

Contents

Preface xi

Chapter 1: Getting Started 1

Chapter 2: Millions, Billions, Zillions 9

2.1 How long will it last? 10

2.2 How can this be? 11

2.3 Check the units 14

2.4 Summary 17

Chapter 3: Big Numbers 19

3.1 Number numb 20

3.2 What's my share? 22

3.3 High finance 25

3.4 Other big numbers 27

3.5 Visualizations and graphical explanations 28

3.6 Summary 30

Chapter 4: Mega, Giga, Tera, and Beyond 31

4.1 How big is an e-book? 32

4.2 Scientific notation 36

4.3 Mangled units 38

4.4 Summary 39

Chapter 5: Units	41
5.1 Get the units right	41
5.2 Reasoning backwards	43
5.3 Summary	46
Chapter 6: Dimensionality	49
6.1 Square feet and feet square	50
6.2 Area	51
6.3 Volume	54
6.4 Summary	57
Chapter 7: Milestones	59
7.1 Little's Law	59
7.2 Consistency	62
7.3 Another example	65
7.4 Summary	65
Chapter 8: Specious Precision	69
8.1 Watch out for calculators	70
8.2 Units conversions	71
8.3 Temperature conversions	77
8.4 Ranking schemes	79
8.5 Summary	81
Chapter 9: Lies, Damned Lies, and Statistics	85
9.1 Average versus median	86
9.2 Sample bias	88
9.3 Survivor bias	90
9.4 Correlation and causation	91
9.5 Summary	92
Chapter 10: Graphical Trickery	95
10.1 Gee-whiz graphs	96
10.2 Broken axes	99
10.3 Pie charts	100
10.4 One-dimensional pictures	102
10.5 Summary	104

Chapter 11: Bias 109

- 11.1 Who says so? 110
- 11.2 Why do they care? 112
- 11.3 What do they want you to believe? 113
- 11.4 Summary 116

Chapter 12: Arithmetic 119

- 12.1 Do the math! 120
- 12.2 Approximate arithmetic, round numbers 121
- 12.3 Annual and lifetime rates 122
- 12.4 Powers of 2 and powers of 10 124
- 12.5 Compounding and the Rule of 72 126
- 12.6 It's growing exponentially! 129
- 12.7 Percentages and percentage points 131
- 12.8 What goes up comes down, but differently 132
- 12.9 Summary 135

Chapter 13: Estimation 137

- 13.1 Make your own estimate first 138
- 13.2 Practice, practice, practice 140
- 13.3 Fermi problems 142
- 13.4 My estimates 145
- 13.5 Know some facts 148
- 13.6 Summary 149

Chapter 14: Self Defense 151

- 14.1 Recognize the enemy 151
- 14.2 Beware of the source 153
- 14.3 Learn some numbers, facts, and shortcuts 154
- 14.4 Use your common sense and experience 155

Further Reading 157**Figure Credits** 159

