ALGEBRA I
College Prep. B
CURRICULUM GUIDE

NUMBER: 303
LEVEL: College Prep. B
TEXTBOOK: ALGEBRA 1 CONCEPTS AND SKILLS, McDougal Littell Inc., 2001
LENGTH: Full year
CREDITS: 5 Credits
REVISED: April 2012

Midterm Exam Revised: December 2011
Final Exam Revised: May 2012

PREREQUISITE

There are no prerequisite courses for Algebra 1 CP B. Incoming freshman are scheduled for this course based on their scores on standardized tests and teacher recommendation. Upper classmen may schedule the course with teacher recommendation.

COURSE DESCRIPTION

Algebra 1 CP B is the first year of college preparatory mathematics at our CP B level. This course is designed for students who, based on test scores and previous mathematical background, would have difficulty in succeeding in our Algebra 1 CP A. course. It covers the same concepts, but applies them to less complex problems.

Topics covered in this course are operations on real numbers, solutions of first degree equations and inequalities, exponents, polynomials, factoring, radicals, functions, probabilities, percents, and data analysis. Problem solving and real-life situations, which apply these concepts, are stressed throughout the course.

HSPA Review problems will also be integrated into the course through teacher prepared worksheets and/or transparencies. Similar problems will appear on tests and quizzes.

Scientific and graphing calculators are required for the course both for exploration and discovery and as an aid to computation in real life problems. The use of a calculator allows students to concentrate on problem solving strategies and enables us to use the types of numbers which occur in real life situations, but may be difficult to work with if a calculator is not available. Students will be given instructions on how to use the calculators efficiently. Estimation and reasonableness of answers will be stressed so that students can recognize calculator errors.

Students are expected to be active participants in the learning process. The teacher will involve them in the introduction and development of material through questioning and class discussions. Understanding of concepts is stressed rather than rote memorization of skills. When appropriate, students are guided in discovering the concept themselves.
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through a study of patterns and by relating the new work to their prior knowledge. Critical thinking is emphasized and students will be asked to draw, label, explain, justify, verify and interpret as they apply the concepts to new situations. Cooperative learning activities will be used throughout the course, both informal activities such as discussing homework or solving a problem from the textbook and formal discovery and problem solving activities. Students will be encouraged to verbalize math concepts and share ideas with each other.

District Policy: ACADEMIC INTEGRITY

Pupils are expected to be honest in all of their academic work. This means that the students in this course will not engage in any of the following acts:

• Cheating on examinations or other school assignments, including but not limited to, the non-authorized use of books or notes, the use of crib sheets, copying from other students’ papers, exchanging information with other students orally, in writing, or by signals, obtaining copies of the examination illegally and other similar activities. Cheating through the use of technology to exchange information on any school assignment, examination, etc. is prohibited. Technology is defined as, but not limited to, computers, telephones, text messaging, palm pilots, calculators, cameras or any other hand held device.
• Plagiarism is not permitted in term papers, themes, essays, reports, images, take-home examinations, and other academic work. Plagiarism is defined as stealing or use without acknowledgment of the ideas, words, formulas, textual materials, on-line services, computer programs, etc. of another person, or in any way presenting the work of another person as one’s own.
• Falsifications, including forging signatures, altering answers after they have been graded, inserting answers after the fact, erasing of grader’s markings, and other acts that allow for falsely taking credit.

A pupil found guilty of academic dishonesty may be subjected to a full range of penalties including, but not limited to reprimand and loss of credit for all of the work that is plagiarized. Disciplinary action may also be a consequence of such behavior. Additional consequences may apply as defined in specific department policies and guidelines. A teacher who believes that a pupil has been academically dishonest in his/her class should resolve the matter in the following manner:
• Reprimand the student orally and/or in writing. The teacher is also authorized to withhold credit in the work due to academic dishonesty.
• If warranted, the teacher shall file a written complaint against the student with the Administration, requesting a more stringent form of discipline. The complaint must describe in detail the academic dishonesty that is alleged to have taken place, and must request that the matter be reviewed by the Administration.
• The Administration will determine if further discipline of the pupil is appropriate, and will determine the nature of the discipline on a case-by-case basis.
• If the pupil is not in agreement with the disciplinary action of the Administration, he/she may appeal the action first to the Principal and secondly to the Superintendent. If the pupil is dissatisfied with the Superintendent’s disposition of the case, he/she may grieve the action in accordance with Policy No. 5710, Pupil Grievance.
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District Policy: Equal Opportunity

High Point Regional High School’s curriculum and instruction are aligned to the State’s Core Curriculum Content Standards and address the elimination of discrimination by narrowing the achievement gap, by providing equity in educational programs and by providing opportunities for students to interact positively with others regardless of race, creed, color, national origin, ancestry, age, marital status, affectional or sexual orientation, gender, religion, disability or socio-economic status.

