

INDEX

A

- Abscissa, 76
Absolute value, 6–7, 55
Absolute value function, 382–386
transformations of,
reflection, 386
scaling, 386
translation, 385–386
Accuracy, 31
Acute angle, 249
Acute triangle, 263
Addition, 38
of algebraic expressions, 168–171
of algebraic fractions, 550–554
associative property of, 47–48
commutative property of, 47
distributive property of
multiplication over, 48–49
of radicals, 487–489
of like radicals, 487
of unlike radicals, 488–489
of signed numbers, 54–58
with opposite signs, 56–58
with same signs, 54–55
verbal phrases involving, 89
Addition method in solving systems of
linear equations, 416–420
Addition property
of equality, 118
of inequality, 147–148
of zero, 49–50
Additive identity, 49–50
Additive inverse (opposite), 50
Adjacent angles, 250
Adjacent side of an angle, 307
Algebraic equation, 565
Algebraic expression(s), 89
addition of, 168–171
evaluating, 100–102
subtraction of, 168–171
terms in, 95–96, 168
like, 123, 168
unlike, 123, 168
translating verbal phrases into,
89–90, 92–93
writing in words, 98–99,
Algebraic fraction(s), 540
addition of, 550–554
division of, 548–549
multiplication of, 545–547
subtraction of, 550–554
Algebraic solution of quadratic-linear
system, 529–531
Alternate exterior angle(s), 259
parallel lines and, 260
Alternate interior angle(s), 258
parallel lines and, 259
Angle(s), 248–249
acute, 249
adjacent, 250
alternate exterior, 259
alternate interior, 258
base, 265
classifying triangles according to,
263
complementary, 250–251
congruent, 252
consecutive, 272
corresponding, 259
cosine of, 317
definition of, 248
of depression, 313
of elevation, 313
exterior, 258
interior, 258
on the same side of transversal,
259
linear pair of, 252
measuring, 248
obtuse, 249
opposite, 272
pairs of, 250–254
perpendicular, 249
parallel lines and, 258–261
parallelograms and, informal proofs,
274–275
polygons and, 275
of quadrilaterals, 273
right, 248
sides of an, 248
sine of, 317
straight, 249
sum of the measures of,
for polygons, 275
for triangles, 263–265
supplementary, 251
tangent of, 308
types of, 248–249
vertical, 252–253
Angle bisector, 271
Approximation, 20–21
of numbers, 469
rational, 20, 477–478
Area
of irregular polygons, 279–280
surface, 282–284
Arithmetic
averages in, 680
order of operations in, 38–43
Arithmetic mean, 681
Ascending order, polynomials in, 170
Associative property
of addition, 47–48
of multiplication, 48
Average(s). *See also* Central tendency
in arithmetic, 680
numerical, 681
in statistics, 680–681
Axiom (postulate), 246
Axis, graphing line parallel to, 352–353
Axis of symmetry of the parabola, 510

B

- Bar (fractional line), 41
Base(s),
in geometry,
angles of an isosceles triangle, 265
of a prism, 282
of a trapezoid, 275
of an isosceles triangle, 265
in number theory,
division of powers with the same,
186–187
of exponents, 39–40
multiplication of powers with the
same, 173–174
in percent, 227
powers of, 95–96
Bias, 662
Biased object, 579
Bimodal data, 683
Binary operation, 38
Binomial(s), 169
division of polynomial by, 200–201
multiplication of, 454–455
Bisector
angle, 271
perpendicular, 271
Bivariate statistics, 710–720
causation, 711–715
correlation, 711–715
line of best fit, 715–720
extrapolation, 717
interpolation, 717

Bivariate statistics, line of best fit *cont.*
 regression line, 715
 scatter plot, 710–715
 time series, 715

Blinding, 663

single-blind experiments, 663
 double-blind experiments, 664

Box-and-whisker plot, 699–701
 Brackets, as grouping symbol, 41

C

Calculated probability, 585. *See also*
 Theoretical probability

Calculator,

algebraic expressions,
 entering variables, 101–102, 130
 equations,
 intersect feature, 526–527
 solving systems of equations, 414,
 526–527

