analysis	109
§1. Notes, remarks and difficult questions	120
Chapter 13. Return of the Fourier transform	123
§1. Notes, remarks and difficult questions	130
Chapter 14. It is time to say goodbye	133
Bibliography	135