

MATH CURRICULUM STANDARDS

- Uses a variety of strategies in the problem solving process.
- Understands and applies properties of the concepts of numbers.
- Uses various procedures while performing the process of computation.
- Understands and applies properties of the concepts of measurement.
- Understands and applies properties of the concepts of geometry.
- Understands and applies concepts of statistics and data analysis.
- Understands and applies concepts of probability.
- Understands and applies properties of functions and algebra.
- Understands and applies the use of technology.

GENERAL MATH

Subject: General Mathematics

Grade: 9

Length of Course: First and Second Semester

Prerequisite: Permission of Instructor Only

CURRICULUM BENCHMARKS:

1. To round decimals
2. To add whole numbers
3. To subtract whole numbers
4. To multiply whole numbers
5. To divide whole numbers
6. To use the order of operations on whole number operations
7. To find the prime factorization of whole numbers
8. To find the GCF of whole numbers
9. To reduce fractions to simplest form
10. To add fractions
11. To subtract fractions
12. To multiply fractions
13. To divide fractions
14. To convert between mixed numbers and improper fractions
15. To add mixed numbers
16. To subtract mixed numbers
17. To multiply mixed numbers
18. To divide mixed numbers
19. To evaluate formulas involving fractions
20. To write the name of a decimal
21. To recognize place values
22. To write a number in decimal form from written form
23. To round decimals

24. To add decimals
25. To subtract decimals
26. To multiply decimals
27. To divide decimals
28. To round decimals
29. To evaluate formulas involving decimals
30. To write percents as decimals and fractions
31. To write decimals as percents
32. To write fractions as percents
33. To perform operations involving percents
34. To add signed numbers
35. To subtract signed numbers
36. To multiply signed numbers
37. To divide signed numbers
38. To use the order of operations on signed number operations
39. To evaluate formulas involving signed numbers
40. To translate verbal statements to mathematical statements using variables
41. To solve one step equations
42. To solve multi-step equations
43. To write and reduce ratios
44. To set up and solve proportions
45. To understand rules of exponents
46. To evaluate exponents using calculator
47. To simplify scientific notation
48. To evaluate square roots

COURSE DESCRIPTION:

In general mathematics, there will be review of the four basic operations (addition, subtraction, multiplication and division) involving whole numbers, integers, decimals and fractions. Relations between decimals, fractions, and percents will be introduced. The metric system is discussed and related to everyday use. Problem solving of various degrees of difficulty is used as a strategy to develop individuals for adult life. Algebra 1 concepts are introduced.

WHAT STUDENTS ARE EXPECTED TO DO:

1. Complete homework on time with acceptable quality.
2. Take notes over examples.
3. Participate in classroom examples and discussion.
4. Maintain a successful average on tests and quizzes.

EVALUATION:

Students will be evaluated on completion of daily assignments, quizzes, and tests.

FUNCTIONAL ALGEBRA

Subject: Functional Algebra

Grade: 9, 10

Length of Course: First and Second Semester

Prerequisite: Pass General Math with an average grade of “C” or better or recommendation based on 8th grade math scores and results of Algebra placement test.

CURRICULUM BENCHMARKS:

1. To write variable expressions
2. To use the order of operations to simplify an expression
3. To evaluate variable expressions
4. To graph integers on a number line and find their absolute values
5. To add and subtract integers
6. To multiply and divide integers
7. To graph ordered pairs in the coordinate plane
8. To simplify variable expressions
9. To solve one step equations involving integers and decimals
10. To solve and graph one step inequalities
11. To round numbers using place values, front end estimation, and clustering
12. To calculate the mean, median, and mode of a set of data
13. To evaluate formulas
14. To simplify expressions involving exponents
15. To find the prime factorization of a number
16. To reduce fractions
17. To use properties of powers to simplify expressions
18. To add and subtract fractions
19. To multiply and divide fractions
20. To convert between customary units of measurement
21. To solve equations involving fractions
22. To find powers of products and quotients
23. To write ratios and unit rates
24. To set up and solve proportions
25. To use proportions to find missing parts of similar figures or scale drawings
26. To calculate the probability of an event
27. To calculate the odds of an event
28. To convert between fractions, decimals and percents
29. To solve equations involving percents
30. To solve multi- step equations involving real numbers
31. To solve equations with variables on both sides
32. To solve multi-step inequalities
33. To calculate simple and compound interest using formulas
34. To determine if a relation is a function
35. To graph linear equations
36. To calculate slope between two points

37. To find the slope and y-intercept of a line
38. To find the area of a parallelogram
39. To find the area of a triangle, trapezoid and circle
40. To find the surface area 3-dimensional figures
41. To find the volume of 3-dimensional figures

COURSE DESCRIPTION:

This course will begin with basic concepts of Algebra I, but at a slower pace. Students will learn different methods of solving multiple step equations and will learn to simplify expressions involving multiple variables and powers.