testing for equality, 129–130, 218
 graphing functions on, 349–350, 352

absolute value, 384

CALC, 513–514

exponential, 390

quadratic, 512–515

TBLSET, 515

TRACE, 349–350, 414

vertex, finding, 512–514

ZOOM, 349–350

number theory,

additive inverses (opposites), 50
 decimals, 13–14

converting to a fraction, 52,
 209–210

FRAC, 52, 209–210

exponents, 40, 67

fractions,

comparing, 12

converting to a decimal,
 13–14

mixed, 57–58

grouping symbols, 42–43

multiplicative inverses

(reciprocals), 51

negative symbol, 61

numerical expressions, 3–4

reciprocals, 51

roots,

general, 472–475

square roots, 18–19

scientific notation, 193–195

squaring numbers, 18, 470–472

probability,

combinations, 642

factorials, 628–629

permutations, 631–634

statistics,

1-Var Stats, 684, 695

box-and-whisker plot, 700

five statistical summary, 700

frequency histogram, 676–678

line of best fit, 715–716

mean, 684

median, 684

scatter plot, 711–712

trigonometry,

cosine ratios, 319–320

degree mode, 309

sine ratios, 319–320

tangent ratios, 308–311

Cancellation, 542

Cancellation method, 545

Cards, standard deck of, 580

Causation, 711

Check, in solving equations, 119

Census, 662

Center of a sphere, 286

Central tendency (average), 690–695

and linear transformations, 686

mean, 681

for grouped data, 691–692

for intervals, 694–695

median, 681–682

for grouped data, 691

for intervals, 694

mode, 682–683

for grouped data, 690

for intervals (modal interval), 693

Certainty, 591

Closure, property of, 45–47

Coefficient, 95

Combination(s), 639–644, 646

comparing permutations and, 639–641

relationships involving, 641–644

Commas in verbal phrases, 90

Common denominator, 551

Common fraction, 13

Common monomial factor, 447

Commutative property

of addition, 47, 170

of multiplication, 47

Compass, 270

Complement of a set, 73

Complementary angles, 250–251

Completeness property of real

numbers, 25

Composite number, 39, 443

Compound event, 609

Compound interest, 389

Computations with more than one

operation, 41

Conditional equation, 117

Conditional probability, 619–623

Cone, volume of, 288

Congruent line segments, 265

Congruent angles, 252

Consecutive angles, 272

Consistent system of equations,

410–411

Constant of variation, 222

Constant ratio, 222

Construction, geometric, 270

angle bisector, 271

congruent angles, 270

congruent line segments, 270

perpendicular bisector, 271

Continued ratio, 209–210

Control group, 663

Convergence, 579

Coordinate axes, 75

Coordinate plane, 75

locating a point on, 76–77

Coordinates of a point, 76

finding on a plane, 77–78

Correlation, 711–715

Corresponding angles, 259

parallel lines and, 259–260

Cosine of an angle, 317

Cosine ratio, 318

applications of, 323–324

finding, on calculator, 319–320

Counting numbers, 2, 11

Counting principle, 610–611, 612

Cross-multiplication, 217

Cross-product, 217

Cube root, 472

Cumulative frequency, 702–703

Cumulative frequency histogram,

703–707

Cumulative relative frequency, 578–579

Cylinder(s)

right circular, 283

surface area of, 283

D

Data, 661

collection of, 661–665

bias, 662

sampling, 662

techniques of, 662–663

grouped, 668–670, 690–695

organization of, 667–672

frequency distribution table, 668

grouped data, 668–670

cumulative frequency, 702–703

types of,

univariate, 710

bivariate, 710

qualitative, 661

quantitative, 661

visualization of data,

interpreting graphs of data, 664–665

types of,

box-and-whisker plot, 699–701

cumulative frequency

histogram, 703–707

scatter plot, 711–714

stem-and-leaf diagram, 670–672

histogram, 675–678

Decimal(s)