COURSE OBJECTIVES

Students will be able to:

1. perform computations with real numbers.
2. solve linear equations and inequalities.
3. solve problems involving ratios, proportions, rates and percents.
4. identify, evaluate and graph functions (linear, absolute value, quadratic, and exponential) and their transformations.
5. solve systems of equations.
6. use concepts of data analysis, probability and discrete mathematics to solve problems.
7. use computation rules for exponents, radicals and polynomials; factor polynomials.
8. apply all concepts to real life problems.

COURSE POLICIES

Homework will be given almost every day and is an important part of the course, providing students with the opportunity to apply skills learned in class, strengthen their understanding of the concepts, and identify areas they don’t understand. It is imperative that students do homework regularly and conscientiously. Homework will be reviewed in class and it is the student’s responsibility during that time to ask questions about problems he/she doesn’t understand, to identify specific mistakes, and to take notes on any further explanations concerning these problems. Students will be responsible to make up any missed class work (tests, quizzes, projects, and homework) in a timely manner and according to teacher established policies, which will be discussed in class. It is the student’s responsibility to obtain material (notes, homework) for any extended absence and meet with the teacher upon return to class.

Students are expected to bring their textbook, homework, and a writing implement to class. They are expected to take notes during class and to keep these notes along with homework, quizzes, and tests, in an organized manner.
STUDENT EVALUATION

Quizzes, based on the course proficiencies, will be given about once a week, with a major test, based on the proficiencies, given at the end of each unit. Pop quizzes may also be given at the discretion of the instructor. An exam, covering the semester’s work, will be given at the end of the semester.

Homework will be checked daily. It will usually not be graded, but will be considered satisfactory if the work shown indicates the student has made a conscientious effort to complete the assignment. Sometimes an assignment given for homework may be collected and graded as a quiz. This will occur only when the concepts have been thoroughly reviewed.

Grades will be calculated according to the school grading policy and the following guidelines:

A. Marking Period
   1. Tests and Quizzes 75%
   2. Homework and class work 25%
   (Each teacher will explain his/her policy to the class)

B. Semester Grade
   1. Each Marking Period 40%
   2. Exam 20%
NOTES TO THE TEACHER

The proficiencies, not the textbook, are to be used as a guide for this course. Teachers must develop materials for topics not covered in the textbook. At the end of each unit a list of resources and activities are given. The textbook is a major resource and will be listed first. For each unit there are also extensive supplementary materials from which the teacher should select appropriate activities for their class. These materials include:


2. Warm Up Transparencies and Daily Homework Quiz Book
3. Starting Points: Alternative Lesson Opener
4. Instant Replay Video Review Games which contains video clip previews for each chapter as well as video review games
5. *Electronic Lesson Presentations* CD Rom
6. Electronic Teacher Tools, Student Tutor, and Test and Practice Generator CD ROMs
7. On-line resources at [www.mcdougallittell.com](http://www.mcdougallittell.com) both for teachers and students (access code for teachers: MCD4852A61HLW; access code for students: MCDHJ4CRQDPE7)
8. *Understanding MATH Program*: worksheets are available online at [www.neufeldmath.com](http://www.neufeldmath.com)
9. HSPA Resource Book

We will also be using the Geometer’s Sketchpad. Sample activities can be found in the book Exploring Algebra with the Geometer’s Sketchpad *.

The HSPA Departmental Resource Book noted in the list of resources contains practice worksheets which should be used at the teacher’s discretion. The worksheets listed in the resources are enrichment worksheets, which extend the concepts and include HSPA activities. These must be included in the course. If time constraints make it impossible to include all these activities, teachers should jointly decide which ones to omit. HSPA sample problems given in the curriculum guide must also be included in the course.

2003-2004 is the first year we will be using this Curriculum Guide. The teacher should note specific activities used from the starred (*) resources in their lesson plans for inclusion in this guide.
COURSE PROFICIENCIES

Unit 1: Connections to Algebra  17 Days

Goals:  Students will be able to use algebraic expressions, equations and inequalities to model real life situations and to solve problems.

