Math Department Sequence

	Non-Accelerated Pathway	Accelerated Pathway	Conceptual Algebra (Algebra I over two years) Pathway	Graduation Requirements
Grade:	Course Title	Course Title	Course Title	All pathways require three years of high school level math for graduation. Most students will take the non-accelerated pathway unless they have qualifying assessment scores and teacher recommendation.
Grade 7	Math 7	Math 7 1st Sem Pre-Algebra 2nd Sem	Math 7	
Grade 8	Pre-Algebra	Honors Algebra	Pre-Algebra	
Grade 9	Algebra	Honors Geometry	Conceptual Algebra 1	
Grade 10	Geometry	Honors Algebra II/Trigonometry	Conceptual Algebra 2	
Grade 11	Algebra II	Pre-Calculus	Geometry	
Grade 12	Pre-Calculus * Senior Math Stats Consumer Math┼	Calculus Senior Math Stats Consumer Math	Algebra II Honors Algebra II/Trigonometry Senior Math Stats Consumer Math	

* It is highly recommended that students take Honors Algebra II with Trigonometry before enrolling in Pre-Calculus.

┼Consumer math is only open to juniors who meet placement criteria that include assessment placement and recommendation.

MATH DEPARTMENT

PHILOSOPHY

The math department believes that all students should be well rounded in the area of mathematics. This includes understanding the content, communicating ideas (both written and oral), reading/comprehending mathematical terminology, and applying appropriate concepts to solve real-world problems. The department strives to achieve this by:

- Presenting information for various learning styles including: visual, kinesthetic, and auditory. Appropriate technology is integrated via the online textbooks, 1:1 Chromebooks, and graphing calculators.
- Providing courses for a range of student thinking styles and learning paces
- Varying the mode of instruction in terms of individual, small group, and large group activities and discussions
- Promoting good questioning techniques and higher order thinking skills

STANDARDS: The student will:

1) Effectively use a variety of strategies in the problem-solving process.
2) Understand and apply basic and advanced properties of the concept of numbers.
3) Use basic and advanced procedures while performing the process of computation.
4) Understand and apply basic and advanced properties of the concept of measurement.
5) Understand and apply basic and advanced properties of the concepts of geometry.
6) Understand and apply basic and advanced concepts of data analysis and distributions.
7) Understand and apply basic and advanced concepts of probability and statistics.
8) Understand and apply basic and advanced properties of functions and algebra.
9) Understand the general nature and uses of mathematics.
10) Effectively use appropriate technology in the problem solving process.
11) Effectively use written and verbal communication to articulate a variety of mathematical ideas.

CAREERS IN THE MATH FIELD

Actuary
Air traffic controller
Airline pilot
Architect
Artist
Auto mechanic
Bank employee
Biomedical engineer
Bookkeeper
Building contractor
Carpenter
Cartographer
CNC Operator
College Professor
Computer science teacher
Life Insurance Administrator
Mathematics/Science Teacher
Mortgage supervisor
Nuclear engineer
Nuclear physicist
Operations manager
Pediatric nurse practitioner
Pension analyst
Photographer
President of a training & consulting firm
Professor of meteorology
Quality engineer
Regional planner
Reliability engineer
Research environmental engineer

Computer systems analyst and designer	Sales manager
Computer Programmer	School superintendent
Construction contractor	School system technology coordinator
Cryptologist	Scientist
Customer service manager	Software engineer
Development engineer	Statistical process controller facilitator
Draftsperson	Statistician
Engineering technician	Structural engineer
Farmer	Systems engineer
G.P.S. Technician	Tax consultant
Guidance counselor	Technical manager for a chemical company
High School physics teacher	Tool and gage designer
Internal auditor	Training coordinator-information services
Industrial Engineer	Veterinarian
Investment planner	Web page designer

Number:	633/634	Title:	Conceptual Algebra 1
Grade(s):	9	Meeting Time:	Daily
Length:	Year	Credit:	5 Per Semester

COURSE SUMMARY: The student will:

1. Develop connections to algebra
2. Understand apply properties of real numbers
3. Solve, graph and evaluate linear equations
4. Write and model linear equations
5. Solve and graph linear inequalities