equivalent, 586–587

expressing as rational numbers, 15

expressing rational numbers as, 13–14

in ordering real numbers, 26

periodic, 14

repeating, 14, 17, 587

terminating, 14, 586

Decimal fraction, 13

Decimal notation, changing scientific

notation to, 193–195

Decrease, percent of, 230

Degree, 248

Denominator

common, 551

least common (LCD), 552

Dependent system of equations, 412–414

Dependent events, 617

Dependent variable, 341

Depression, angle of, 313

Descending order, polynomials in, 170

Descriptive statistics, 661

Diagram

stem-and-leaf, 670–672

tree, 609–611, 627

Diameter of a sphere, 286

Die, 580, 584

rolling of fair, 596

- Difference of two perfect squares, factoring, 452–453
- Digits, set of, 3
significant, 29–32, 144–145, 195, 280, 284, 289, 304
- Dimensional analysis, 234
- Direct measurement, 301
- Direct variation, 222–224
constant of, 222
equation of, 375
graphing, 374–376
- Directly proportional, 222
- Disjoint sets, 72
- Distance formula, 136
- Distributive property, 48–49
of multiplication over addition or subtraction, 168, 178, 183
- Division, 4, 38
of fractions, 548–549
of a monomial by a monomial, 197–198
of a polynomial
by a binomial, 200–201
by a monomial, 198–199
of powers that have the same base, 186–187
of signed numbers, 68–70
of square-root radicals, 494–495
verbal phrases involving, 90
- Division property of equality, 118
of a fraction, 541
- Domain, 89, 151
of a function, 341
of an inequality, 151
of an open sentence, 104–105
of a relation, 339
- Double-blind experiment, 664
- Double root, 506
- E**
- Elevation, angle of, 313
- Empirical probability, 576–581
- Empirical study, 577, 579
- Empty set, 3, 72
- Endpoint(s), 247–248
of a ray, 247
of a segment, 247
- Equality
addition property of, 118
division property of, 118
multiplication property of, 118
properties of, 117–119
subtraction property of, 118
- Equally likely outcomes, 586
- Equation(s), 117
conditional, 117
equivalent, 117
left side of, 117
right side of, 117
root of, 117
simplifying each side of, 122–126
solving linear,
with more than one operation, 117–121
with the variable in both sides, 128–132
solution set of, 117
systems of,
linear, 416–420, 422–424
quadratic-linear, 529–531
writing linear
given slope and one point, 402
given the intercepts, 407–409
given two points, 404–405
- Equiangular triangle, 263
- Equilateral triangle, 265, 266
- Equivalent decimals, 586–587
- Equivalent equations, 117
- Equivalent fractions, 541
- Equivalent inequalities, 151
- Equivalent ratios, 208–209
- Error, 227
in geometric calculations, 289–290
percent of, 227–229
relative, 228
- Estimation, radicals and, 477–478
- Evaluating an algebraic expression, 100–102
- Event(s), 584
compound, 609
dependent, 617
favorable, 584
independent, 611–612, 618
mutually exclusive, 600–603
probability of an, 592
singleton, 585, 590
unfavorable, 584
- Everywhere dense, 12
- Experimental design, 663–664
- Experiment(s), 579, 663
double-blind, 664
in probability, 579–581
single-blind, 663
- Exponent(s), 39, 40, 95–96
negative integral, 189–190
zero, 188–189
- Exponential decay, 389
- Exponential function, 387–391
exponential decay, 389–391
exponential growth, 388–391
- Exponential growth, 388
- Expression. *See* Algebraic expression(s); numerical expressions
- Exterior angle(s), 258
alternate, 259
- Extraneous solutions, 565
- Extrapolation, 717
- Extremes, of a proportion, 216
- F**
- Face, of a solid, 282
- Factorial n , 628
- Factorial symbol (!), 628
- Factoring, 443–445
a number, 443
over the set of integers, 443–445
a polynomial, 447,
completely, 461–463
the difference of two perfect squares, 452–453
trinomials, 457–460
solving quadratic equations by, 503–507
- Factor(s), 39, 443
common monomial, 447
greatest common, 444–445
greatest common monomial, 447
of a term, 95
- Fair and unbiased objects, 579
- Favorable event, 584
- Finite set, 3, 339–340
- First-degree equations in one variable, 122
graphing, 346–350, 370–373
parallel to axes, 352–353
solving
with more than one operation, 117–121
with the variable in both sides, 128–132
- systems of,
consistent, 410–411
dependent, 412–414
inconsistent, 411
independent, 411
solving,
graphically, 410–414
using substitution, 422–424
using the addition method, 416–420
writing
given slope and one point, 402
given the intercepts, 407–409
given two points, 404–405
- First-degree inequalities in two variables, graphing, 378–381
- First quartile, 698
- Five statistical summary, 699
- FOIL method, 183
in multiplication of binomials, 454
in multiplication of polynomials, 183
- Formula(s), 107, 143
distance, 136
in problem solving, 134–137
for surface area, 293
transforming, 143–145
for volume, 293
writing, 107–108
- Fractional coefficients
solving equations with, 556–559
solving inequalities with, 562–563
- Fractional equation(s), 565
solving, 565–567
- Fractional expression, 540
- Fraction line, as grouping symbol, 41
- Fraction(s)
addition of, 550–554
algebraic, 540
common, 13
decimal, 13
division of, 548–549
division property of, 541
equivalent, 13–14, 541, 216
lowest terms, 541
multiplication of, 545–547
multiplication property of a, 542
reducing to lowest terms, 541–543
subtraction of, 550–554
writing probability of events as, 586
- Frequency distribution table, 668
- Frequency histogram, 676
cumulative, 703–707

Function, 341. *See also* Absolute value function; Exponential function; Linear function; Quadratic function
 domain of a, 341
 range of a, 341

G

Geometric calculations, error in, 289–290
 Geometry
 angles in, 248–249, 258–261
 areas of irregular polygons in, 279–280
 half-lines in, 247
 line segments in, 247
 lines in, 246–247
 parallel lines in, 258–261
 perpendicularity in, 249
 planes in, 246
 points in, 246
 quadrilaterals in, 272–276
 rays, 247–248
 surface areas of solids in, 282–284
 triangles in, 262–267
 undefined terms in, 246
 volumes of solids in, 286–290
 Graph(s),
 interpreting, 664–665
 of ordered pairs, 76, 610
 of a point, 6
 of a polygon, 78–79
 and root finding, 522–524
 of sets,
 intersection, 153–154
 union, 154–155
 and solving systems of equations,
 linear, 410–414
 quadratic-linear, 525–527
 types of,
 absolute value, 382–386
 direct variation, 374–376
 exponential, 387–391
 inequalities, 378–381
 linear, 346–350, 352–353, 370–373
 quadratic, 508–516
 Graphic solution of a quadratic-linear system, 525–527
 Graphing calculator. *See also* Calculator
 Greatest common factor (GCF),
 444–445
 Greatest common monomial factor,
 447
 Greatest possible error (GPE), 29
 Grouped data, 668–670
 calculator solution for, 692–693
 mean of a set of, 691–692
 measures of central tendency and,
 690–695
 median of a set of, 691
 mode of a set of, 690
 Grouping symbols
 expressions with, 41–43
 multiplication and, 179–180
 Group mode, 693
 Group, 669

