



Math Department Curriculum Guide

Algebra 3

Course Description

This course includes the study of arithmetic topics, problem solving, equations and inequalities, sequence and series, elementary functions and elementary trigonometry. This course is designed to help students develop effective strategies to solve math problems on college placement exams, and will also include units from the NEFE High School Financial Planning Program.

Upon completion of this course, students should be able to:

- Apply various problem-solving strategies
- Solve problems that involve fundamental arithmetic and algebra concepts
- Solve linear equations and quadratic equation by factoring
- Solve systems of equations and inequalities
- Simplify expressions and solve equations using the properties of exponents and radicals
- Gain knowledge of basic trigonometric functions and exponential functions
- Study sequences and series, determinants, permutations and combinations
- Gain knowledge about sound money management skills
- Develop positive behaviors to attain financial maturity

Graphing Calculator

Hanover High School students enrolled in Algebra 1, Algebra 2, Precalculus, Calculus, or Statistics should purchase a graphing calculator, preferably a TI-84 Plus or TI-84 Color. It is important for students to gain familiarity with their own calculator in order to use it as a tool during class and for homework. Furthermore, students are expected to use calculators on standardized assessments, including MCAS, PSAT, SAT, and AP, as well as college placement exams. Many of the questions on these assessments are designed in such a way that students are expected to use a graphing calculator. Although there are graphing calculator apps that can be downloaded and used on mobile devices, keep in mind that mobile devices are not allowed on the MCAS, PSAT, SAT, and AP exams. Therefore, it is important that students have access to and learn to use an assessment-approved graphing calculator. There is a limited number of graphing calculators that can be borrowed on a first come first serve basis – please contact the office for information.

Algebra 3 – Calculator Skills

- Perform operations with fractions and exponents
- Convert between decimals and fractions
- Enter equations in $y =$
- Manipulate the window
- Manipulate and use the table
- Graph functions
- Analyze functions by using tables, graphs, and equations



Content Standards

Number and Quantity

Quantities

- A. Reason quantitatively and use units to solve problems.

Algebra

Seeing Structure in Expressions

- A. Interpret the structure of exponential, polynomial, and rational expressions.
- B. Write expressions in equivalent forms to solve problems.

Arithmetic with Polynomials and Rational Expressions

- A. Perform arithmetic operations on polynomials.
- B. Understand the relationship between zeros and factors of polynomials.
- C. Use polynomial identities to solve problems.
- D. Rewrite rational expressions.

Creating Equations

- A. Create equations that describe numbers or relationships.

Reasoning with Equations and Inequalities

- A. Understand solving equations as a process of reasoning and explain the reasoning.
- D. Represent and solve equations and inequalities graphically.

Functions

Interpreting Functions

- B. Interpret functions that arise in applications in terms of the context (polynomial, rational, square root and cube root, trigonometric, and logarithmic functions).
- C. Analyze functions using different representations.

Building Functions

- A. Build a function that models a relationship between two quantities.
- B. Build new functions from existing functions.

Linear, Quadratic, and Exponential Models

- A. Construct and compare linear, quadratic, and exponential models and solve problems.

Trigonometric Functions

- A. Extend the domain of trigonometric functions using the unit circle.
- B. Model periodic phenomena with trigonometric functions.
- C. Prove and apply trigonometric identities.

Financial Mathematics

Mathematical Language in a Financial Context

- A. Demonstrate reasoning skills in developing, explaining, and justifying sound financial decisions.
- B. Communicate effectively, using accurate mathematical language in a financial context.

The Algebra of Finance

- A. Apply algebraic skills and concepts to make responsible and wise financial decisions.

Financial Modeling with Functions and Data

- A. Create, interpret, and analyze various functions, graphs, and data to make responsible and wise financial decisions.



Subject: Algebra 3

Unit	Content
Solving Equations Term 1 September	- Combining like terms on either side of equation - Solving equations with problems containing parentheses - Solving equations with problems containing fractions - Solving equations with problems containing decimals - To solve equations involving proportions
Solving Word Problems Term 1 October	- Solving word problems using linear equations - To solve percent word problems - To solve word problems involving money - To solve distance word problems ($d = rt$) - To solve ratio and proportion word problems - To solve mixture and solution word problems
Factoring Term 1 October and November	- To factor trinomials with leading coefficient $a = 1$ - To factor trinomials with leading coefficient $a > 1$ - To factor special cases including: - Difference of two squares - Difference of two cubes - Sum of two cubes - To solve quadratic equations by factoring
Projects Term 1 November	- Ancient Numbering systems - Factoring
Factoring Term 2 November	- To solve the quadratic equation by using the quadratic formula - To solve application problems with factoring and quadratic formula - To factor by grouping
Exponents Term 2 November and December	- Simplify expressions using product rule - Simplify expressions of powers raised to a power - Simplify negative exponents - Simplify expressions using quotient rule
Sequences and Series Term 2 December and January	- To find terms in a finite and infinite sequence given functions - To define series and partial sum of series - To define and solve problems involving arithmetic sequences and series - To define and solve problems involving geometric sequences and series



Unit	Content
Projects Term 2 January	- Optical illusions - Sequences and series
Combinatorics Term 3 January and February	- To define and solve problems involving permutations - To define and solve problems involving combinations
Trigonometry Term 3 February	- To define sine, cosine, tangent - To solve right triangles by using trigonometric ratios - To solve angle of elevation and depression problems using trigonometry
Exponential & Logarithmic Functions Term 3 February and March	- To define and graph exponential functions - To define and graph logarithmic functions - To identify relationships between exponential and logarithmic functions - To solve logarithmic equations by writing in exponential form - To solve word problems involving exponential functions - To solve money problems compounding interest n times a year and continuously - To define and use the rule of 72 (doubling your money)
Projects Term 3 March and April	- Perspective drawing - Exponential functions
Your Financial Goals Term 4 April	- Analyze how you spend your money - Identify decision making process - Identify guidelines to implement financial plan - Examine the difference between needs and wants - Set SMART goals
Making the most of your Money Term 4 April and May	- To define cash flow and income - Examine how you spend your money - Define different types of expenses – fixed versus variable - Examine the “pay yourself first” method - To build a personal budget
Term 4: Making Money work for you Term 4 May	- Identify the principle of the time value of money - Examine the ways to invest your money - High risk and low risk stocks and bonds - Identify the financial planning pyramid



Unit	Content
Term 4: Good Debt, Bad Debt, and Using credit wisely Term 4 May and June	▪ Define credit ▪ Examine the cost of using credit ▪ Examine good credit versus bad credit ▪ Identify the 4 C's of credit: Collateral, Capital, Capacity, and Character ▪ To examine credit score and credit report