

Index

- 1/X 42
 3n+1 problem 58–60
- Access
 Digit tests 83–87, 95–97, 136, 138
 Functions 84
 2 GB limit 88
 Number duplications 126–129
 Database 133, 315
- Advanced tests 71, 89, 315
 AIG 209, 230–233
 Almost Benford 99–102, 113, 315
 Annual reports 218–244
 Apple Inc. 263
 Associated tests 71, 117, 315
 Arithmetic sequence 14, 53
- Base invariance 62–65, 313, 315
- Benford, Frank
 Personal details 2, 315
 Laser pointer 2
 Empirical results 4
 Family xviii, 4
- Benford set 10, 14, 31, 47, 67, 97, 154,
 165, 280, 316
 Creating a Benford set 163–165
- Benford's Law
 Number of records 20–21
 Data requirements 21–22
 Published papers 294, 311–313
- Berkshire Hathaway Inc. 263–264
 Biases in data 75–76, 142, 280, 316
- Bounds, upper and lower 152–153
 Bui, Kha 303–306
- Chi-square test 21, 153–156, 241,
 261, 288, 316
- Chinese culture 217, 224
 Chrysler 255–258
 Clinton, William J. 286–290
 City and town populations 8–9
 First-two digits 9
 Ordered logs 15, 161
 Mantissas 19–20
 Scale invariance 34–35, 113–114
 Multiplication by 1/X 42–43
- Base 8 63–65
 Summation test 90–92
 Second-order test 107–108,
 113–114
 Number duplications 121–122
 Last-two digits 131–132
 Manipulated data 140–142,
 145–146
 Distortion factor 145–146
 Conformity tests 151–152, 154,
 157–158,
- Continuous monitoring 115
 Control thresholds 79, 118, 174–175
 Corporate payments 26–28, 35–36,
 72–79, 92–94, 102–104, 119–120,
 130–131, 253–258
 County populations 8, 20, 234–237
 Creditor claims 248–255

- Da Vinci Code* 51
- Data
 - Minimum or maximum values 22, 182, 276–277
 - Lake data 28–31, 36–38, 274–280
 - Corporate payments data 26–28, 35–36, 72–79, 92–94, 102–104, 119–120, 130–131, 253–258
 - County populations 8, 20, 234–237
 - City and town populations 8–9, 14–15, 19–20, 34–35, 42–43, 63–65, 107–108
 - Journal-entry data 104–107
 - Last-two digit applications 130
 - Accounting data 200–207, 207–213, 216–244
 - Ledger balances 210–213
 - Streamflows 268–274
 - Creditor claims 248–259
 - Stock market returns 259–266
 - Interest income 281–282
 - Interest expense 284–286
 - Dividend income 283–284
 - Clinton tax returns 286–291
 - Payroll 295–297
 - Gifts to a college 297–300
 - Lehman's gifts 306–310
- Data profile 27, 29, 43–45, 72–73, 118, 316
- Dell Inc. 263–265
- Descriptive statistics 269–270, 275–276
- Diaconis, Persi 3, 4
- Digits
 - Table of expected proportions 6
 - General significant digit law 13
 - Prime 17, 104, 113, 234, 236, 271, 277, 304
 - Minor 17, 104, 234
 - Conformity to Benford 18
- Discriminant analysis 241–243
- Distortion factor model 138–146, 317
- Distributions, statistical 43–45, 99, 104
- Dividend income 283–284
- Divisional reports 210–213
- Earnings numbers 149, 205–209, 227
- Election results 132–135
- Error bars 201–204, 317
- Excel
 - Scientific notation 7
 - First digit formula 12
 - Random numbers 39–40, 61
 - Digit formulas 12, 52, 109, 135
 - Base 8 conversion 63
 - Record limit 73, 95, 110–113
 - Benford's Law tests 80–83
 - Filtering results 95, 125
 - Data import 107, 122
 - Pivot tables 123, 317
- Excel functions 80, 82, 95, 109, 110, 124, 135, 145, 150, 153, 168, 208, 239
- ExxonMobil 227–229
- Fibonacci sequence 51–53, 154, 317
- Fairfield Sentry 259–262
- First digits
 - Formulas 5, 52, 317
 - Too high level 74
- First-two digits test
 - Discussed 78–80, 317
 - Findings 78–79
 - Steps to calculate and graph 80
- Formulas 5
 - Excel and Access functions 80, 84, 109
- Forensic unit 210, 317
- Formulas
 - Digits 5, 52
 - Random numbers 39–40
 - Digits in base 8 63–65
- Fraud
 - Detection 115
 - Prevention 115
 - Expense account 172
 - Insurance 173
 - Administrative assistant 173
 - Vendor 174, 182–184
 - Payroll 175–177
 - Daily sales 177–181, 189–191
 - Health care claims 181–182