H

Half-line, 247
 Half-plane, 378

Histogram, 675–678
 cumulative frequency, 703–707
 frequency, 676
 Horizontal number line, 6
 Hypotenuse, 263, 301, 307

I

Identity, 117
 additive, 49–50
 multiplicative, 50, 179
 Identity element
 of addition, 49–50
 of multiplication, 50
 Impossibility, 591
 Inconsistent system of equations, 411
 Increase, percent of, 230
 Independent events, 611–612, 618
 Independent system of equations, 411
 Independent variable, 341
 Index, of a radical, 473
 Indirect measurement, 301
 Inequalities
 domain (replacement set) of, 151
 equivalent, 151
 finding and graphing the solution of,
 151–155
 with fractional coefficients,
 562–563
 graphing first-degree,
 in one variable, 151–155
 in two variables, 378–381
 systems of, 431–434
 in problem solving, 157–159
 properties of, 146–149
 addition, 147–148
 multiplication, 148–149
 order, 146–147
 transitive property, 147
 solution set of, 151
 symbols of, 7–8
 verbal phrases involving, 157–159
 Infinite set, 3, 340–344
 Integer(s), 2–8
 ordering, 6
 set of, 4–5
 subsets of, 5
 Intercept form of a linear equation, 367
 Intercept(s)
 of a line, 366–367
 writing equation given, 407–409
 Interest, compound, 389
 Interior angle(s), 258
 alternate, 258
 on the same side of the transversal,
 258
 Interpolation, 717
 Intersection of sets, 71–72, 597
 graphing, 153–154
 Interval, 669
 containing the mean, 694–695
 containing the median, 694
 containing the mode (modal interval), 693
 Interval notation, 151–152
 Inverse operation, using, in dividing signed numbers, 68–69
 Inverse
 additive, 50
 multiplicative, 51–52, 548

Irrational numbers, 17–23
 basic rules for radicals that are,
 478–481
 radicals and, 476–481
 set of, 17–18
 Irregular polygons, area of, 279–280
 Isosceles trapezoid, 276
 Isosceles triangle, 265–266
 base angles of, 265
 base of, 265
 legs of, 265
 vertex angle of, 265

L

Latitude, 75
 Leaf, in a stem-and-leaf diagram, 670
 Least common denominator (LCD), 552
 Left member of an equation, 117
 Left side of an equation, 117
 Legs
 of isosceles triangles, 265
 of right triangles, 263, 307
 Letters, using, to represent numbers,
 89–90
 Length of a line segment, 247
 Like radicals, 487
 addition of, 487
 subtraction of, 487
 Like terms (similar terms), 123, 168
 Line, in geometry, 246–247. *See also*
 Linear function
 Line of best fit, 715–720
 Line segment, 247
 Linear equation, 347. *See also* First-degree equation
 Linear function,
 graphing,
 using slope, 370–373
 using solutions, 346–350
 intercepts of, 366–367
 x-intercept, 366–369
 y-intercept, 366–369
 slope of, 355–360
 finding, 355–357
 parallel, 258–261, 352–353, 363
 perpendicular, 249, 364–365
 transformations of,
 reflection, 372
 scaling, 372
 translation, 372
 Linear growth, 387
 Linear pair of angles, 252
 Linear regression. *See* Bivariate statistics
 Linear system of equations, 410
 solving,
 addition method, 416–420
 graphically, 410–415
 substitution method, 422–424
 types of,
 consistent, 411
 dependent, 412
 inconsistent, 411
 independent, 411
 using to solve verbal problems, 426–428
 Linear transformation of a set of data,
 686
 Line segment(s), 247
 congruent, 265
 length of, 247

List of ordered pairs, 609
 Longitude, 75
 Lower quartile, 698
 Lowest terms, 212
 reducing fractions to, 541–543
 Lowest terms fraction, 541

M

Mathematics, defined, 2
 Maximum, 511
 Mean, 681
 arithmetic, 681
 interval containing, 694–695
 of a set of grouped data, 691–692
 Measure of a line segment, 247
 Measurement(s)
 accuracy of, 31
 changing units of, 234–236
 direct, 301
 indirect, 301
 numbers as, 28–32
 precision of, 30–31
 Measures of central tendency. *See*
 Central tendency
 Median, 681–682
 interval containing, 694
 of set of grouped data, 691
 Member of a set (\in), symbol for, 338
 Minimum, 509
 Minus symbol, 61–62
 Modal interval, 693
 Mode, 682–685
 of set of grouped data, 690
 Monomial, 169
 division of a, by a monomial, 197–198
 division of a polynomial by a,
 198–199
 finding the principal square root of a,
 482–483
 multiplication of a monomial by a,
 177–178
 multiplication of a polynomial by a,
 178–179
 square of a, 449
 Monomial square roots, division of,
 494–495
 Multiplication, 3–4, 38
 associative property of, 48
 of binomials, 454–455
 commutative property of, 47
 distributive property of, over
 addition, 49, 168, 178, 183
 of fractions, 545–547
 grouping symbols and, 179–180
 of monomial by a monomial,
 177–178
 of polynomials, 183–184
 by a monomial, 178–179
 of powers that have the same base,
 173–174
 of signed numbers, 64–67
 of square-root radicals, 491–492
 of sum and difference of two terms,
 450–451
 verbal phrases involving, 89–90
 Multiplication property
 of equality, 118
 of a fraction, 542
 of inequality, 148–149

 of one, 50
 of zero, 52
 Multiplicative identity, 50, 179
 Multiplicative inverse (reciprocal),
 51–52, 548
 Mutually exclusive events, 600–603

