Index

• Symbols •

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>e</td>
<td>(base e), 110</td>
</tr>
<tr>
<td>10</td>
<td>(base 10), 110</td>
</tr>
<tr>
<td>C</td>
<td>(combinations), 166–167</td>
</tr>
<tr>
<td>0!</td>
<td>(factorial operation), 166</td>
</tr>
<tr>
<td>&gt;</td>
<td>(greater than), 17</td>
</tr>
<tr>
<td>≥</td>
<td>(greater than or equal to), 17</td>
</tr>
<tr>
<td>i</td>
<td>(imaginary numbers), 157–159</td>
</tr>
<tr>
<td>x</td>
<td>(input variable), 47–49</td>
</tr>
<tr>
<td>&lt;</td>
<td>(less than), 17</td>
</tr>
<tr>
<td>≤</td>
<td>(less than or equal to), 17</td>
</tr>
<tr>
<td>y</td>
<td>(output variable), 47–49</td>
</tr>
<tr>
<td>P</td>
<td>(permutations), 166</td>
</tr>
<tr>
<td>Σ</td>
<td>(sums), 167–168</td>
</tr>
</tbody>
</table>

• A •

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>a</td>
<td>absolute value inequality, 21–22</td>
</tr>
<tr>
<td>b</td>
<td>absolute value operation</td>
</tr>
<tr>
<td>c</td>
<td>basic steps for solving, 20–21</td>
</tr>
<tr>
<td>d</td>
<td>polynomial equations, 76–77</td>
</tr>
<tr>
<td>e</td>
<td>solving with inequalities, 21–22</td>
</tr>
<tr>
<td>f</td>
<td>addition</td>
</tr>
<tr>
<td>g</td>
<td>algebraic properties, 6–7</td>
</tr>
<tr>
<td>h</td>
<td>geometric sequences, 168</td>
</tr>
<tr>
<td>i</td>
<td>odd numbers, 167</td>
</tr>
<tr>
<td>j</td>
<td>summing n integers, 167</td>
</tr>
<tr>
<td>k</td>
<td>sums of squares, 167</td>
</tr>
<tr>
<td>l</td>
<td>additive identity, 7</td>
</tr>
<tr>
<td>m</td>
<td>additive inverse, 7</td>
</tr>
<tr>
<td>n</td>
<td>Algebra I For Dummies (Sterling), 2, 9</td>
</tr>
<tr>
<td>o</td>
<td>Algebra II For Dummies (Sterling), 2</td>
</tr>
<tr>
<td>p</td>
<td>Algebra Workbook For Dummies (Sterling), 96</td>
</tr>
<tr>
<td>q</td>
<td>algebraic inequalities</td>
</tr>
<tr>
<td>r</td>
<td>about the rules of, 17–18</td>
</tr>
<tr>
<td>s</td>
<td>basic steps for solving, 18–19</td>
</tr>
<tr>
<td>t</td>
<td>interval notation, 19–20</td>
</tr>
<tr>
<td>u</td>
<td>algebraic properties, 5–8</td>
</tr>
<tr>
<td>v</td>
<td>arrangements, numbers of, 166</td>
</tr>
</tbody>
</table>

• B •

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>b</td>
<td>base (exponent)</td>
</tr>
<tr>
<td>c</td>
<td>about the notation, 107</td>
</tr>
<tr>
<td>d</td>
<td>classifying, 108–109</td>
</tr>
<tr>
<td>e</td>
<td>creating matching bases, 111</td>
</tr>
<tr>
<td>f</td>
<td>frequently used, 110</td>
</tr>
<tr>
<td>g</td>
<td>binomials, quadratic</td>
</tr>
<tr>
<td>h</td>
<td>solving by factoring, 25–26</td>
</tr>
<tr>
<td>i</td>
<td>using synthetic division, 87–88</td>
</tr>
</tbody>
</table>

