

## Task Index

- whole numbers, *see also* number theory  
arithmetic expressions (sixth grade,  
France, 2002), 306  
division into buses (NAEP, 1983), 69,  
70  
mental arithmetic (sixth grade, France,  
2002), 306  
next-term problem, 39, 40  
setting up problem (sixth grade,  
France, 2002), 307  
subtraction  
equivalent problems, 10  
explaining (California, 1873), 131  
maximizing difference (PISA), 321  
time (sixth grade, France, 2002), 306  
word problem, 70
- decimals, *see also* percent  
arithmetic expressions (sixth grade,  
France, 2002), 306  
comparison (sixth grade, France,  
2002), 306
- mental arithmetic  
(California, 1875), 128  
(sixth grade, France, 2002), 306
- fractions  
addition, 255–258, 266  
and percentages, 217, 226  
comparison, 196–197, 204–207, 225,  
227–232, 238–240  
(California Standards Test), 207  
density, 236  
division, 131, 214  
equivalence, 220–227, 234–238, 240,  
243, 244  
estimation, 240, 241, 265, 266  
explaining computations  
(California 2006), 194  
(California, 1873), 131  
improper, 258–262  
multiplication, 214, 215  
nested, 263–265  
on number line, 232–238, 241–243

- choose representative (California Standards Test), 207
  - mark position, 208–211
  - write equivalent, 6
- part-whole representation, 218–226, 245–250
  - sharing pizza, 197–200
- pie chart, 197–200, 228, 229, 231, 264
- proof (California, 1875), 128
- reduction, 215, 251–255
- subtraction, 258–263
- using cards to make, 204–207
- word problems
  - (California 2006), 193
  - mixing paints, 201–202
- percent
  - (California, 1992), 49
  - and fractions, 217, 226
  - interest rate, 102
  - national defense budget, 103
  - traffic increase, 202–203
- proportions
  - completing job
    - (Japan, 1995), 133
    - lawn mowing, 144
    - potato eating (California, 1875), 128
    - wall building (California, 1875), 128
  - mental arithmetic (California, 1875), 128
  - poster, 142
- geometry and measurement
  - areas (France), 294
  - classroom size, 51
  - describing a figure, 92
  - distance, 80, 103
    - on map, 99
  - drawing (sixth grade, France, 2002), 308
  - inscribe a square in a circle, 93
  - inscribe a square in a triangle (Pólya), 65
  - moorish star, 108–110
  - parallel lines, 348–350
  - perimeter, 321, 346
  - recognizing rectangles (sixth grade, France, 2002), 308
  - reflection (France), 294
  - rotation, 44
  - scaling, 142
  - square peg, 93
  - three-dimensional
    - camera viewpoint, 106–107
    - card-folding, 80
    - designing a tent, 81
    - pyramid proof (Michigan, 1899), 132
    - quadric (Baccalauréat, 2003), 301
    - string around rod, 104
  - triangle
    - inequality, 80, 103
    - may-pole (California, 1875), 128
    - proof (TIMSS, 1995), 126
    - rolling (CAP), 358
    - sum of angles, 79
- algebra and functions
  - absolute value (NBPTS, 2005), 131
  - analyzing expressions, 161
  - analyzing table (Praxis, 2005), 129
  - determining expressions (France), 304
  - exponential, 120–121
  - formulating expressions, 103, 116–120
    - chocolate boxes, 90
    - hexagonal patterns, 147–148
    - ice-cream van, 89
    - number of ancestors, 120–121
    - paintings (Wisconsin 1998), 133
    - paper cups, 182–187
    - party flag, 174, 175
    - shopping carts/baskets, 182–187
    - square patterns, 169–171
    - table to function (NBPTS, 2005), 130
    - traffic lights, 90
  - graphs
    - cost of taxi ride (NBPTS, 2005), 130
    - economy, 122, 123
    - rope, 173, 174

- world population (sixth grade, France, 2002), 307
- linear equations
  - and distributivity, 362
  - cancellation, 166
  - completing job (California, 1875), 128
  - ice-cream van, 89
  - mental solution (California, 1875), 128
  - prices, 134
  - sum of angles of triangle, 79
- linear functions, 182–185
- number machines, 168, 169
- patterns
  - arithmetic sequences, 182–185
  - arrays of squares, 169–171
  - chocolate boxes, 90
  - sums of consecutive addends, 79
- plotting and solving (France), 304
- plugging in values, 189, 321
- polynomials, 101
- calculus
  - differential equations (Baccalauréat, 2003), 302–303
  - integration, 159, 305
  - sequences (France), 304
- complex variables (Baccalauréat, 2003), 300
- logic
  - boys and girls (sixth grade, France, 2002), 307
  - choosing a contender, 91
  - college acceptance (CAP), 359
  - four cards/envelopes/drinkers, 178–182
  - fractions proof (California, 1875), 128
  - next-term problem, 39, 40
  - pyramid proof (Michigan, 1899), 132
  - sums of consecutive addends, 79
  - triangle proof (TIMSS, 1995), 126
- modeling
  - growth of bacteria (Baccalauréat, 2003), 302–303
- number theory
  - divisibility, 171, 173 (Praxis, 2005), 129
  - modular arithmetic (France), 301, 305
  - numbers with 1 as only digit (France), 305
- statistics and probability
  - average, 102
  - choosing a contender, 91
  - choosing a route (CAHSEE, 2004), 337
  - college acceptance (CAP), 359
  - false positive paradox, 122
  - risk evaluation, 93
- theory and practice of teaching
  - engaging pupils (California, 1875), 132
  - justifying algorithms
    - arithmetic (California, 1875), 128
    - pyramid formula (Michigan, 1899), 132
  - oral reading (California, 1875), 128