

Algebra 2

An Incremental Development

Third Edition

John H. Saxon Jr.

SAXON PUBLISHERS, INC.

Contents

Preface	xi
Basic Course	
<i>Lesson A</i> Geometry Review • Angles • Review of Absolute Value • Properties and Definitions	1
<i>Lesson B</i> Perimeter • Area • Volume • Surface Area • Sectors of Circles	8
<i>Lesson 1</i> Polygons • Triangles • Transversals • Proportional Segments	19
<i>Lesson 2</i> Negative Exponents • Product and Power Theorems for Exponents • Circle Relationships	26
<i>Lesson 3</i> Evaluation of Expressions • Adding Like Terms	31
<i>Lesson 4</i> Distributive Property • Solutions of Equations • Change Sides—Change Signs	34
<i>Lesson 5</i> Word Problems • Fractional Parts of a Number	39
<i>Lesson 6</i> Equations with Decimal Numbers • Consecutive Integer Word Problems	42
<i>Lesson 7</i> Percent • Equations from Geometry	46
<i>Lesson 8</i> Polynomials • Graphing Linear Equations • Intercept-Slope Method	50
<i>Lesson 9</i> Percent Word Problems	56
<i>Lesson 10</i> Pythagorean Theorem	59
<i>Lesson 11</i> Addition of Fractions • Inscribed Angles	62
<i>Lesson 12</i> Equation of a Line	67
<i>Lesson 13</i> Substitution • Area of an Isosceles Triangle	71
<i>Lesson 14</i> Finding the Equation of a Line	75
<i>Lesson 15</i> Elimination	79
<i>Lesson 16</i> Multiplication of Polynomials • Division of Polynomials	82
<i>Lesson 17</i> Subscripted Variables • Angle Relationships	86
<i>Lesson 18</i> Ratio Word Problems • Similar Triangles	89

<i>Lesson 19</i>	Value Word Problems • AA Means AAA	94
<i>Lesson 20</i>	Simplification of Radicals • Line Parallel to a Given Line	98
<i>Lesson 21</i>	Scientific Notation • Two Statements of Equality	101
<i>Lesson 22</i>	Uniform Motion Problems—Equal Distances • Similar Triangles and Proportions	104
<i>Lesson 23</i>	Graphical Solutions	108
<i>Lesson 24</i>	Fractional Equations • Overlapping Triangles	112
<i>Lesson 25</i>	Monomial Factoring • Cancellation • Parallel Lines	116
<i>Lesson 26</i>	Trinomial Factoring • Overlapping Right Triangles	121
<i>Lesson 27</i>	Rational Expressions	125
<i>Lesson 28</i>	Complex Fractions • Rationalizing the Denominator	128
<i>Lesson 29</i>	Uniform Motion Problems: $D_1 + D_2 = k$	131
<i>Lesson 30</i>	Deductive Reasoning • Euclid • Vertical Angles Are Equal • Corresponding Interior and Exterior Angles • 180° in a Triangle	134
<i>Lesson 31</i>	Negative Reciprocals • Perpendicular Lines • Remote Interior Angles	141
<i>Lesson 32</i>	Quotient Theorem for Square Roots • Congruency • Congruent Triangles	145
<i>Lesson 33</i>	Major Rules of Algebra • Complex Fractions	151
<i>Lesson 34</i>	Uniform Motion Problems: $D_1 + k = D_2$	155
<i>Lesson 35</i>	Angles in Polygons • Inscribed Quadrilaterals • Fractional Exponents	158
<i>Lesson 36</i>	Contrived Problems • Multiplication of Rational Expressions • Division of Rational Expressions	164
<i>Lesson 37</i>	Chemical Compounds • Parallelograms	167
<i>Lesson 38</i>	Powers of Sums • Solving by Factoring • Only Zero Equals Zero	172
<i>Lesson 39</i>	Difference of Two Squares • Parallelogram Proof • Rhombus	176
<i>Lesson 40</i>	Abstract Fractional Equations	181
<i>Lesson 41</i>	Units • Unit Multipliers	184
<i>Lesson 42</i>	Estimating with Scientific Notation	187
<i>Lesson 43</i>	Sine, Cosine, and Tangent • Inverse Functions	190
<i>Lesson 44</i>	Solving Right Triangles	195
<i>Lesson 45</i>	Difference of Two Squares Theorem	200
<i>Lesson 46</i>	More on Radical Expressions • Radicals to Fractional Exponents	203
<i>Lesson 47</i>	Rate Unit Conversions • More on Fractional Exponents	206
<i>Lesson 48</i>	Radical Equations	210
<i>Lesson 49</i>	Linear Intercepts • Transversals	213

