Index

A Acute angle, 94 Adding decimal numbers, 47, 48 fractions, 210–213, 237–239, 241 integers, 310–322 mixed numbers, 245–248 Addition statement, 246, 248 Airport design, 88, 93, 99, 107, 121, 125	Carroll diagram, 202 Cartesian plane, 4–8; see also Coordinate grid Celsius temperature scale, 314 Central angle, 292 Centre of rotation, 19, 22, 23, 24 Chinese fractions, 255 Circle graph creating, 292–295 interpreting, 287–289 Circles	Coordinate grid, 4–8 drawing designs on, 12–17 horizontal and vertical movement, 30–33 identifying points on, 6 math game, 40 patterns on, 372–373 plotting points on, 7, 374, 375 transformations, 18–24 Coordinates, 5, 6 Cross-number puzzles, 386
Analysing data, 457 Angle bisector, 94–97 Angles in circles, 293, 295 Animating a transformation, 41 Area of a circle, 280–284 of a parallelogram, 100–104 of a triangle, 108–112 Ascending order, 128 Average, see Mean B Babylonian numbers, 259 Bar notation, 135, 137, 353 Base, 101 Base 10 diagrams, 62–63, 127 Bead designs, 2, 17, 29, 39 Bimodal data, 424 Bisect, definition, 89	Circles area, 280–289 circumference, 273–277 diameter, 269–270, 273–275, 277 drawing, 268–270 games, 302, 307 pi (π), 274–276, 277 radius, 268, 270, 276, 277, 282 sum of angles, 293, 295 Winners' Circle design, 303 Circumference, 273–275 Climate graph, 16 Code, 195, 388, 394, 401, 407, 413, 417 Common denominators adding and subtracting fractions, 239–241 adding mixed numbers, 248	Data analysing, 457 game, 456 outlier, 435, 436, 437, 440–444 range for data sets, 434–437 reading sports data, 132–134, 322, 335, 345, 436 see also Measures of central tendency Decimal numbers adding and subtracting, 47, 48 changing to fractions, 136, 137 converting fractions to, 128, 132–135, 137
Bisector, <i>see</i> Angle bisector; Perpendicular bisector Brackets in order of operations, 68, 69, 70 C Calculator, 56, 64, 69, 135, 353 Calendars, 348, 356, 357, 364, 371, 381 Card game, 150	defined, 231 finding, 230–233 subtracting mixed numbers, 254–255 Common factors, 203, 204 Compass, 90, 95, 269 Consecutive numbers, 322 Constant defined, 360 in expressions and equations, 390–391, 392	dividing, 60–64 multiplying, 52–56 order of operations, 68–70 and percents, 128, 132–135 Decimals placing decimal point by estimation, 46, 53, 61, 64 repeating decimals, 135, 137, 353, 354 terminating decimals, 136 Descartes, René, 4 Descending order, 128