Objectives:  Students will be able to:

1. Evaluate variable expressions and powers. (A-SSE 1a)
2. Use the established order of operations. (A-APR 1)
3. Check solutions of equations and inequalities. (A-SSE 1a)
4. Translate words into mathematical symbols. (7 EE)
5. Model and solve real life problems. (7EE 3, 4)
6. Organize data using a table or graph. (F-IF 9)
7. Construct and interpret scatter plots. (S-ID 1, N-Q 1)
8. Construct a line of best fit and identify outliers. (8.SP)
9. Use four different ways to represent functions, emphasizing domain and range. (F-IF 1)

Common Core Standards for Mathematics

A-SSE 1a, A-APR 1, 7EE 1 – 4, F-IF 1 & 9, S-ID 1, 8.SP, N-Q 1

References:

1. Textbook, Chapter 1.
3. *Warm Up Transparencies and Homework Quiz* transparencies.
5. *Electronic Lesson Presentations CD*
Goals: Students will be able perform computations with real numbers.

Objectives: Students will be able to:

1. Graph, compare and order real numbers; use vectors to show direction on the number line. (S-ID 1, N-RN 1-3)
2. Use the number line to find the opposite and absolute value of a number. (N-RN 1-3)
3. Add real numbers on the number line (using vectors) and identify the commutative and associative properties of addition. (A-APR 1)
4. Demonstrate an understanding of the reflexive, symmetric and transitive properties. (This is not covered in the text and must be supplemented) (A-APR 1)
5. Multiply real numbers correctly using the rules for finding the sign of non-zero numbers, use the distributive property. (A-APR 1)
6. Simplify algebraic expressions by combining like terms. (A-SSE 1)
7. Divide real numbers and simplify algebraic expressions involving division. (A-APR 1)
8. Add and subtract matrices; do scalar multiplication. (NVM 6 – 9)
9. Apply these concepts to solving real life problems.

Common Core Standards for Mathematics:

(S-ID 1, N – RN 1-3, A-APR 1, A-SSE 1, NVM 6-9)

References:

1. Textbook, Chapter 2.
2. Supplementary worksheets (attached).
4. Warm Up Transparencies and Homework Quiz transparencies.
6. Electronic Lesson Presentations CD
9. Enrichment worksheets 1.5 and 1.6 (worksheets attached).
Unit 3: Solving Linear Equations and Inequalities

14 Days

**Goals:** Students will be able to solve linear equations and inequalities; and use formulas, ratios and percents.

**Objectives:** Students will be able to:

1. Solve linear equations using addition, subtraction, multiplication and division. (A-CED 1a, 3)
2. Use two or more steps to solve linear equations. (A-CED 1a, 3)
3. Solve equations with variable on both sides. (A-CED 1a, 3)
4. Solve more complicated equations, including equations with fractions and decimals (it is necessary to supplement the exercises in the book). (A-CED 1a)
5. Solve a formula for one variable. (A-CED 1a, 4)
6. Solve and graph basic inequalities. (A-REI 1)
7. Solve absolute value equations. (A-REI 1)

**Common Core Standards for Mathematics:**

A-CED 1a, 4, A-REI 1

**References:**

2. Supplementary worksheets (attached).
4. *Warm Up Transparencies and Homework Quiz* transparencies.
6. *Electronic Lesson Presentations CD*
Unit 4: Graphing Linear Equations and their Functions 23 Days

Goals: Students will be able to graph lines and evaluate functions.

Objectives: Students will be able to:

1. Plot and give the coordinates of points in the coordinate plane. (8. F 4, 5)
2. Demonstrate an understanding of scatter plots, line of best fit, negative and positive correlation. (SID 6 a-c)
3. Demonstrate an understanding of the meaning of slope. (Internet Activity attached) (SID 7, 8, F-IF 5, 7, FLE 1a, 1b, 2, 3, 5)
4. Determine the slope of a line given two points on the graph of an equation. (F-IF 6)
5. Graph a linear equation using a table of values and the slope-intercept form of an equation. (8.F 3 – 5)
6. Graph horizontal and vertical lines. (8.F 3 – 5)
7. Determine the x- and y-intercepts of a line. (F-IF 4)
8. Use a graphing calculator to graph linear functions. (A-REI 2)
9. Identify functions and use function notation: determine domain and range. (F-IF 1, 2)
10. Use graphs of linear equations to solve real-life problems.

Common Core Standards for Mathematics

8.F 3, 4, 5, SID 6 a-c, 7, 8, F-IF 1, 2, 4, 5, 6, 7, FLE 1a, 1b, 2, 3, 5, A-REI 2

References:

1. Textbook, Chapter 4 (omit 4.6)
2. Supplementary worksheets (attached).
4. Warm Up Transparencies and Homework Quiz transparencies.
6. Electronic Lesson Presentations CD
11. Graphing calculator activity on slope.
**Goals:** Students will be able to write linear equations and apply them to real-life situations. Students will also be able to recognize patterns and find the nth term rule for sequences.