<i>Lesson 50</i>	Quadratic Equations • Completing the Square	217
<i>Lesson 51</i>	Imaginary Numbers • Product of Square Roots Theorem • Euler's Notation • Complex Numbers	221
<i>Lesson 52</i>	Chemical Mixture Problems, Type A	226
<i>Lesson 53</i>	Metric Unit Conversions • English Units to Metric Units • Weight Combination by Percent	229
<i>Lesson 54</i>	Polar Coordinates • Similar Triangles	232
<i>Lesson 55</i>	Advanced Abstract Equations • Word Problems and Quadratic Equations	237
<i>Lesson 56</i>	Angles in Circles • Proofs	241
<i>Lesson 57</i>	Ideal Gas Laws	245
<i>Lesson 58</i>	Lead Coefficients • More on Completing the Square	249
<i>Lesson 59</i>	Experimental Data • Simultaneous Equations with Fractions and Decimals • Rectangular Form to Polar Form	252
<i>Lesson 60</i>	Direct and Inverse Variation	257
<i>Lesson 61</i>	Chemical Mixture Problems, Type B	261
<i>Lesson 62</i>	Complex Roots of Quadratic Equations	264
<i>Lesson 63</i>	Addition of Vectors	268
<i>Lesson 64</i>	Complex Fractions • Complex Numbers	271
<i>Lesson 65</i>	Advanced Substitution	275
<i>Lesson 66</i>	Signs of Fractions • 30° - 60° - 90° Triangles	278
<i>Lesson 67</i>	Radical Denominators	283
<i>Lesson 68</i>	Scientific Calculator • Scientific Notation • Powers and Roots	285
<i>Lesson 69</i>	Gas Law Problems	291
<i>Lesson 70</i>	Advanced Abstract Equations	294
<i>Lesson 71</i>	Quadratic Formula	297
<i>Lesson 72</i>	Lines from Experimental Data • Negative Angles	301
<i>Lesson 73</i>	More on Radical Denominators	306
<i>Lesson 74</i>	Uniform Motion with Both Distances Given	309
<i>Lesson 75</i>	Factorable Denominators and Sign Changes	312
<i>Lesson 76</i>	Using Both Substitution and Elimination • Negative Vectors	316
<i>Lesson 77</i>	Advanced Radical Equations • Multiple Radicals	320
<i>Lesson 78</i>	Force Vectors at a Point	324
<i>Lesson 79</i>	Metric Volume • 45° - 45° - 90° Triangles	327
<i>Lesson 80</i>	Direct Variation as a Ratio • Inverse Variation as a Ratio	331
<i>Lesson 81</i>	Complex Numbers and Real Numbers • Products of Complex Conjugates • Division of Complex Numbers	335

<i>Lesson 82</i>	Algebraic Simplifications	339
<i>Lesson 83</i>	Product Rule with Variables • Power Rule with Variables	342
<i>Lesson 84</i>	Degree of Equations • Solutions to Systems of Equations	346
<i>Lesson 85</i>	Systems of Nonlinear Equations	350
<i>Lesson 86</i>	Greater Than • Trichotomy and Transitive Axioms • Irrational Roots	355
<i>Lesson 87</i>	Slope Formula	360
<i>Lesson 88</i>	The Distance Formula • The Relationship $PV = nRT$	364
<i>Lesson 89</i>	Conjunctions • Disjunctions • Products of Chords and Secants	368
<i>Lesson 90</i>	Systems of Three Equations	374
<i>Lesson 91</i>	Linear Inequalities • Greater Than or Equal To; Less Than or Equal To • Systems of Linear Inequalities	377
<i>Lesson 92</i>	Boat-in-the-River Problems	382
<i>Lesson 93</i>	The Discriminant	386
<i>Lesson 94</i>	Dependent and Independent Variables • Functions • Functional Notation	389
<i>Lesson 95</i>	More Nonlinear Systems	394
<i>Lesson 96</i>	Joint and Combined Variation • More on Irrational Roots	398
<i>Lesson 97</i>	Advanced Substitution	403
<i>Lesson 98</i>	Relationships of Numbers	405
<i>Lesson 99</i>	Absolute-Value Inequalities • Absolute-Value Conjunctions • Absolute-Value Disjunctions • Negative Numbers and Absolute Value	409
<i>Lesson 100</i>	Graphs of Parabolas	413
<i>Lesson 101</i>	Percent Markups	420
<i>Lesson 102</i>	Sums of Functions • Products of Functions	422
<i>Lesson 103</i>	Advanced Polynomial Division	426
<i>Lesson 104</i>	Review of Complex Numbers • Subsets of the Real Numbers • Representing Repeating Decimals as Fractions	429
<i>Lesson 105</i>	Advanced Factoring	433
<i>Lesson 106</i>	More on Systems of Three Equations	437
<i>Lesson 107</i>	Numbers, Numerals, and Value • Number Word Problems	440
<i>Lesson 108</i>	Sum and Difference of Two Cubes	443
<i>Lesson 109</i>	More on Fractional Exponents	446
<i>Lesson 110</i>	Quadratic Inequalities (Greater Than)	448
<i>Lesson 111</i>	Three Statements of Equality	450
<i>Lesson 112</i>	Quadratic Inequalities (Less Than)	453