Designs airport, see Airport design bead designs, 2, 17, 29, 39 drums, 272 magazine design, 265 mandala, 271 medallions, 303 mosaics, 227 Olympic rings, 268 on a coordinate grid, 12–17 Diameter, 269–270, 273–275, 277 Dividing decimal numbers, 60–64	Estimates, 44–45 fractions, 210, 213, 217 front-end estimation, 46, 48, 56 overestimate and underestimate, 45 percents, 124–125, 136, 137, 141 placing decimal point, 46, 53, 61, 64 percents, 124–125, 136, 137 Even numbers, 199 Experimental probability, 183–186	Fractions adding, 210–213, 237–239, 241 challenge in real life, 227, 265 changing to decimals, 132–135, 137 changing terminating decimals to, 136, 137 Chinese, 255 compared with decimals and percents, 128 Egyptian, 228, 236, 244, 251 estimating, 210, 213, 217
opposite operation, 404 understanding division, 61 Divisibility, 198–206 definition of divisible, 199 determining factors, 203 divisibility rules, 199–201 finding multiples, 232 lowest terms of a fraction, 204–205, 206, 212, 213 sorting numbers, 202 Double prime, 32 Drums, 266, 272, 279, 286, 301 E Egyptian fractions, 228, 236, 244, 251 Equations	Expressions, 358, 360, 361 difference from equations, 390–392 evaluating, 366, 368 modelling, 365, 368, 390 F Factors common factors, 203, 204 greatest common factor, 203, 205 writing a fraction in lowest terms, 204–205, 206 Favourable outcome, 160, 161, 162 Flags Maritime signal, 16 national, 12, 14	finding common denominators, 230–233 games, 264 improper fractions, 246, 256, 265 and percents, 128, 132–134, 136 subtracting, 217–219, 240–241 with unlike denominators, 237–241 writing in lowest terms, 204–205, 206, 212, 213 see also Divisibility; Factors; Mixed numbers Frequency table, 424, 425 Front-end estimation, 46, 48, 56, 64
defined, 391, 392 difference from expressions, 390–392 inspecting to solve, 396, 397, 398, 403 modelling problems, 390–392, 395–397, 402–403, 408–410 solving one-step equations, 395–398, 402–405 solving two-step equations, 408–411 writing, 392	Foldables™, 3, 5, 43, 81, 123, 157, 197, 198–201, 229, 267, 309, 349, 389, 421 Formulas area of a circle, 281–284 area of a parallelogram, 100–104 area of a triangle, 108–112 circumference of a circle, 274–277 Fraction bar, 248 Fraction converter, 151 Fraction strips, 238, 240, 252–253, 254	Games and probability, 177–180, 182, 193, 194, 302 Graphing linear relations, 372–377 Graphs, 374, 375 linear relations, 372–377 plotting ordered pairs, 7, 374, 375, 377 Greatest common factor, 203, 205 Grid, see Coordinate grid

Height of a parallelogram, 101, 104 Horizontal and vertical movement, 30–33 Hundreds grids, 47, 54–55 Hurricane Katrina, 11 Improper fractions, 246, 256, 265 Independent events, 166, 168 applications of, 177–180 probabilities of, 171–174 Integer chips, 311–313, 323–327 Integers adding, 310–322 applying operations, 336–339 integer word game, 346 opposite, 311, 313 subtracting, 323–335 virtual reality game, 347 writing and reading integer sums, 311 K Kwanzaa, 362 L Line of reflection, 21, 24 Linear relations, graphing,	Mean (continued) effect of outliers, 442, 443, 444 making predictions, 430 trimmed mean, 445 Measures of central tendency, 423 choosing the best, 446–449 defined, 423 effects of outliers, 440–442 see also Mean; Median; Mode Median, 422–425 comparing with mean, 448, 449 determining, 423, 442, 443 effect of outliers, 442, 443, 444 working with, 424–425 Mira, 84, 85, 91, 96 Mixed numbers adding, 245–248 defined, 245 with like denominators, 245– 246, 248, 252–253, 256 subtracting, 252–256 with unlike denominators, 247–248, 254–255, 256 Mode, 422–425, 448 determining, 423 working with, 424–425 Modelling adding fractions, 211 adding mixed numbers, 245–	Multiplication decimal numbers, 52–56 opposite operation, 404–405 N Number lines adding integers, 316–319 estimating, 64 subtracting integers, 330–333 Number pattern, 353 Numerical coefficient, 360, 390–392 O Obtuse angle, 95 Odd numbers, 199 Odometer, 45 Opposite integers, 311, 313 Opposite operation, 397, 398, 404–405 Order of operations and decimal numbers, 68–70 reverse, 410, 411 Ordered pair, 6–8 plotting, 7, 374, 375, 377 Origin in coordinate grid, 4, 5 Outcomes favourable, 160, 161, 162 organizing, 165–168, 171– 174, 177–180 predicting, 159–160, 171–174, 178–180
Linear relations, graphing, 372–377	=	_
Logo, 131, 155 Lowest terms of a fraction, 204–205, 206	62–63 expressions, 365, 368, 390 finding a percent, 127	defined, 435 effects, 440–444 Overestimate, 45
Magic squares, 315 Maritime signal flags, 16 Maze, 120 Mean calculating, 428–429, 431, 442, 443 comparing with median, 448, 449	problems with equations, 390–392, 395–397, 402–403, 408–410 subtracting fractions, 218 subtracting mixed numbers, 252–253 Mosaics, 227 Multiples and common denominator, 231, 232, 233, 248, 254	Palliser's Triangle, 108, 111 Paper folding to check an angle bisector, 96 to check parallel lines, 84 to check perpendicular lines, 85