N

n factorial, 628
 Natural numbers, 2
 Negative integral exponent, 189–190
 Negative numbers, 4
 absolute value of, 7
 Negative slope, 358
 Nonlinear function, 388
 No slope, 358
 Not a member of a set (\notin), symbol for,
 338
 Notation
 decimal, 193–195
 interval, 151–152
 scientific, 191–195
 set-builder, 338–344
 Null set, 3
 Numerical coefficient, 95
 Number line, 2, 6
 ordering real numbers on, 25
 rational, 11–12
 real, 25
 standard, 6
 Number pairs, graphing, 75–79
 Number(s), 2
 approximations of, 469
 composite, 39, 443
 counting, 2, 4, 5, 11
 factoring, 443
 irrational, 17–20, 469, 470
 as measurements, 28–32
 natural, 2
 negative, 4
 positive, 4
 prime, 39, 443
 rational, 11–15, 470–475
 real, 2, 25–26
 representing two, with the same
 variable, 125–126
 symbols for, 2
 using letters to represent, 89–90
 whole, 3
 writing, in scientific notation,
 192–193
 Number systems, 1–36
 integers in, 2–8
 irrational numbers in, 17–20
 measurements and, 28–32
 rational numbers in, 11–15
 real numbers in, 2, 25–26
 Numeral, 2
 Numerical average, 681
 Numerical expression(s), 3–4
 with grouping symbols, 41–43
 simplifying, 3, 42–43

O

Obtuse angle, 249
 Obtuse triangle, 263
 One, multiplication property of, 50
 Open sentence, 104–105

Operation(s)
 binary, 38
 computations with more than one, 41
 order of, 38–43
 properties of, 45–52
 with sets, 71–73
 solving equations using more than
 one, 117–121
 Operational symbols, 3
 Opposite angles, 272
 Opposite rays, 248
 Opposite (additive inverse), 4–5, 50
 Opposite side of an angle, 307
 Ordered pair(s), 38, 75
 graph of, 610
 list of, 609
 Order of operations, 38–43
 Order property of real numbers,
 146–147
 Ordinate, 75
 Origin, 75
 Outcome(s), 584
 equally likely, 586

P

Palindrome, 37
 Parabola, 509
 axis of symmetry of the, 510
 Parallel lines, 258–261
 alternate exterior angles and, 260
 alternate interior angles and, 259
 corresponding angles and, 259–260
 slope of, 363
 to the x -axis, 352
 to the y -axis, 353
 Parallelograms, 272
 family of, 273–274
 informal proofs for statements about
 angles in, 274–275
 Parentheses as grouping symbol, 41
 Percent, 227
 of decrease, 230
 of error, 227–229
 of increase, 230
 Percentage, 227
 Percentiles, 701–702
 Perfect squares, 449, 471
 factoring the difference of two,
 452–453
 square root of, 471
 Perfect square trinomial, 455
 Perimeter, 134
 Periodic decimals, 14
 Permutations, 627–634, 646
 calculator and, 631–634
 comparing with combinations,
 639–641
 with repetition, 636–637
 representing, 629–630
 symbols for, 631
 that use some of the elements,
 630–631
 Perpendicular bisector, 271
 Perpendicularity, 249
 Perpendicular lines, 249
 slope of, 364–365
 Pi (π), 20
 Placebo, 663
 Placebo effect, 663