This course is designed for students who struggle with math. Students will be recommended by their teacher to enroll in Conceptual Algebra 1 followed by Conceptual Algebra 2 as a sophomore. However, just because a student is recommended does not mean that they must take this pathway. The two courses will satisfy two years of the school and state math requirements but will only count as one year of math for the purpose of college entrance requirements. The *Concepts and Skills* program is committed to meeting the needs of all learning levels by providing an accessible approach that helps prepare students for success in algebra. The course is designed to build a solid foundation in the fundamentals with visual learning strategies, easy-to-follow examples, and help-notes for homework, vocabulary, and problem solving and to provide flexible and manageable pacing and prepare students with targets and frequent practice. Upon completion of this course students will be prepared to take Conceptual Algebra 2

Number:	643/644	Title:	Conceptual Algebra 2
Grade(s):	10	Meeting Time:	Daily
Length:	Year	Credit:	5 Per Semester

COURSE SUMMARY: The student will:

1. Solve and graph systems of linear equations and inequalities
2. Understand, apply and evaluate exponents and exponential functions
3. Solve, simplify and graph quadratic equations and functions
4. Apply mathematical operations and factoring to polynomials
5. Understand, evaluate and solve rational expressions and equations
6. Use technology to solve problems when appropriate.

This course is the second year of the Conceptual Algebra sequence. This course is designed for students who struggle with math. Students who completed Conceptual Algebra 1 will need to complete this course to complete the Algebra course work. The two courses will satisfy two years of the school and state math requirements but will only count as one year of math for the purpose of college entrance. Upon completion of this course students will be prepared to take Geometry.

Number:	625/626	Title:	Honors Algebra I
Grade(s):	8, 9	Meeting Time:	Daily
Length:	Year	Credit:	5 Per Semester

Guideline: Honors guidelines apply

COURSE SUMMARY: The student will:

1. Evaluate, graph and analyze equations in one variable
2. Evaluate, graph, write, and solve equations in two variables
3. Write and solve linear equations and inequalities.
4. Recognize, find, and evaluate exponential models and quadratic functions.
5. Work with radicals and discover geometry connections.
6. Use technology to solve problems when appropriate.

Honors Algebra is designed for students with above average math skills and above average work ethic. Students will build a strong base of math knowledge for more advanced math courses and also assess the importance of Algebra in other areas of study and everyday living. While the topics covered are similar to Algebra 1, the topics are examined in more detail with strong emphasis on discovery and application. Students will be expected to develop critical thinking skills, problem solving skills and oral and written articulation of concepts. A graphing calculator will be required. Upon completion of this course students will be prepared for Honors Geometry.

Number:	629/630	Title:	Algebra I
Grade(s):	9	Meeting Time:	Daily
Length:	Year	Credit:	5 Per Semester

COURSE SUMMARY: The student will:

1. Evaluate, graph and analyze equations in one variable.
2. Evaluate, graph, write, and solve equations in two variables.
3. Write and solve linear equations and inequalities.
4. Recognize, find, and evaluate exponential models and quadratic functions.
5. Identify, make connections, and analyze radical and rational functions.
6. Use technology to solve problems when appropriate.

Algebra is designed for students with average math skills. Students will be expected to develop and practice newly introduced concepts and apply these concepts to real-life situations. Emphasis will be placed on developing critical thinking skills, problem solving skills and oral and written articulation of the concepts. A TI-84 calculator is recommended but not required. A non-graphing calculator could be used.Upon completion of this course students will be prepared for Geometry.

Number:	639/640	Title:	Honors Geometry
Grade(s):	9	Meeting Time:	Daily
Length:	Year	Credit:	5 Per Semester

Guideline: Honors guidelines apply

COURSE SUMMARY: The student will:

1. Apply, solve, graph, reason and prove concepts involving points, lines and planes.
2. Apply, prove and reason theories of triangles
3. Solve and apply theorems regarding figures in the plane including right triangles, trigonometry, quadrilaterals, and properties of transformation.
4. Find, apply, and graph problems regarding circles and measurements including: properties of circles, measuring length and area, surface area and volume of solids,
5. Apply analytical reasoning to problem solving situations using geometric formulas, theorems, postulates, and other concepts.
6. Use technology to solve problems when appropriate.

Honors Geometry is designed for students with above average math skills and above average work ethic. Students will build a strong base of math knowledge for more advanced math courses and for careers in math and science. While the topics covered are similar to Geometry, the topics are examined in more detail with strong emphasis on discovery application. Students will be expected to develop critical thinking skills, problem solving skills and oral and written articulation of concepts. A TI-84 calculator is recommended but not required. A non-graphing calculator could be used. Upon completion of this course students will be prepared for Honors Algebra 2/Trigonometry.

