

COURSE PROFICIENCY OUTLINE ALGEBRA II FUNDAMENTALS

Fundamentals

5 Credits

Purpose

This third year of mathematics focuses on key topics in algebra while providing students with foundational skills and knowledge.

Students will be provided with the fundamental problem solving skills and mathematical understanding needed to be successful in their daily lives and careers.

Students will use calculators as a tool for processing data and perform calculations to investigate and solve problems where appropriate.

I. New Jersey Core Curriculum Standards for Mathematics

- 4.1 Number and Numerical Operations
- 4.2 Geometry and Measurement
- 4.3 Patterns and Algebra
- 4.4 Data Analysis, Probability, and Discrete Mathematics
- 4.5 Mathematical Processes

II. Content Clusters

- Unit 1 – Linear equations, Inequalities, Functions, and Systems
- Unit 2 – Quadratic, Polynomials, Radical Functions, and Discrete Math
- Unit 3 – Other Non-linear Functions and Relations
- Unit 4 – Data Analysis and Probability

III. Student Outcomes

Unit I - Linear equations, Inequalities, Functions, and Systems (4.1.A, 4.1.B, 4.2.C, 4.3.B, 4.3.C, 4.3.D, 4.4.A)

Students will be able to:

1. Graph, order, and use real numbers
2. Define and use algebraic expressions.
3. Simplify algebraic expressions.
4. Solve linear equations.
5. Rewrite common formulas and equations that have more than one variable.
6. Use problem solving strategies to solve real-life problems.
7. Use statistical measures and data displays to represent data.
8. Display data in frequency distributions and histograms.
9. Identify and graph functions.
10. Identify, evaluate, and graph linear functions.
11. Find and use the slope of a line.
12. Use slope-intercept form and standard form to graph equations.
13. Write linear equations.
14. Write and graph direct variation equations.
15. See correlation in a scatter plot and find a best-fitting line.
16. Solve a system of linear equations in two variables by graphing, by substitution, and by linear combinations.
17. Solve and graph simple and compound inequalities in one variable.
18. Solve and graph linear inequalities in two variables.
19. Graph, write, and use a system of linear inequalities.
20. Solve and write absolute value equations in one variable.

Unit 2 – Quadratic Functions, Polynomials, Powers, Roots, and Radicals (4.1.B, 4.3.B, 4.3.D)

Students will be able to:

1. Graph quadratic functions in the standard form.
2. Graph quadratic functions in vertex form.
3. Factor trinomials.
4. Factor using special patterns.
5. Solve quadratic equations by finding square roots.
6. Solve quadratic equations using the quadratic formula.
7. Use properties of exponents to evaluate and simplify expressions.
8. Add, subtract, and multiply polynomials.
9. Evaluate n th roots of real number using radicals and rational exponents.
10. Use properties of radicals and rational exponents.
11. Solve equations that contain radicals or rational exponents.
12. Graph square root and cube root functions.

Unit 3 – Other Non-linear Functions and Relations, Discrete Math (4.1.B, 4.3.A, 4.3.C)

Students will be able to:

1. Use inverse variation and joint variation models.
2. Simplify and multiply rational expressions.
3. Divide rational expressions and simplify complex fractions.
4. Add and subtract rational expressions.
5. Solve rational equations.
6. Perform matrix addition, subtraction, and scalar multiplication.
7. Use and write sequences and series.
8. Write rules for arithmetic sequences and find sums of arithmetic series.
9. Write rules for geometric sequences and find sums of geometric series.

Unit 4 – Data Analysis and Probability (4.4.A, 4.4.B, 4.4.C)

Students will be able to:

1. Use unbiased samples and surveys to make predictions.
2. Classify sampling methods and find sampling error.
3. Find how statistical measures are affected by changes to data sets.
4. Use the fundamental counting principle and permutations.
5. Use combinations and relate them to Pascal's triangle.
6. Find theoretical and experimental probabilities.
7. Find probabilities of unions and intersections of events.
8. Find the probability of independent and dependent events.

IV. Materials

A. Text: McDougal Littell Algebra 2 Concepts and Skills 2008

Additional materials will be supplemented when necessary.

B. Notebook, paper, pencil, and eraser must be provided by the student

C. Calculators will be provided when necessary. Students may purchase their own Personal calculator as research supports the fact that the more familiar they are with the calculator, the better their performance.

V. Evaluation

A. The student will be expected to complete classwork, homework, keep a notebook and take tests and quizzes. These will be checked and reviewed by the teacher.

B. The student will be expected to demonstrate an acceptable level of proficiency in the objectives and content of this course.

C. The student will be expected to demonstrate at all times appropriate classroom behavior such as self-control, respect for others, respect for property and a mature attitude.

D. The student will be expected to adhere to the school rules and regulations for behavior and the district policy for attendance.

E. Students will be required to successfully pass the High School Proficiency Test as

mandated in the graduation law (N.J.S.A. 6:8-4.2).

F. Students who fail the HSPA examination will be placed in a Basic Skills Math class as required by N.J.S.A. 6:8-4.2. There will be no exceptions to this requirement.

G. The student will be expected to take a comprehensive final exam covering the entire school year's work. This exam will count at 1/5 of the final grade.

H. The final grade represents the teacher's professional judgment of the student's performance and all of the aforementioned activities and/or requirements are included in the evaluative process.

Teachers in every discipline will include opportunities wherein students will reinforce writing skills through homework assignments, class work activities, and special assignments / projects / reports if required, by writing in complete sentences, using correct spelling and punctuation.

Reviewed and Revised July 2009