- Placeholder, 89
 Plane, 246
 points on, 75–76
 finding the coordinates of, 77–78
 Plane divider, 378
 Plot
 box-and-whisker, 699–701
 scatter, 710, 711
 Point(s), 246
 coordinates of, 75
 finding the coordinates of, on a plane, 77–78
 locating, on the coordinate plane, 76–77
 on a plane, 75–76
 writing equation given slope and one, 402
 writing equations given two, 404–405
 Polygon(s), 78, 262
 angles and, 275
 area of irregular, 279–280
 graphing, 78–79
 sides of, 262
 vertices of, 262
 Polynomial equation of degree two, 503
 Polynomial function, second-degree, 509
 Polynomial(s), 169–170
 in ascending order, 170
 in descending order, 170
 division of
 by a binomial, 200
 by a monomial, 198–199
 factoring, 447
 factoring completely, 461–463
 multiplication of, 183–184
 by a monomial, 178–179
 prime, 447
 Positive numbers, 4
 absolute value of, 7
 Positive slope, 357
 Postulate, 246
 Power(s), 39, 40, 95–96
 division of, 186–187
 finding a power of a , 174–176
 finding the product of, 173–174
 Powers of 10, 192
 Precision, 30–31
 Price, unit, 212
 Prime number, 39, 443
 Prime polynomial, 447
 over the set of integers, 461
 Principal square root, 471–472
 finding, of a monomial, 482–483
 Prism, 282–283
 right, 282–283
 Probabilities, 575–659
 of (A and B), 596–597
 of (A or B), 599–603
 of (not A), 605–606
 of any event, 592
 calculated, 585
 combinations and, 639–644
 conditional, 619–623
 defined, 576
 empirical, 576–581
 evaluating simple, 590–594
 experiments in, 579–581
 permutations and, 627–634
 as sums, 605–606
 theoretical, 584–587
 with two or more activities
 with replacement, 617–618
 without replacement, 617
 uniform, 586
 writing as fractions, 586
 Problem solving
 formulas in, 134–137
 inequalities in, 157–159
 tangent ratio in, 313–315
 trigonometric ratios in, 327–328
 Product, 443
 Properties of equality, 117–119
 addition property of equality, 118
 division property of equality, 118
 multiplication property of equality, 118
 substitution principle, 118
 subtraction property of equality, 118
 Properties of inequalities, 146–149
 addition property of inequality, 147–148
 multiplication property of inequality, 148–149
 order property of real numbers, 146–147
 transitive property of inequality, 147
 Properties of operations, 45–52
 addition property of zero, 49–50
 additive inverse, 50
 associative
 of addition, 47–48
 of multiplication, 48
 closure, 45–47
 commutative
 of addition, 47
 of multiplication, 47
 distributive, 48–49
 multiplication property of one, 50
 multiplication property of zero, 52
 multiplicative inverses, 51–52
 Proportion, 216–220
 cross products in, 217
 extremes of, 216
 general form of, 216
 inner terms of, 216
 outer terms of, 216
 products of the means and extremes in, 217
 Pyramid(s), 288
 volume of, 288
 Pythagoras, 301
 Pythagorean Theorem, 227, 301–304
 statements of, 302–304
 Pythagorean triple, 305
- Q**
- Quadrant, 76
 Quadratic equation(s), 503
 finding roots from a graph, 522–524
 roots of, 504, 522
 solving, by factoring, 503–507
 standard form of, 503
 Quadratic function, 509–518
 axis of symmetry, 510–511
 leading coefficient, 509–511
 transformations of,
 reflection, 517–518
 scaling, 517–518
 translation, 517–518
 turning point, 509
 vertex, 509
 Quadratic-linear system of equations, 525
 solving,
 algebraically, 529–531
 graphically, 525–527
 Quadrilateral(s), 78, 272–276
 angles of, 273
 consecutive angles in, 272
 opposite angles in, 272
 special, 272–273
 Qualitative data, 661
 Quantitative data, 661
 Quartile, 698–699
 first, 698
 lower, 698
 second, 698
 third, 698
 upper, 698
- R**
- Radical(s), 470, 470–475
 addition of like, 487
 addition of unlike, 488–489
 basic rules for irrational numbers as, 478–481
 estimation and, 477–478
 index of, 473
 irrational numbers and, 476–481
 simplifying square-root, 484–485
 subtraction of like, 487
 subtraction of unlike, 488–489
 that are square roots, 471–472
 Radical sign, 18, 470
 Radicand, 470
 Radius of a sphere, 286
 Random selection, 586–588
 Range,
 of data, 669
 of a function, 341
 of a relation, 339
 Rate, 212, 227
 unit, 212
 using ratio to express, 212
 Rational approximation, 20, 477–478
 Rational expression, 540
 Rational number line, 11–12
 Rational numbers, 11–15, 470–475
 expressing, as decimals, 13–14
 expressing decimals as, 15
 properties of, 12–13
 set of, 11–15
 Ratio(s), 208
 constant, 222
 continued, 209–210
 equivalent, 208–209
 expression of, in simplest form, 208–209
 using, to express a rate, 212
 verbal problems involving, 214–215
 Ray(s), 247–248
 opposite, 248