Number:	671/672	Title:	Geometry
Grade(s):	9	Meeting Time:	Daily
Length:	Year	Credit:	5 Per Semester

Guideline: Algebra 1

COURSE SUMMARY: The student will:

1. Apply, solve, graph, reason, and prove concepts involving points, lines and planes.
2. Apply, prove and reason theories of triangles.
3. Solve and apply theorems regarding figures in the plane including right triangles, trigonometry, quadrilaterals, and properties of transformation.
4. Find, apply, and graph problems regarding circles and measurements including: properties of circles, measuring length and area, surface area and volume of solids,
5. Apply analytical reasoning to problem solving situations using geometric formulas, theorems, postulates, and other concepts.
6. Use technology to solve problems when appropriate.

Geometry is designed for the student with typical math skills and follows the completion of Algebra. Students will be expected to develop and practice newly introduced concepts and apply these concepts to real-life situations. Critical thinking, problem-solving, and oral and written articulation of the concepts will be emphasized. A TI-84 calculator is recommended but not required. A non-graphing calculator could be used. Upon completion of this course, students will be prepared to take Algebra 2 or Honors Algebra 2/Trig

Number:	681/682	Title:	Algebra 2
Grade(s):	11, 12	Meeting Time:	Daily
Length:	Year	Credit:	5 Per Semester

Guideline: Geometry

COURSE SUMMARY: The student will study the following topics:

1. Language of algebra
2. Variations of graphs
3. Real numbers and algebraic expressions
4. Linear functions and equations
5. Quadratic functions and equations
6. Quadratic relations
7. Systems of equations and inequalities
8. Exponential and logarithmic functions

Students will apply algebraic concepts and skills in a variety of settings both individually and cooperatively. They will apply analytical reasoning to problem solving for present and future use. Honors Algebra 2/Trigonometry, rather than this course, is the best preparation for students planning to take Pre-Calculus or Physics. A TI-84 graphing calculator will be required for this course.

Number:	693/694	Title:	Honors Alg. 2/Trigonometry
Grade(s):	10, 11	Meeting Time:	Daily
Length:	Year	Credit:	5 Per Semester

Guideline: Honors guidelines apply

COURSE SUMMARY: The student will:

1. Evaluate, graph and analyze equations and inequalities.
2. Write and solve linear equations, systems, functions and matrices.
3. Recognize, find and evaluate quadratic functions and factoring.
4. Identify, make connections between, and analyze polynomial, rational, radical, exponential, logarithmic, and trigonometric functions.
5. Use technology to solve problems when appropriate.
6. Write and solve trigonometric ratios and functions.
7. Identify, make connections, and analyze radical and rational functions.
8. Understand, use and solve trigonometric graphs, identities and equations.
9. Identify, graph and use equations involving Conic Sections.

Honors Algebra 2/Trigonometry is designed for students with consistently above average math skills and demonstrated above average work ethic. Students will build depth to their strong math knowledge base in preparation for more advanced math courses while identifying the importance of algebra in other areas of study and everyday living. While topics covered are similar to Algebra 2, the topics will be examined in more detail with strong emphasis on discovery and application. Students will be expected to develop critical thinking skills, problem solving skills, and oral and written articulation of concepts. A TI-84 graphing calculator will be required for this course. This course is the best preparation for students planning to take Pre-Calculus or Physics.

Number:	653	Title:	Senior Math Applications
Grade(s):	12	Meeting Time:	Daily
Length:	Semester	Credit:	5 Per Semester

Guideline: Geometry

COURSE SUMMARY:

1. Review the fundamentals of algebra.
   - Order of Operations.
   - Rules of Exponents and Scientific Notation.
   - Solving Linear and Literal Equations.
   - Solving and Graphing Linear Inequalities.
   - Graphing Linear Equations.
   - Factoring.
   - Graphing Quadratic Equations.
   - Solving Systems of Equations and Inequalities.
2. Review the fundamentals of geometry.
   - Basic Geometric Concepts, including points, lines, rays, segments and planes.
   - Basic Angle Concepts, including acute, obtuse, right, and straight.
   - Angle Pair Relationships, including congruent, vertical, complementary, supplementary, linear pairs and angles created by transversals.
   - Naming and Classifying Polygons.
   - Triangle Sum Theorem and Exterior Angle Theorem.
   - Area and Perimeter of Polygons.
   - Volume and Surface Area of Solids.
3. Solve real world problems by using a variety of problem solving strategies. Problems include linear programming and story problems.

