Course: Algebra 1 2008-2009
Instructor: Mrs.Conlin

Course philosophy: Welcome to my class! Mathematics is an extremely interesting and exciting pursuit. In this course, you have the opportunity to reinforce and extend your understanding of concepts learned in previous mathematics courses as well as to learn more sophisticated skills. Throughout the course, emphasis is placed on the processes used to find solutions, not on the solutions themselves. It is necessary to learn different problem solving strategies and to be able to explain the methods used to find solutions to problems both in oral and written form. Mathematics is a skill that requires practice, practice, practice. Also, you have opportunities to apply your mathematical knowledge and skills to real life situations via word problems. In addition, technology is used in a variety of ways to enhance learning.

Materials required: Text
Graphing calculator (TI-84 Plus)
Notebook for homework

Classroom expectations:
1. Come to class on time.
2. Come to class prepared. Bring all the required materials and completed homework to class each day.
3. When you arrive in class, immediately get out your homework and begin work on the indicated warm-up exercise. Do not wait for me to start class.
4. You are responsible for any material covered or announcements made during your absence.
5. Respect yourself and others. Dishonest and inappropriate behaviors are not acceptable.
6. Finally, give each task your best effort and remain positive. You may find some of the concepts and problems quite challenging, but do not give up. There is great satisfaction found in persevering until a concept is mastered! Mathematics is an extremely interesting and exciting subject to explore!

Homework policies:

Mathematics is a skill, and, like all skills, it must be practiced. Homework is an important part of the learning process and is assigned almost every night. All homework should be done in pencil and kept in a notebook. It must be labeled with the page number and problem numbers. You must include the work for each problem, not just the answer. Most assignments are due at the beginning of the next class period. The maximum amount of focused, uninterrupted time spent on math homework should be 30 minutes/night for a regular course and 40 minutes/night for an honors course.

Grading procedure:

Grades are determined by points earned out of points possible. Major tests are cumulative and are always announced; quizzes may or may not be announced. Weighting factors are as follows:

tests and quizzes 90%
homework 10%

Tentative Algebra 1 Schedule Text: Algebra Structure and Method Book 1 (Brown, Dolciani, Sorgenfrey & Cole, 2000)

Week Chapters Sections Topics

1 1 All Introduction to algebra
2 1 All Introduction to algebra
3 2 All Real numbers
4 2 All Real numbers
5 3 All except 3.8 Solving equations and problems
6 3 All except 3.8 Solving equations and problems
7 4 All except 4.10 Polynomials
8 4 All except 4.10 Polynomials
9 5 All Factoring polynomials
10 5 All Factoring polynomials
11 5 All Factoring polynomials
12 Review and exam

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13 5 All Factoring polynomials
14 6 All Algebraic fractions
15 6 All Algebraic fractions
16 6 All Algebraic fractions
17 7 All except 7.10 Applying fractions
18 7 All except 7.10 Applying fractions
19 7 All except 7.10 Applying fractions
20 8 All except 8.6 Functions and lines
21 8 All except 8.6 Functions and lines
22 8 All except 8.6 Functions and lines
23 9 All Systems of linear equations

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24 9 All Systems of linear equations
25 9 All Systems of linear equations
26 10 All Inequalities and absolute value
27 10 All Inequalities and absolute value
28 10 All Inequalities and absolute value
29 11 All except 11.6 Rational and irrational numbers
30 11 All except 11.6 Rational and irrational numbers

31 11 All except 11.6 Rational and irrational numbers
32 12 All except 12.7, 12.8 Quadratic functions
33 12 All except 12.7, 12.8 Quadratic functions
34 Review
35 Final exam

Algebra 1 Outline

I. Introduction to algebra

A. Basic terminology
1. Variables
a. Values of the variable
b. Variable and numerical expressions
c. Simplifying expressions
d. Substitution Principle
e. Evaluating expressions
2. Grouping symbols
a. Parentheses, brackets, fraction bar
b. Order of operations
3.. Equations
a. Open sentences
b. Domain
c. Solutions or roots
d. Satisfying an equation

B. Applications and problem solving
1. Translating words into symbols
2. Translating sentences into equations
3. Translating problems into equations
4. Plan for solving word problems

C. Numbers on a line
1. Number lines
a. Origin
b. Natural or counting numbers
c. Whole numbers
d. Integers
i. Positive
ii. Negative
e. Graph
f. Coordinates
g. Real numbers

h. Inequality symbols
2. Opposites
3. Absolute value

II. Working with real numbers

A. Addition and subtraction
1. Basic assumptions
a. Closure Properties
b. Commutative Properties
c. Associative Properties
d. Properties of Equality
i. Reflexive
ii. Symmetric
iii. Transitive
e. Identity Property of Addition
f. Additive Inverse Property
g. Property of Opposite of a Sum
2. Rules for addition
3. Definition of subtraction
B. Multiplication
1. Basic assumptions
a. Distributive Property
b. Identity Property of Multiplication
c. Multiplicative Property of Zero
d. Multiplicative Property of -1
e. Property of Opposites in Products
2. Rules for multiplication
3. Consecutive integer problems
C. Division
1. Basic assumptions
a. Multiplicative Inverse Property
b. Property of the Reciprocal of the Opposite of a Number
c. Property of the Reciprocal of a Product
2. Definition of division
3. Rules for division