- Real number line, 25
 Real numbers, 2, 25–26
 completeness property of, 25
 ordering, 25–26
 order property of, 146–147
 set of, 25
 using properties of, to multiply
 signed numbers, 65–67
 Reciprocal(s), 51–52
 in dividing signed numbers, 69–70
 Rectangle, 272, 273
 Rectangular solid, 283
 Reduced to lowest terms, 541–543
 Reflection rule
 for absolute value functions, 386
 for linear functions, 372
 for quadratic functions, 517
 Regression line, 715–716. *See also*
 Linear regression
 Relation, 339
 domain of, 339
 range of, 339
 Relative error, 228
 Relative frequency, 577
 cumulative, 578–579
 Repeating decimals, 14, 17, 587
 Repetition, permutations with, 636–
 637
 Replacement
 probability with, 617–618
 probability without, 617
 Replacement set, 89
 of inequalities, 151
 Rhombus, 273
 Right angle, 248
 Right circular cylinder, 283
 Right member of an equation, 117
 Right prism, 282–283
 Right side of an equation, 117
 Right triangle, 263, 301
 hypotenuse of, 263, 301, 307
 legs of, 263, 307
 Root(s), 117
 calculators and, 473–475
 cube, 472
 double, 505
 of an equation, 504
 finding, from a graph, 522–524
 square, 470
 Roster form, 338
 Rounding, 21
 Round-off error, 31
- S**
- Sample, 662
 Sample space(s), 584
 subscripts in, 592–594
 Sampling, 662
 techniques of, 662–663
 Scalene triangle, 265
 Scaling rules,
 for absolute value functions, 386
 for linear functions, 372
 for quadratic functions, 517
 Scatter plot, 710–711
 Scientific notation, 191–195
 changing to ordinary decimal
 notation, 193–195
 writing numbers in, 192–193
 Second-degree polynomial function, 509
 Second quartile, 698
 Segment of a line, 247
 Set(s), 3, 71
 disjoint, 72
 empty, 3, 72
 finite, 3, 339–340
 infinite, 3, 340–344
 of integers, 4–5
 of irrational numbers, 17–18
 null, 3
 operations with, 71–73
 intersection of, 71–72, 597
 graphing, 153–154
 complement of, 73
 union of, 72–73
 of rational numbers, 11–15
 of real numbers, 25
 types of, 3
 graphing, 154–155
 universal, 71
 of whole numbers, 3
 Set-builder notation, 338–339
 Sides,
 of an angle, 248
 classifying triangles according to,
 265–266
 of polygons, 262
 Signed numbers,
 addition of,
 with opposite signs, 56–58
 with same signs, 54–55
 division of, 68–70
 multiplication of, 64–67
 subtraction of, 59–62
 Significant digits, 29–32, 144–145, 195,
 280, 284, 289, 304
 rules for determining, 29–30
 Similar terms, 123, 168
 Similar triangles, 307
 Simplest form,
 of a polynomial, 170
 expression of ratio in, 208–209
 of square-root radical, 485
 Simplify a numerical expression, 3
 Sine of an angle, 317
 Sine ratio, 317–318
 applications of, 323–324
 finding, on a calculator, 319–320
 Single-blind experiment, 663
 Singleton event, 585, 590
 Slope, 355–360
 applications of, 360
 graphing linear functions using,
 370–373
 of parallel lines, 363
 of perpendicular lines, 364–365
 slope-intercept form, 367–368
 types of,
 negative, 358
 positive, 357
 undefined, 358
 zero, 358
 as unit rate of change, 356
 writing equations given one point
 and, 402
 Slope-intercept form of a linear
 equation, 368
 in finding equations, 402
 Solids
 surface area of, 282–284
 volumes of, 286–290
 Solutions
 extraneous, 565
 graphing linear functions using their,
 346–350
 Solution set(s), 104
 graphing, for system of inequalities,
 431–434
 of inequalities, 151–153
 of open sentences, 104–105, 117
 Sphere, 286
 center of, 286
 diameter of, 286
 radius of, 286
 volume of, 286
 Square(s), 18, 273, 470
 of monomials, 449
 perfect, 449, 471
 Square root(s), 18, 470
 calculators and, 472
 finding the principal, of a monomial,
 482–483
 of a perfect square, 471
 principal, 471–472
 radicals that are, 471–472
 Square-root radicals
 division of, 494–495
 multiplication of, 491–492
 simplest form of, 485
 simplifying, 484–485
 Standard deck of cards, 580
 Standard form, 503
 first-degree equation in, 347
 Standard number line, 6
 Statistical summary (five statistical
 summary), 699
 Statistics, 660–730
 bivariate data, 710–720
 correlation, 711–715
 causation, 711–715
 line of best fit, 715–720
 extrapolation, 717
 interpolation, 717
 regression line, 715–720
 central tendency (average), 690–695
 and linear transformations, 686
 mean, 681
 for grouped data, 691–692
 for intervals, 694–695
 median, 681–682
 for grouped data, 691
 for intervals, 694
 mode, 682–683
 for grouped data, 690
 for intervals (modal interval), 693
 data collection, 661–665
 bias, 662
 sampling, 662
 techniques of, 662–663
 defined, 661
 experimental design, 663–664
 organization of data, 667–672
 frequency distribution table, 668
 grouped data, 668–670
 cumulative frequency, 702–703
 percentiles, 701–702