WHAT STUDENTS ARE EXPECTED TO DO:

1. Complete all homework on time.
2. Be prepared for class and take notes over examples.
3. Maintain a successful average on tests and quizzes.

EVALUATION:

Students will be evaluated on completion of daily assignments, quizzes, and tests.

ALGEBRA I

Subject: Algebra 1

Grade: 8, 9,10,11,12

Length of Course: First and Second Semester

Prerequisite: Successful completion of General Math or Functional Algebra. Eighth graders must achieve a passing score on the Algebra placement test and have teacher recommendation.

CURRICULUM BENCHMARKS:

1. Use Exponents
2. Solve exponents and order of operations
3. Add, subtract, multiply and divide real numbers
4. Use distribution property.
5. Solve one step equations
6. Solve multiple step equations.
7. Solve equations with variables on both sides.
8. Solve common formulas.
9. Find mean, median, mode, and range.
10. Graph inequalities.
11. Solve inequalities using addition, subtraction, multiplication, and division.
12. Solve multiple step inequalities.
13. Solve compound inequalities.
14. Solve ratios and proportions

15. Use proportions to solve for sides of similar figures.
16. Percent errors and percent of change.
17. Probabilities
18. Relate graphs to events.
19. Relations and functions
20. Writing a function rule.
21. Direct variation.
22. Number patterns
23. Find slope
24. Use slope-intercept form.
25. Use point slope form
26. Use standard form.
27. Use parallel and perpendicular lines.
28. Scatter plots
29. Graph absolute value.
30. Solve systems
31. Systems of linear inequalities
32. Simplify exponents
33. Scientific notations
34. Adding and subtracting polynomials
35. Factoring
36. Quadratic equations

COURSE DESCRIPTION:

Students will write and solve equations and inequalities, graph on a number line, and in sequence. They will review the basic operations and properties, learn basic problem solving techniques, apply the basic operations to polynomials, and learn to factor polynomials.

WHAT THE STUDENT IS EXPECTED TO DO:

1. To complete assignments on a daily basis as assigned.
2. To actively participate in classroom discussions.
3. To successfully complete all tests and quizzes.

EVALUATION:

Evaluation will be made on the student's classroom participation and successful completion of daily assignments, quizzes and unit test.

ALGEBRA II

Subject: Algebra II

Grade: 9-12

Length of Course: First and Second Semester

Prerequisite: Pass Algebra I with an Average Grade of "C" or Better for Both Semesters.

CURRICULUM BENCHMARKS:

1. To solve basic equations.
2. To solve and graph basic inequalities.
3. To calculate experimental probability.
4. To calculate theoretical probability.
5. To identify functions.
6. To find the domain and range of a function.
7. To graph linear functions.
8. To write linear equations.
9. To solve problems involving direct variation.
10. To graph absolute value functions.
11. To solve and graph two variable inequalities.
12. To solve systems of equations.
13. To solve and graph systems of inequalities.
14. To find max/min values to solve linear programming.
15. To add/subtract matrices.
16. To multiply a matrix by a scalar.
17. To multiply a matrix by a matrix
18. To find the inverse of a 2x2 matrix.
19. To graph quadratic functions.
20. To find the max/min (vertex) of a quadratic function.
21. To factor polynomials using greatest common factor.
22. To factor trinomials.
23. To factor special expressions.
24. To solve a quadratic equation using factoring.
25. To solve a quadratic equation using completing the square.
26. To solve a quadratic equation using the quadratic formula.
27. To classify a polynomial expression by degree and term.
28. To divide polynomials using long division.
29. To divide polynomials using synthetic division.
30. To factor sum/difference of cubes.
31. To calculate permutations and combinations.
32. To use Pascal's Triangle to expand a binomial.
33. To simplify radical expressions.
34. To convert between radical expressions and rational exponents.
35. To solve radical equations
36. To find composite function values.
37. To convert between log notation and exponential notation.
38. To simplify and expand logs
39. To solve exponential equations using logs.
40. To solve problems involving inverse variation.
41. To simplify rational expressions.
42. To solve rational equations.
43. To know the difference between irrational and rational numbers.
44. To simplify complex fractions.