**Objectives:** Students will be able to:

1. Determine the equation of a line given the slope and y-intercept or two points on a line. (A-CED 1a, 1b, 2)
2. Write and use a linear equation to solve real-life problems. (A-CED 1a, 1b, 2)

**Common Core Standards for Mathematics:**

- A-CED 1a, 1b, 2

**References:**

1. Textbook, Chapter 5 (omit 5.2, 5.4, 5.6); p.119 – 120.
2. Supplementary worksheets (attached).
5. *Warm Up Transparencies and Homework Quiz* transparencies.
7. *Electronic Lesson Presentations CD*
8. *HSPA* Resource Book, attached problems
Unit 6: Systems of Linear Equations

**Goals:** Students will be able to solve systems of two linear equations using different methods and graph the solutions to the systems of linear.

**Objectives:** Students will be able to:

1. Estimate the solution of a system of linear equations by graphing. (A-REI 5)
2. Solve systems of linear equations by substitution and linear combinations. (Focus on simple problems) (A-REI 5-7, 10 – 12, F-IF 7)
3. Apply and use linear systems to solve real life problems (supplement with HSPA problems). (A-REI 5)
4. Identify how many solutions a linear system has. (A-REI 5-7, 10 – 12, F-IF 7)

**Common Core Standards for Mathematics**

- A-REI 5-7, 10-12, F-IF 7

**References:**

1. Textbook, Chapter 7 (omit 7.6)
2. Supplementary worksheets (attached).
4. *Warm Up Transparencies and Homework Quiz* transparencies.
6. *Electronic Lesson Presentations CD*
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Unit 7: Exponents and Exponential Functions 12 days

Goals: Students will be able to simplify expressions involving exponents, graph exponential functions, and model real-life situations using exponents.

Objectives: Students will be able to:

1. Use the multiplication properties of exponents. (omit power-power section) (A-SSE 3c)
2. Evaluate powers that have zero exponents. (omit negative exponents) (A-SSE 3c)
3. Graph an exponential function and find its domain and range. (A-SSE 3c)
4. Use division properties of exponents. (A-SSE 3c)
5. Read and write numbers in scientific notation. (8. EE 3)
6. Write and graph exponential growth functions and exponential decay functions. (F-IF 8a, A-REI 2, FLE 1a, 1c, 2, 3, 5)

Common Core Standards for Mathematics:

- A-SSE 3c, 8.EE 3, F-IF 8a, A-REI 2, FLE 1a, 1c, 2, 3, 5

References:

1. Textbook, Chapter 8.
2. Supplementary worksheets (attached).
4. Warm Up Transparencies and Homework Quiz transparencies.
   Real Life Applications: “Telephone Numbers” p. 18; “Banking” p.30;
   “Internet Usage” p. 56; “Investing for College” p.84;”Record Albums”, p.99;
   Interdisciplinary Application: “Carbon-14 Dating”, p. 42; “Sahara Desert” p. 69;
   Chapter Review Games and Activities, p. 101.
6. Electronic Lesson Presentations CD
7. Instant Replay Video Review Games and corresponding black line masters
8. HSPA Resource Book.
Goals: Students will be able to identify, compute with, and factor polynomial expressions.

Objectives: Students will be able to:

1. Add and subtract polynomials. (A-APR 1)
2. Multiply polynomials using the distributive property. (A-APR 1)
3. Use special product patterns to multiply polynomials. (A-SSE 2)
4. Factor trinomials of the form: \( x^2 + bx + c \) (A-SSE 3a)
5. Factor trinomials of the form: \( ax^2 + bx + c \) (A-SSE 3a)
6. Factor special products. (A-SSE 3a, A-REI 4b)

Common Core Standards for Mathematics

- A-APR 1, A-SSE 2, 3a, F-IF 8a, A-REI 4b

References:

1. Textbook, Chapter 10, omit sections 10.4 and 10.8
2. Starting Points: Alternative Lesson Opener transparencies.
3. Warm Up Transparencies and Homework Quiz transparencies.
   Chapter 10 Resource Book: “Strategies for Reading Mathematics,” p.7, 8;
   Real Life Applications: “Cutting the Lawn” p. 32; “Marching Band” p. 68;
   “The Art of Africa” p. 80; “Manufacturing” p. 95; Interdisciplinary Application:
   “Stained Glass” p.19; “Pythagoras” p. 44; Chapter Review Games p. 108.
4. Electronic Lesson Presentations CD
5. HSPA Resource Book.
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Unit 9: Quadratic Equations and Absolute Value Functions

12 days

Goals: Students will be able to evaluate square roots and radicals, graph quadratic and absolute value functions, and interpret graphs of real life situations.