Statistics *cont.*

- quartiles, 698–699
 - five statistical summary, 699
- sampling in, 662–663
- visualization of data, types of,
 - box-and-whisker plot, 699–701
 - cumulative frequency histogram, 703–707
 - histogram, 675–678
 - scatter plot, 711–714
 - stem-and-leaf diagram, 670–672
- interpreting graphs of data, 664–665
- univariate data, 710
- Stem-and-leaf diagram, 670–672
- Straight angle, 249
- Straight line(s), 246–247
 - facts about, 246–247
- Straightedge, 270
- Subscripts, 592
 - in sample spaces, 592–594
- Subsets of the integers, 5
- Substitution method for solving a system of linear equations, 422–424
- Substitution principle, 118, 423
- Subtraction, 3, 38
 - of algebraic expressions, 168–171
 - of algebraic fractions, 550–554
 - distributive property of multiplication over, 168, 178, 183
 - of like radicals, 487
 - of signed numbers, 59–62
 - of unlike radicals, 488–489
 - verbal phrases involving, 89
- Subtraction property of equality, 118
- Successor, 2
- Sums, probabilities as, 605–606
- Supplementary angles, 251
- Surface area
 - of cylinders, 283
 - formulas for, 293
 - of rectangular solids, 283
 - of solids, 282–284
- Symbol(s)
 - approximately equal to (\approx), 20
 - factorial (!), 628
 - grouping, 41–43
 - of inequality, 7–8
 - infinity (∞), 151–152
 - is an element of (\in), 338
 - is not an element of (\notin), 338
 - minus ($-$), 61–62
 - for numbers, 2
 - operational, 3
 - for permutations, 631
 - translating verbal phrases into, 91–93
 - vertical bar ($|$), 338
- System of equations. *See* Linear system of equations; Quadratic-linear system of equations
- System of inequalities, graphing the solution set of, 431–434
- System of simultaneous equations, 410

T

- Table(s)
 - frequency distribution, 668
 - preparing, 668
- Tally mark, 668
- Tangent of an angle, 308
- Tangent ratio(s), 307–311
 - applications of, 313–317
 - angle of depression, 313
 - angle of elevation, 313
 - in problem solving, 313–315
 - finding, on a calculator, 308–311
- Terminating decimals, 14, 586
- Term(s), 95, 122, 168
 - factors of, 95
 - like, 123, 168
 - lowest, 212
 - multiplication of the sum and difference of two, 450–451
 - reducing fractions to lowest, 541–543
 - similar, 123, 168
 - undefined, 246
 - unlike, 123, 168
- Theorem, 253
- Theoretical probability, 584–587
- Third quartile, 698
- Time series, 715
- Total frequency, 668
- Transitive property of inequality, 147
- Translation rules
 - for absolute value functions, 385–386
 - for linear functions, 372
 - for quadratic functions, 517
- Transversal, 258
- Trapezoid, 272, 275–276
 - isosceles, 276
- Treatment group, 663
- Tree diagram, 609–611, 627
- Trial, 579
- Triangle(s), 262–267
 - classifying
 - according to angles, 263
 - according to sides, 265–266
 - properties of special, 266–267
 - similar, 307
 - sides of, 262
 - sum of the measures of the angles of a, 263–265
 - types of,
 - acute, 263
 - equiangular, 263
 - equilateral, 265–266
 - isosceles, 265–266
 - obtuse, 263
 - right, 263, 301
 - scalene, 265
 - vertices of, 262
- Trigonometry, 300
 - cosine ratio in, 318–320, 323–324
 - problem solving using ratios, 327–328
 - Pythagorean Theorem in, 301–304
 - sine ratio in, 317–320, 323–324
 - tangent ratio in, 307–317
- Trinomial(s), 170
 - factoring, 457–460
- Turning point, 509
- Two-valued statistics, 710. *See also* Bivariate statistics

U

- Undefined term, 246
- Unfavorable event, 584
- Uniform probability, 586
- Union of sets, 72–73
 - graphing, 154–155
- Unit measure, 6
- Unit price, 212
- Unit rate, 212
 - of change, 356
- Units of measure, changing, 234–236
- Univariate statistics, 710
- Universal set, 71
- Unlike radicals
 - addition of, 488–489
 - subtraction of, 488–489
- Unlike terms, 123, 168
- Upper quartile, 698

V

- Variable(s), 89
 - dependent, 341
 - first-degree equations in one, 122
 - graphing first-degree inequalities in two, 378–381
 - independent, 341
 - representing two numbers with the same, 125–126
 - solving, for in terms of another variable, 142–143
 - solving equations that have, in both sides, 128–132
 - writing algebraic expressions involving, 92
- Verbal phrases
 - commas in, 90
 - involving addition, 89
 - involving division, 90
 - involving multiplication, 89–90
 - involving subtraction, 89
 - translating, into symbols, 91–93
- Verbal problems
 - involving ratio, 214–215
 - using systems of equations in solving, 426–428
- Vertex angle of an isosceles triangle, 265
- Vertex of a parabola, 509
- Vertex of an angle, 248
- Vertical angles, 252–254
- Vertical bar ($|$), 338
- Vertical number line, 6
- Vertices, 78
 - of a polygon, 262
- Volume
 - of cones, 288
 - formulas for, 293
 - of pyramids, 286
 - of solids, 286–290
 - of spheres, 286
- Whole numbers, 3
 - set of, 3
- With replacement, probability problems, 617–618

Without replacement, probability problems, 617

Words, writing algebraic expressions in, 98–99

X

x -axis, 75

lines parallel to, 352

x -coordinate, 76

x -intercept, 366

writing equation given, 407–409

Y

y -axis, 75

lines parallel to, 353

y -coordinate, 76

y -intercept, 366

slope and, 367–368

writing equation given, 407–409

Z

Zero, 3

addition property of, 49–50

division of, by nonzero number, 69

multiplication property of, 52

Zero exponent, 188–189

Zero slope, 358