This course will consist of review and further work in various topical areas introduced in algebra and geometry courses. Emphasis will be placed on linear algebra, linear programming, and the mathematics of finance. This course is meant for those students wishing to have a fourth year of math but do not need the trigonometry or analytic geometry needed for the study of calculus. A TI-84 graphing calculator will be required for this course.

Number:	657	Title:	Statistics I
Grade(s):	12	Meeting Time:	Daily
Length:	Semester	Credit:	5 Per Semester

COURSE SUMMARY: The students will complete units of instruction in the following areas:

1. Introduction to Statistics
2. Descriptive Statistics
3. Introduction to Probability
4. Discrete and Continuous Probability Distribution
5. Statistical Sampling and Sampling Distribution
6. Statistical Inference: Estimation
7. Hypothesis Testing

COURSE DESCRIPTION: The purpose of this course is an introduction to the basic methods of statistical reasoning. The student will be able to describe and summarize data using descriptive statistical methods. The student will be able to analyze relationships between variables, use techniques from probability theory as an aid in interpreting sample data, and use statistical inference to make valid generalizations from sample data.

Number:	651/652	Title:	Pre-Calculus
Grade(s):	11, 12	Meeting Time:	Daily
Length:	Year	Credit:	5 Per Semester

Guideline: Algebra 2 or Honors Algebra 2/Trig

COURSE SUMMARY: The students will:

1. Analyze, evaluate, and graph functions. Functions that are covered include: linear, quadratic, polynomial, rational, radical, exponential, logarithmic, and trigonometric.
2. Solve real-world problems by using a variety of problem solving strategies. Problems include: linear programming, mathematical modeling, related rates of change, maximization, and minimization, and growth/decay models.
3. Explore data with the regression features of a graphing calculator.
4. Explore the various trigonometric identities, equations, formulas and relationships.
5. Work with linear systems and matrices.
6. Examine sequences, series and probability.
7. Be introduced to the introductory calculus topics of derivatives and integrals with their applications.
8. Use appropriate technology to aid in finding solutions.

This course is intended for those students planning to attend college and major in science, engineering, business, or mathematics. The student entering this class should have taken and excelled in Honors Algebra 2/Trig. The student finishing this class will be prepared for entry into calculus courses based on their math proficiency. A TI-84 graphing calculator is required for this course.

Number:	661-662	Title:	AP Calculus
Grade(s):	12	Meeting Time:	Daily
Length:	Year	Credit:	5 Per Semester

Guideline: Pre-Calculus

COURSE SUMMARY The student completing AP Calculus will have been introduced to and tested in the following topics and their applications as directed by the College Board's Advanced Placement Program:

1. Functions, graphs, and limits
    A. Analysis of graphs
    B. Limits of functions (including one-sided limits)
    C. Asymptotic and unbounded behavior
    D. Continuity as a property of functions

11. Derivatives
    A. Concept of derivative
    B. Derivative at a point
    C. Derivative as a function
    D. Second derivatives
    E. Applications of derivatives
    F. Computation of derivatives

111. Integrals
    A. Riemann sums
    B. Interpretations of properties of definite integrals
    C. Applications of integrals
    D. Fundamental Theorem of Calculus
    E. Techniques of anti-differentiation
    F. Applications of anti-differentiation
    G. Numerical approximations to definite integrals

Calculus will be taught as a college class and should only be taken by those excelling in mathematics. The class will be rigorous in order to prepare for the AP Calculus Exam. A graphing calculator will be required for this course. A TI-84 graphing calculator will be required for this course. Students have the opportunity to take the Advanced Placement test offered in May with the possibility of gaining college credit.

Number:	655/656	Title:	Consumer Math
Grade(s):	11, 12	Meeting Time:	Daily
Length:	Year	Credit:	5 Per Semester

Guideline: Juniors need assessment placement and recommendation.

COURSE SUMMARY: Students will:

1. Review use of fractions, including operations of adding, subtracting, multiplying and dividing in mixed, proper and improper forms.
2. Develop career and financial goals and evaluate the effect career choices have on finances.
3. Understand how to calculate gross pay, payroll deductions, and net pay and analyze their effect on creating a spending plan.
4. Identify types and sources of credit and calculate their various costs.
5. Evaluate savings instruments and long-term investments.
6. Analyze risk and evaluate various types of insurance to minimize risk.
7. Maintain a financial record-keeping system to include a record of cash purchases, a checkbook register, and a budget of monthly expenditures

This course covers the objectives of the Iowa Core Curriculum for financial literacy and meets the financial literacy graduation requirement. This course does not meet math requirements for entrance into a four-year college.