

## ALGEBRA II – Unit Plan and Syllabus

This is the course of study for Algebra II. This course should take about one school year to complete, but some students may take more time or less time to do so. Each number represents one class period (or one quiz) and the skills that students should master – as demonstrated in class or on a quiz. Students will have “completed” a topic when they have demonstrated said mastery. Students will have passed Algebra II when they have completed everything on this list.

Date Completed, Grade

### Unit I – Tools of Algebra

1. Review graphing, including coordinates, slope, and intercepts. \_\_\_\_\_
2. Simplify algebraic expressions, balance equations, solve for “x.” \_\_\_\_\_
3. Develop equations with variables, and solve those equations. \_\_\_\_\_
4. Solve and graph inequalities. \_\_\_\_\_
5. Understand and calculate probability. \_\_\_\_\_
6. Practice and review. \_\_\_\_\_
7. Take the Unit I test. \_\_\_\_\_

### Unit II – Functions, Equations and Graphs

8. Graph equations of lines. \_\_\_\_\_
9. Develop equations and graph those equations. \_\_\_\_\_
10. Understand how equations relate to vertical and horizontal translations. \_\_\_\_\_
11. Graph absolute value equations and inequalities. \_\_\_\_\_
12. Practice and review. \_\_\_\_\_
13. Take the Unit II test. \_\_\_\_\_

### Unit III – Linear Systems

14. Solve systems of equations using the graphing method. \_\_\_\_\_
15. Solve systems of equations using the substitution method. \_\_\_\_\_
16. Solve systems of equations using the elimination method. \_\_\_\_\_
17. Solving systems of equations using any method. \_\_\_\_\_
18. Develop equations from word problems and solve those equations. \_\_\_\_\_
19. Practice and review. \_\_\_\_\_
20. Take the Unit III test. \_\_\_\_\_

### Unit IV – Quadratic Equations and Functions

21. Identify quadratic functions and parts of quadratic equations. \_\_\_\_\_
22. Become familiar with graph shifts: up, down, left, right, flip. \_\_\_\_\_
23. Find minimum and maximum values (vertex). \_\_\_\_\_
24. Put equations into standard form or vertex form. \_\_\_\_\_
25. Factor quadratic equations. \_\_\_\_\_
26. Find x intercepts. \_\_\_\_\_
27. Use the quadratic formula, and understand the “discriminate.” \_\_\_\_\_
28. Simplify equations involving imaginary numbers. \_\_\_\_\_
29. Solve problems by completing the square. \_\_\_\_\_
30. Develop equations and solve those equations. \_\_\_\_\_
31. Practice and review. \_\_\_\_\_
32. Take the Unit IV test. \_\_\_\_\_

Unit V – Matrices

- 33. Describe matrices and their elements (including determinants).
- 34. Put data (from word problems or other sources) into a matrix.
- 35. Add, subtract, multiply, divide matrices.
- 36. Solve matrix equations.
- 37. Graph geometric shapes with matrices.
- 38. Use a matrix to reflect, rotate, translate, dilation, or reduce a graph.
- 39. Develop equations and solve those equations (with multiple variables).
- 40. Practice and review.
- 41. Take the Unit V test.

---

---

---

---

---

---

---

---

---

Unit VI – Polynomials and Polynomial Functions

- 42. Factor polynomials (3<sup>rd</sup> degree and higher).
- 43. Graph polynomials (3<sup>rd</sup> degree and higher).
- 44. Find rational roots and imaginary roots, using synthetic division.
- 45. Use Pascal’s triangle to factor binomials.
- 46. Calculate permutations and combinations.
- 47. Practice and review.
- 48. Take the Unit VI test.

---

---

---

---

---

---

---

---

Unit VII – Radical Functions and Rational Exponents

- 49. Review square roots.
- 50. Convert rational exponents to radical notation, and simplify.
- 51. Add, subtract, multiply, divide radical expressions
- 52. Graph radical functions.
- 53. Factor and graph inverse functions.
- 54. Practice and review.
- 55. Take the Unit VII test.

---

---

---

---

---

---

---

---

Unit VIII – Exponential and Logarithmic Functions

- 56. Factor exponents and logarithms (as inverses of each other).
- 57. Identify examples of exponential and logarithmic functions.
- 58. Learn the properties of logarithmic functions.
- 59. Solve equations involving logarithms.
- 60. Calculate natural logarithms and “e.”
- 61. Calculate compound interest (and continuously compounded interest).
- 62. Practice and review.
- 63. Take the Unit VII test.

---

---

---

---

---

---

---

---

- 64. Algebra II Final Exam/Project/Make-Up Assignment

---