• C •

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>(combinations), 166–167</td>
</tr>
<tr>
<td>c</td>
<td>calculus, 1</td>
</tr>
<tr>
<td>d</td>
<td>circles</td>
</tr>
<tr>
<td>e</td>
<td>defining the features, 126</td>
</tr>
<tr>
<td>f</td>
<td>intersecting parabolas, 151–155</td>
</tr>
<tr>
<td>g</td>
<td>rewriting to standard form, 126</td>
</tr>
<tr>
<td>h</td>
<td>standard form, 127</td>
</tr>
<tr>
<td>i</td>
<td>coexisting lines, 141–142</td>
</tr>
<tr>
<td>j</td>
<td>combinations (C), 166–167</td>
</tr>
<tr>
<td>k</td>
<td>common denominator, least (LCD), 36–38</td>
</tr>
<tr>
<td>l</td>
<td>common factor, greatest. See</td>
</tr>
<tr>
<td>m</td>
<td>greatest common factor (GCF)</td>
</tr>
<tr>
<td>n</td>
<td>commutative property, 6</td>
</tr>
</tbody>
</table>
complex numbers
addition and substraction, 159–160
imaginary numbers, 157–158
division and multiplication, 160–161
polynomial equations, 162–164
quadratic equations, 161–162
simplifying radicals, 161
complex root, 162–164
complex zeros, 163–164
compound interest, 168–169
conics. See circles; ellipses;
hyperbolas; parabolas
conjugate axis, 131
conjugate pairs, 163–164
conventions, book, 2
counting states, multiplication
property of, 165
cross-multiplying, 38–39

• D •

Descartes’ rule of signs, 85–88
difference of squares, 26
difference quotient, 56–57
directrix, parabola, 122
discontinuities, 97–102
distributive property, 6–7
division, 6–7, 9–11
domain
of exponential functions, 108
input values, 49–50
of rational functions, 92
double root, 150

• E •
e (base e), 110
elimination, 138–140
equations, solving systems of
by graphing, 137–137
parabolas with circles, 151–155
parabolas with lines, 148–151
special formulas for, 165–169
using elimination, 138–140
using substitution, 140–142
using the standard form, 136
with three linear equations,
142–145
with more than three equations,
145–148
even functions
classifying, 52
graphing, 53, 62–63
exponential function
classifying bases, 108–109
frequently used bases, 109
order of operations, 107–108
solving, 110–113
exponents
about the rules of, 8–11
factoring out negatives, 42–44
notation, 107
order of operations, 108
power of i, 158
extraneous solution, 36–38

• F •
factorial operations, 166
factoring. See also quadratic entries
applying, 11–14
exponent equations, 112–113
finding discontinuities by, 98
polynomial equations, 81–82
quadratic equations, 25–28
first-degree linear equations, 16–17
first terms, trinomial. See FOIL
focus/foci
ellipse, 127, 130
hyperbola, 130–131
parabola, 122
FOIL (trinomial factoring), 12–13
formulas, frequently used, 165–169
four-term factoring, 14
fractional exponents
 basic review of, 9–11
 factoring, 45
 factoring out GCF, 45–46
 quadratic-like terms, 46
 fractions
 cross-multiplying, 38–39
 eliminating, 16–17
 LCD, 36–38
 working with exponents, 9–11
 functions
 composing, 56–57
 defining function notation, 47–49
 domain and range, 49–51
 even and odd, 51–53
 identifying inverses, 57–60
 one-to-one, 53–55

• G •

GCF. See greatest common factor (GCF)
 geometric sequences, 168
 geometry, 1, 6
 graphing
 about x- and y-intercepts, 61–62
 conics, 121–122
 hyperbolas, 132–133
 linear functions, 64–67, 137–138
 one-to-one functions, 55
 parabolas, 73–74, 124–125
 parabolas with circles, 151–155
 parabolas with lines, 148–151
 quadratic functions, 68–74
 rational functions, 91–97
 symmetry, 62–63
 using domain and range, 51
 using odd and even functions, 53
 greater than (>), 17
 greater than or equal to (≥), 17
 greatest common factor (GCF)
 exponential equations, 112
 factoring techniques, 11–14
 fractional exponents, 45–46
 negative exponents, 42–44
 quadratic equations, 25–26
 grouping of operations. See operations, order of

• H •

horizontal asymptotes, 94–96
 humor, mathematics, 4
 hyperbolas
 asymptotes, 131–132
 defining the features, 130–131
 rewriting to standard form, 126
 sketching the graph, 132–133