- Check fraud 184–187
- Electricity theft 187–189
- Corporate payments 191–193
- Income statement numbers 216–227
- Financial statement numbers 216–244
- General Electric 2, 22
- General Motors 230–233, 253–255, 259
- Geometric sequence 14, 21, 51, 53, 66–68, 97–99, 143, 160–163, 164, 317
- Histogram 30, 100–101, 272, 277–278, 284–285
- IBM 227–229
- IDEA 109, 153, 268, 270, 271, 273, 276, 277–278, 281, 282, 288, 289, 318
- Income tax evasion 79, 118, 139, 140–142, 173, 177, 178, 193–196, 313
- Income tax returns 286–290
- Individual tax model files 139, 194, 281
- Interest income 281–282
- Interest expense 284–286
- Internal Revenue Service 65, 221, 281
- Johannesburg Stock Exchange 237
- Johnson & Johnson 227–229
- Kaupthing Bank 249–251
- Kolmogorov-Smirnov 18, 157–158, 318
- Lake data 28, 36–38, 274–280
- Last-two digits test 129–138, 180, 191, 195–196, 211–212, 224–225, 282, 318
- Lehman Brothers 230–233, 259, 306–310
- Logarithm 14, 31–33, 161–163, 166, 318
- Tables 2
- Defined 10
- Mantissa 10, 13, 16–18, 19, 31–33, 38–41, 139, 161–163, 165–169, 280
- Characteristic 10, 139
- Ordered logs 15, 250–251
- Largest minus smallest 14, 21, 66–67, 163–164
- Test of the logarithms 56–57
- Logarithmic basis 10, 21, 23, 56, 160–163
- Lucas numbers 52, 53–55, 318
- Madoff
 - Trustee 248, 259
 - Victim list 248
- Mantissa 10, 13, 16–18, 19, 31–33, 38–41, 139, 161–163, 165–169, 280, 319
- Mantissa arc test 165–169, 274, 318
- Mean absolute deviation (MAD) 34, 81, 87, 100, 159–160, 319
- Critical values 159–160, 299
- Minitab 43–44, 100, 158, 243, 319
- Minor first-two digits 17, 104, 234, 319
- Multiplication
 - By a constant 31–33
 - By $1/X$ 42–43
 - By a continuous distribution 43–45
- My Law 295–300, 319
- $n!$ 69
- New York Stock Exchange 20, 178–179, 200, 202, 205, 221, 308
- Nigrini cycle template 80–83, 85, 94–95, 96, 101, 103, 107, 109–110, 136, 159,
- Nigrini, Mark xii, xviii, 45, 98, 99, 102, 103, 139, 144, 159, 174, 175, 210, 237, 268, 279, 281
- Nortel Networks 230–233
- Number duplication test 117–129, 180, 192–193, 282, 283, 288–290, 304–305, 308–309, 319
- Number invention 300–306
- Pareto principle 50, 273
- Payables, trade 253–254

- Payments, before bankruptcy 253–254, 255–258
- Payroll fraud 119, 175–177
- Ponzi scheme 247, 252, 319
- Power law 50, 273, 278–280, 320
- Predictors 210
- Primary tests 71, 320
- Prime first-two digits 17, 104, 113, 234, 236, 271, 277, 304, 320
- Procter & Gamble 227–229, 233
- Published papers 294
- Purchasing cards 79

- Raimi, Ralph A. xiv, xviii, 25–26, 161, 310
- Random numbers 39–42, 43–44, 60–62, 100–102,
- Rounding-up 76
- Round numbers 129, 130, 184, 211, 254–255, 256, 277, 282, 283, 289, 299, 308–309
- Runs test 271–271, 276, 320

- S&P 500 260–262
- Scale invariance 31–33, 34–38, 113–114, 139, 313, 321
- Schenectady Torch Club 2
- Scientific American 4
- Scientific notation 7, 321
- Second digits
 - Formula 5, 76, 321
 - High-level test 75–76, 179
 - Biases in accounting numbers 206–207, 216–217
- Second-order test 97–115, 233–237, 257–258, 309, 321
- Sequences 55–58, 321
 - Geometric 14, 21, 51, 53, 66–68, 97–99, 143, 160–163, 164
- Primes 69
- Significance 144–145, 150–153, 157, 167–169, 272
- Significand 7, 38, 69, 321
- Slope of the line 18, 20, 47, 162–163, 321
- Smithsonian, Science Service 2
- Spikes 27, 36, 37, 59, 76–77, 78, 90–93, 102–103, 105, 108, 113, 117, 118, 120, 140, 142, 150–153, 175–177, 180, 182, 184, 192, 211–213, 219–221, 236, 238–239, 250, 264, 277, 283, 296, 300, 304, 308, 309
- Stock market returns 259–266
- Streamflow data 268–274
- Summation
 - Theorem 65–69, 322
 - Test 89–97
- Link to number duplications 118
- Results 212–213, 273–274, 282, 284, 309–310
- The Law of Anomalous Numbers 2–4, 25, 97
- Trigonometric functions 167

- Uniform distribution
 - Data 38–42, 322
 - Mantissas 11, 13, 16–18, 19–20, 163, 165–169
 - Ultimate uniform 60–62
- U.S. Census Bureau 8
- U.S. Geological Survey 268

- Waxenberg 252–253

- Z-statistics 81–82, 87, 15, 150–153, 182, 216, 219, 238, 248, 262, 271–272, 277, 322
- Zipf's Law 46–50, 322