<i>Lesson 113</i>	Logarithms • Antilogarithms	455
<i>Lesson 114</i>	Nonlinear Inequalities	460
<i>Lesson 115</i>	Exponential Equations • Exponential Functions • Compound Interest	464
<i>Lesson 116</i>	Fundamental Counting Principle and Permutations • Probability • Independent Events	470
<i>Lesson 117</i>	Letter Symbols for Sets • Set-Builder Notation	476
<i>Lesson 118</i>	Logarithmic Equations	479
<i>Lesson 119</i>	Absolute-Value Inequalities	483
<i>Lesson 120</i>	Age Word Problems	486
<i>Lesson 121</i>	Rational Inequalities	490
<i>Lesson 122</i>	Laws of Logarithms • Intersection of Sets • Union of Sets • Venn Diagrams	494
<i>Lesson 123</i>	Locus • Basic Construction	497
<i>Lesson 124</i>	Conditions of Congruence • Proofs of Congruence • Isosceles Triangles	503
<i>Lesson 125</i>	Distance Defined • Equidistant from Two Points • Equidistant from Sides of an Angle • Circle Proofs	509
<i>Lesson 126</i>	Quadrilaterals • Chords and Arcs	514
<i>Lesson 127</i>	Lines and Planes in Space	520
<i>Lesson 128</i>	Circumscribed and Inscribed • Inscribed Triangles • Inscribed Circles • Proof of the Pythagorean Theorem • Inscribed Angles	524
<i>Lesson 129</i>	Stem-and-Leaf Plots • Measures of Central Tendency • The Normal Curve • Standard Deviation	532
	Glossary	539
	Index	549
	Answers	565



Oak Meadow
YOUR TRUSTED PARTNER IN JOYFUL LEARNING

8 Bellows Falls Road • PO Box 615 • Putney, VT 05346
802-251-7250 • info@oakmeadow.com • oakmeadow.com

Algebra II Syllabus

Textbook

Algebra II: An Incremental Development (Saxon)

Materials

Algebra II textbook

Homeschool Packet: Practice tests (formerly called Form A tests), answers to problem sets and practice tests

Schedule of Assignments

As an independent study student, you can complete this course at your own pace. Some students benefit from doing every single problem in the problem sets while others prefer to do all the even numbered problems, and then go back and do the odd numbered problems for skills that need extra practice. By checking your answers after each problem set, you can gauge how well you are grasping the material and adjust your work load accordingly.

There is a proposed schedule of assignments on the back that will help you move through the course in 32 weeks. Feel free to adjust this schedule to suit your needs and learning style.

We wish you a challenging and successful year of Algebra II!

Algebra II Assignment Sheet

Lesson	Problem Sets	Tests
1	1–2	1
2	3–6	2
3	7–10	3
4	11–14	4
5	15–18	5
6	19–22	6
7	23–26	7
8	27–30	8
9	31–34	9
10	35–38	10
11	39–42	11
12	43–46	12
13	47–50	13
14	51–54	14
15	55–58	15
16	59–62	16
17	63–66	17
18	67–70	18
19	71–74	19
20	75–78	20
21	79–82	21
22	83–86	22
23	87–90	23
24	91–94	24
25	95–98	25
26	99–102	26
27	103–106	27
28	107–110	28
29	111–114	29
30	115–118	30
31	119–122	31
32	123–129	32