Paper folding (continued) to find common denominator, 231, 233 to find a pattern, 350–351 Parallel lines, 82–83, 86 drawing parallel line segments, 84 identifying parallel line segments, 82, 83 Parallelogram area, 100–104 defined, 100 height, 101, 104 Pattern blocks and fractions, 210–211, 217–218, 237 and mixed numbers, 245–246, 247 Patterns defined, 350 describing, 350–354, 360–361, 374–375, 377 graphs of linear relations, 372–377	Pi (π), 274–276, 277 Pie chart, see Circle graph Place value, 47 Plotting ordered pairs, 7, 374, 375, 377 Plus/minus score, 308, 322, 325, 345 Pool game, 121 Prime, 19 Probability comparing, 158–159 determining, 161, 171–174, 177–180 experimental and theoretical, 183–186 games, 177–180, 182, 193, 194, 302 independent events, 166, 168, 171–174 organizing outcomes, 165–168, 172–174, 178–180 predicting outcomes, 159–160 using outcomes to predict,	Relative size estimation, 46, 48, 56 Repeating decimals, 135, 137, 353, 354 Reverse order of operations, 410, 411 Right triangle, 84, 91 Rotation, 19, 22–23, 24 Rounding, 79, 142 S Sample space, 166 Sector, 287 Sorting numbers using divisibility rules, 202 Spider diagram, 167 Spreadsheet, 185–189, 294, 295 Subtracting decimal numbers, 47, 48 fractions, 217–219, 240–241 integers, 323–335 mixed numbers, 252–256 Subtraction statement, 253,
number patterns, 353 shapes, 352 Percents	171–174, 178–180 Protractor, 85, 96, 293 Puzzles, 386, 418	254–255 Sudoku, 53
applying, 140–142 calculating, 142 in circle graphs, 287–289 and decimals, 128 estimating, 124–125, 136, 137, 141 finding, 126–127 and fractions, 128, 132–134, 136 meaning, 124 Perpendicular bisector, 89–92 Perpendicular line segments, 82–83, 86 defined, 83 drawing perpendicular segments, 85 identifying perpendicular segments, 83	Quadrants, 5, 8 Quotient, 200 R Radius, 268, 270, 276, 277, 282 Random event, 171 Random number generator, 185 Range for data sets, 434–438 calculating, 435 defined, 435, 437 Reading coordinates, 6 Reading prime, 19 Reflections, 19, 21, 24 Regrouping mixed numbers, 254–255 Relationships describing patterns with, 375, 376	Table of values, 367 Tables interpreting outcomes, 165–166, 173–174, 179–180 Tally chart, 183, 184, 186 Temperature, 314, 318 Terminating decimal, 136, 137 Theoretical probability, 184–186 Time zones, 323 Transformations, 18–24 animating a transformation, 41 in a bead design, 29 Translation, 24 on a coordinate grid, 18, 20 3–D drawings, 20 Translation arrow, 20

Tree diagram, 167, 172, 178–179 Triangles area, 108–112 right triangle, 84

U

Underestimate, 45 Unit fractions, 244

V

Value defined, 360

Variable, 358–359, 360, 361, 390–391, 392 isolating, 397, 398, 409
Venn diagram, 202
Vertex (plural vertices) naming with ordered pairs, 14 of a shape on a grid, 13, 32, 33
Vertical movement, 30–33

W

Wind chill, 337-338

X

x-axis, 4, 5, 8 *x*-coordinate, 5, 6, 7, 8

Y

y-axis, 4, 5, 8 *y*-coordinate, 5, 6, 7, 8

Z

Zero as placeholder, 46 Zero pair, 310, 313, 327