• I •

icons, defined, 2–3
 identities, 7
 imaginary numbers (i), 157–159.
 See also complex numbers
 inequality/inequality notation
 absolute value operation, 21–22
 in linear equations, 17–20
 in quadratic equations, 29–34
 infinite geometric sequences, 168
 infinity
 determining, 102–104
 evaluating limits at, 104–105
 inner terms, trinomial. See FOIL
 intercepts. See x-axis; y-axis
 interest, calculating, 168–169
 interval notation, 19–20
 inverses
 defined, 7
 identifying functions as, 58–59
 one-to-one functions, 54, 59–60
 irrational numbers, 28

• L •

last terms, trinomial. See FOIL
 least common denominator (LCD), 36–38
 less than (<), 17
 less than or equal to (≤), 17
 limits, rational function
 finding discontinuities, 100–102
 finding infinity, 102–105
 notation, 99–100
linear equations
absolute value operations, 20–22
basic inequalities, 17–20
first degree, 15–17
graphing, 64–67, 137–138
intersecting parabolas, 148–151
solving system of three, 142–145
solving systems of more than three, 145–148
solving with standard form, 136
using elimination, 138–140
using substitution, 140–142
linear inequalities
about the rules of, 17–18
basic steps for solving, 18–19
interval notation, 19–20
linear notation, 19–20

• M •
major axis, ellipse, 129
minor axis, ellipse, 129
multiplication
algebraic properties, 6–7
working with exponents, 9–11
multiplication property of counting states, 165
multiplication property of zero (MPZ) defined, 7
determining x-intercept, 71
in exponential equations, 112
in quadratic equations, 25–26
multiplicative identity, 7
multiplicative inverse, 7

• N •
negative exponents
basic review of, 9–11
factoring, 42–44
negative numbers, 18–19
number theory, 1
numbers/number systems
complex numbers, 159–164
geometric sequences, 168
imaginary numbers, 157–158
irrational numbers, 28
negative numbers, 18–19
odd numbers, 167–168
permutations and combinations, 166

• O •
odd functions
classifying, 52
graphing, 53, 62–63
odd numbers, adding, 167–168
one (numeral), 7
one-to-one functions, 53–55, 59–60
operations, order of. See also equations, solving systems of applying algebraic properties, 6–7
exponential function, 107–108
four-term expressions, 14
rules for performing, 8
outer terms, trinomial. See FOIL

• P •
parabolas
about the form of, 123–124
computing the vertex, 72–73
defining the features, 122–123
graphing, 68–70
intersecting with circles, 151–155
intersecting with lines, 148–151
sketch the graph, 73–74, 124–125
standard form, 125–126
x-intercept, 71–72
y-intercept, 70
parallel lines, 67, 141–142
permutations (P), 166
perpendicular lines, graphing, 67
polynomial equations
about the form of, 75
with complex numbers, 162–164
creating the sign line, 79–81
Descartes’ rule of signs, 85–86
intercepts and turning points, 77–78
rational root theorem, 82–84
relative versus absolute value, 76–77
roots, factoring, 81–82
roots, synthetic division, 86–90
x- and y-intercepts, 78–79
power (exponent). See exponents
power of i, 158
proportions, 38–39

• Q •
quadratic binomials, 25–26
quadratic equations
about using, 23
factoring, applying, 11–14
factoring, solving with, 25–28
similarity to exponents, 111–112
square root rule, 24
quadratic formula
complex numbers, 157, 161–162
determining x-intercept, 71
when factoring fails, 26–28, 37,
150–151
quadratic functions
about graphing, 68–70
axis of symmetry, 68, 73–74
computing the vertex, 72–73
finding y-intercept, 70
getting x-intercept, 71–72
sketching the graph, 73–74
quadratic inequalities, 29–34
quadratic trinomials
factoring, 12–14
solving, 26–27, 44, 112–113
quadratic-like equations
factoring, 112–113
fractional terms, 46
solving, 28–29, 44

• R •
radicals/radical expressions
 grouping operations, 8
 solving, 39–42
 square root rule, 25
 with complex numbers, 161
 working with exponents, 9–11
range (output value), 50–51
rational functions
about the form of, 91–92
domain (input value), 92
eliminating fractions, 35–38
graphing, 95–96
horizontal asymptotes, 94
limits, 99–105
proportions, 38–39
removable discontinuities, 97–99
vertical asymptotes, 93–94
x- and y-intercepts, 92–93
rational root theorem, 82–84
rational solutions, 27–28
relative value, polynomial, 76–77
removable discontinuities
determining limits of, 100–102
rational function, 97–99
reverse the sense, 18
roots
complex roots, 162–164
Descartes’ rule of signs, 85–86
double root, 150
factoring for, 81–82
rational root theorem, 82–84
solving radical equations, 40–41
using synthetic division, 87–88
working with exponents, 9–10