Objectives: Students will be able to:

1. Evaluate and approximate square roots. (A-REI 1)
2. Solve quadratic equations by finding square roots. (A-REI 1)
3. Identify the domain and range of a function. (F-IF 1)
4. Identify and graph quadratic, absolute value and exponential functions. (A-REI 2)
5. Identify and graph quadratic absolute value, and exponential functions. (A-REI 2)
6. Graph translations and reflections of a given function without a calculator.
7. Sketch and interpret graphs representing real life situations (must be supplemented with HSPA graphs). (F-IF 5, 6, 7)

Common Core Standards for Mathematics

- A-REI 1, 2, F-IF 1, 5, 6, 7

References:

1. Textbook, Chapter 9 sections 9.1 and 9.2 only.
2. Supplementary worksheets (attached).
4. Warm Up Transparencies and Homework Quiz transparencies.
6. Electronic Lesson Presentations CD
7. HSPA Resource Book.
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Unit 10: Percents, Discrete Math, Statistics and Probability
16 days

Goals: Students will develop an understanding of and be able to apply concepts and techniques of data analysis, probability and discrete mathematics.

Objectives: Students will be able to:

1. Use ratio, percents and rates to solve problems. (7.RP 1 – 3)
2. Determine the mean, median, mode and range for a set of data (supplement with HSPA problems). (S-ID 2, 3)
3. Determine the most appropriate measure of central tendency for a problem. (S-ID 2)
4. Display and interpret data in a variety of formats including frequency distribution, tables, histograms and scatter plots. (S-ID 1- 3)
5. Use tree diagrams and other systematic forms of listing to solve problems. (7.SP8)
6. Use the counting principle to solve problems. (7.SP8)
7. Use factorial notation when appropriate. (7.SP8)
8. Determine whether or not a sample is biased. (7.SP 3, 4)
9. Find the probability of a single event, mutually exclusive events, and independent and dependent events. (7.SP8)
10. Determine and compare experimental and theoretical probability. (7.SP5)
11. Identify a pattern in a table of numbers, sequence or a diagram. (F-BF 2)
12. Make a prediction by using patterns in number sequences. (F-BF 2)
13. Find the nth term rule for sequences, linear and non-linear. (F – BF 2)
14. Understand statistics as a process for making inferences about population and use data from experiments to compare two treatments. Then they will be able to evaluate reports based upon data. (S-IC 1, 2, 3, 4, 5, 6)
15. Describe the subspace of events. (S-CP 1)
16. Understand the differences between independent and dependent probability and calculate the probability of two or more events happening. (S-CP 2, 3, 4)
17. Use the rules of probability to compute probabilities of compound events in a probability model. (S-CP 6, 7, 8, 9)
18. Calculate expected values and use them to solve problems. (S-MD 1 – 4)
19. Use probability to evaluate outcomes of decisions. (S-MD 5-7)

Common Core Standards for Mathematics:

- 7.RP 1 – 3, S-ID 1, 2, 3, 7.SP 3, 4, 5, 8, F-BF 2, S-IC 1, 2, 3, 4, 5, 6,
S-CP 1, S-CP 2, 3, 4, S-CP 6, 7, 8, 9, S-MD 1 – 4, S-MD 5-7
References:

2. Supplementary worksheets (attached).
3. *HSPA* Resource Book

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**Unit 11: Rational Expressions and Equations** (if time is available) 10 Days

**Goals:** Students will be able to solve proportions, simplify operations involving rational expressions, and solve rational equations.

**Objectives:** Students will be able to:

1. Solve proportions using the means and extremes property. (A-APR 7)
2. Demonstrate an understanding of simplifying rational expressions. (A-APR 6)
3. Multiply and divide rational expressions. (A-APR 6)
4. Add and subtract rational expressions with like denominators. (A-APR 7)
5. Add and subtract rational expressions with unlike denominators. (A-APR 7)
6. Solve rational equations. (A-REI 1, 2)

**Common Core Standards for Mathematics:**

- A-APR 6, 7, A-REI 1, 2

**References:**

1. Textbook, Chapter 11, omit 11.2.
3. *Warm Up Transparencies and Homework Quiz* transparencies.
5. *Electronic Lesson Presentations CD*
6. *Instant Replay Video Review Games* and corresponding black line masters from *Video Resource Book:* “Decoder”, p. 36-37