III. Solving equations and problems

A. Transforming equations into equivalent equations
1. By addition and subtraction
a. Addition Property of Equality
b. Substitution
2. By multiplication and division

a. Multiplication Property of Equality
b. Never multiply by zero when transforming an equation
3. Using several transformations
B. Solving problems
1. Using equations to solve word problems
2. Equations with the variable on both sides
C. Extending problem solving skills
1. Using charts to solve word problems
2. Cost, income,and value problems

IV. Polynomials

A. Addition and subtraction
1. Basic terminology
a. Exponent, base, power
b. Monomial, binomial, trinomial, polynomial
c. Constant
d. Coefficient
e. Similar or like terms
f. Simplest form
g. Degree
2. Simplifying polynomials by adding like terms
B. Multiplication
1. Exponent Rules
a. Product of Powers
b. Power of a Power
c. Power of a Product
2. Multiplying polynomials by monomials
3. Multiplying polynomials
C. Problem solving
1. Transforming formulas
2. Distance-rate-time problems
3. Area problems

V. Factoring Polynomials

A. Quotients and factoring
1. Factoring integers
a. Prime factorization
b. Greatest common factor
2. Dividing monomials
a. Property of Quotients
b. Exponent Rule for Division
c. Negative and zero exponents

3. Monomial factors of polynomials
B. Products and factors
1. Multiplying binomials mentally (FOIL method)
2. Difference of two squares
3. Perfect square trinomials
4. Factoring trinomials with a leading coefficient of one
5. Factoring by grouping
6. Factoring trinomials with a leading coefficient other than one
7. Using several methods to factor completely
C. Applications
1. Solving equations by factoring
a. Zero-Product Property
b. Double roots
2. Solving word problems by factoring

VI. Algebraic fractions

A. Simplifying algebraic fractions
B. Multiplying algebraic fractions
1. Multiplication Rule for Fractions
2. Exponent Rule: Power of a Quotient
C. Dividing algebraic fractions
D. Adding and subtracting algebraic fractions
1. Least common denominators
2. Addition Rule for Fractions
E. Polynomial division
1. Mixed expressions
2. Polynomial long division

VII. Applying fractions

A. Ratios
B. Proportions
C. Equations with fractional coefficients
D. Fractional equations (equations with a variable in the denominator)
E. Percents
1. Translating three types of percent problems into equations
2. Percent of increase or decrease problems
3. Interest problems
F. Mixture problems
G. Work problems
H. Summary of rules of exponents

VIII. Functions and lines

A. Equations in two variables
B. Basic vocabulary
1. Plot
2. Origin
3. Axes
a. Horizontal (x-axis)
b. Vertical (y-axis)
4. Graph of an ordered pair
5. Coordinates
a. Abscissa (x-coordinate)
b. Ordinate (y-coordinate)
6. Coordinate plane
7. Quadrants
C. Slope of a line
1. Definition
2. Slope of straight line - constant
3. Slope of horizontal line - 0
4. Vertical line - no slope
D. Forms of a linear equation
1. Standard
2. Slope-intercept
3. Point-slope
E. Graphing linear equations
1. By finding x- and y-intercepts (using standard form)
2. By finding y-intercept and counting slope (using slope-intercept form)
G. Parallel and perpendicular lines
H. Determining an equation of a line
1. Given the graph
2. Given the slope and one point on the line
3. Given two points on the line
I. Functions
1. Domain and range
2. Notation
a. Arrow
b. Functional
3. Linear
4. Quadratic
a. Minimum and maximum
b. Vertex
c. Axis of symmetry
d. Parabola
J. Relations
K. Variation
1. Direct

a. $y = kx$, where k is a nonzero constant
b. Constant of variation; constant of proportionality
c. Graph – line through origin
2. Inverse
a. $y = k/x$, where x is not zero
b. Constant of variation
c. Graph – hyperbola

IX. Solving systems of linear equations

A. Graphing method
B. Substitution method
C. Linear combinations method
D. Applications
1. Wind and water current problems
2. Puzzle problems

X. Inequalities

A. Inequalities in one variable
1. Order of real numbers
2. Graphing on a number line
3. Solving inequalities
a. Property of Comparison
b. Transitive Property of Order
c. Addition Property of Order
d. Multiplication Property of Order
e. Transformations that produce equivalent inequalities
4. Word problems
B. Sets
1. Venn diagrams
2. Intersection
3. Union
4. Null, or empty, set
C. Solving combined inequalities
1. Conjunction
2. Disjunction
D. Absolute value in open sentences
1. Solving absolute value equations and inequalities in one variable
2. Graphing solution set on a number line
E. Graphing linear inequalities
F. Graphing absolute value equations in two variables
G. Graphing a system of two linear inequalities

XI. Rational and irrational numbers

A. Rational numbers
1. Definition
2. Density Property for Rational Numbers
3. Decimal forms
a. Terminating
b. Repeating
4. Rational square roots
a. Principal root
b. Radicand
c. Product Property of Square Roots
d. Quotient Property of Square Roots
B. Irrational numbers
1. Irrational square roots
2. Property of Completeness
C. Square roots of variable expressions
D. Radical expressions
1. Multiplying
2. Dividing
3. Simplifying
4. Rationalizing the denominator
5. Adding
6. Subtracting
E. Multiplication of binomials containing radicals
F. Simple radical equations

XII. Quadratic functions

A. Quadratic equations with perfect squares
B. Completing the square
C. The quadratic formula
D. Graphs of quadratic equations
a. Roots
b. Discriminant
E. Methods for solving a quadratic equation
F. Word problems