• S •
sense of the inequality, 18
sign line
 increasing the factors of, 33–34
 polynomial equations, 79–81
 quadratic inequalities, 30–32
 rational inequalities, 32–33
 signs
 Descartes’ rule of signs, 85–86
 sign change rule, 80–81
 slant (oblique) asymptotes, 96–97
 slope of a line
 graphing, 64–65
 parallel lines, 138
 slope-intercept form, 65–67, 138
 square root. See roots
square root rule, 25
squared integers, sums of, 167
standard form
  circles, 126
  ellipses, 126
  hyperbolas, 126
  linear equations, 136
  linear functions, 65–67
  parabolas, 125–126
  quadratic functions, 68–70
Sterling, Mary Jane (author)
  Algebra I For Dummies, 2, 9
  Algebra II For Dummies, 2
  Algebra Workbook For Dummies, 96
substitution, 140–142
subtraction, 6–7
sum symbol (Σ), 167–168
sums of squares, 167
symmetry/symmetric
  linear functions, 62–63
  quadratic functions, 68–70
synthetic division
  about using, 86
  dividing by a binomial, 89–90
  searching for roots, 87–88

T

tangents, 150
10 (base 10), 110
three-term factoring, 12–14
transverse axis, 131
trigonometry, 1
trinomials, 44. See also
  quadratic trinomials
turning points,
  polynomial, 77–78
two-line equations
  slope-intercept form, 66–67
  standard form, 65–66
two-term factoring, 11–12

U

unFOIL, 13–14

V

variables
  eliminating, 138–140
  first-degree linear equations, 47–49
  substitution, 140–142
  vertex
    ellipse, 129
    parabola, 72–74, 122–123
  vertical asymptotes, 93–96

X

x (input variable), 47–49
x-axis/x-intercept
  ellipse, 129
graphing lines, 62–63, 137–138
graphing quadratics, 71–72
hyperbola, 130–131
polynomial turning points, 77–78
of rational functions, 92–93
solving polynomials, 78–79

Y

y (output variable), 47–49
y-axis/y-intercept
  ellipse, 129
graphing lines, 62–63, 137–138
graphing quadratics, 70
hyperbola, 130–131
polynomial turning points, 77–78
of rational functions, 92–93
solving polynomials, 78–79

Z

zero
  additive identity of, 7
  additive inverse of, 7
  finding the x-intercept, 71–72
  multiplication property of, 7
  multiplying and dividing by, 18
  use in complex numbers, 163–164
From hooking up a modem to cooking up a casserole, knitting a scarf to navigating an iPod, you can trust Dummies.com to show you how to get things done the easy way.

Visit us at Dummies.com
Dummies products make life easier!

DVDs • Music • Games •
DIY • Consumer Electronics •
Software • Crafts • Hobbies •
Cookware • and more!

For more information, go to Dummies.com® and search the store by category.
Just the critical concepts you need to score high in Algebra II

Algebra II Essentials For Dummies sticks to the point, with concise explanations of critical concepts taught in a typical Algebra II course. It’s perfect for cramming, for homework help, or as a reference for parents helping students prepare for an exam.

- **Play by the rules** — get the lowdown on algebraic properties, exponential rules, and factoring techniques
- **Be rational** — follow easy-to-grasp instructions for working with rational and radical equations, from dealing with negative exponents to fiddling with fractional exponents
- **Know your functions** — discover how to use exponential and logarithmic functions to solve algebraic problems
- **Cozy up with polynomials** — learn the steps to confidently (and correctly) solve polynomial equations

Open the book and find:

- How to multiply and divide exponents
- Instructions for solving linear equations
- The quadratic formula
- How to denote function notation
- Graphing techniques
- Introducing zero to find y-intercepts
- The steps to solving systems of equations
- Formulas you need to know

Learn:

- Exactly what you need to know on exponential functions
- The “must-know” laws of logarithms
- Matrices, sequences, series, and sets in quick, focused lessons

Mary Jane Sterling is professor of mathematics at Bradley University and author of several books, including Algebra II For Dummies and Algebra II Workbook For Dummies.