45. To solve rational equations.

COURSE DESCRIPTION:

Algebra II reviews concepts covered in Algebra I. The course begins with a thorough discussion of the properties of real numbers. Solving equations and inequalities is the primary focus of this course. To do this, students will learn various techniques for simplifying expressions, factoring polynomials, and graphing. Concepts like functions, relations and imaginary numbers will also be introduced. These algebraic skills will be applied through story problems.

WHAT STUDENTS ARE EXPECTED TO DO:

1. Complete homework on time with acceptable quality.
2. Be prepared for class and take notes over examples.
3. Participate in classroom examples and discussion.
4. Pass tests and quizzes.

EVALUATION:

Students will be evaluated on successful completion of daily assignments, quizzes and tests.

GEOMETRY

Subject: Geometry

Grade: 10, 11, 12

Length of Course: First and Second Semester

Prerequisite: Completion of Algebra 1 with "C" Average Strongly Urged, Along with Teacher Approval.

CURRICULUM BENCHMARKS:

1. Uses a variety of strategies to understand new math content and to develop more efficient solution methods or problem extensions.
2. Constructs algorithms for multi-step and non-routine problems.
3. Understands the concept of a mathematical proof.
4. Constructs logical verifications or counter examples to test conjectures and to justify algorithms and solutions to problems.
5. Uses formal math language and notation to represent ideas, to demonstrate relationships within and among representation systems and to formulate generalizations.
6. Understands the difference between a statement that is verified by mathematical proof and one that is verified empirically using examples or data.
7. Understands the components of mathematical modeling.
8. Selects and uses an appropriate indirect method of measurement in a given situation.
9. Solves real-world problems involving three-dimensional measures.

10. Understands that object and relations in geometry correspond directly to objects and relations in algebra.
11. Uses the Pythagorean theorem and its converse and properties of right triangles to solve mathematical and real-world problems.
12. Uses geometric constructions to complete simple proofs, to model, and to solve mathematical and real world problems.
13. Understands the basic concepts of right triangle trigonometry.
14. Uses trigonometric ration methods to solve mathematical and real world problems.
15. Uses inductive and deductive reasoning to make observations about and to verify properties of and relationships among figures.
16. Uses properties of and relationships among figures to solve mathematical and real-world problems.
17. Understands the concept of a function as the correspondences between the elements of two sets.
18. Uses calculators to solve problems involving area, volume and right triangle trigonometry.
19. Uses graphing calculators to recognize symmetric functions.

COURSE DESCRIPTION:

The course deals with the proofs of theorems and properties of plane and solid figures and the relationships of their parts. Proofs are used in arriving at logical conclusions or to express ideas more precisely; practical applications are not stressed, but are included along with computation, measurement, construction, and the general analysis of problems.

EVALUATION:

The student's evaluation will be made on the consistent completion of daily assignments, classroom participation, and a successful average on tests and quizzes.

MATH ANALYSIS CONCEPTS

Subject: Math Analysis Concepts (Trigonometry)

Grade: 11, 12

Length of Course: First and Second Semester

Prerequisite: Algebra II and Geometry with "C" Average Strongly Urged along with Teacher Approval.

CURRICULUM BENCHMARKS:

1. To compare relations and functions.
2. To identify a functions domain and range.
3. To find composite functions.
4. To graph linear functions and calculate their zeros.
5. To graph and become familiar with families of linear graphs
6. To model real world data using linear functions and the TI-83 calculator

7. To graph piecewise functions and linear inequalities.
8. To solve systems of equations by graphing and using substitution and elimination
9. To perform basic operations, graph, and solve equations involving matrices.
10. To use linear programming to solve word problems involving maximums and minimums.
11. To define where a function is symmetrical and sketch its graph.
12. To graph rational functions and find asymptotes.
13. To solve direct, inverse, and joint variations.
14. To solve quadratics by graphing on the TI-83 calculator, factoring, completing the square and using the quadratic formula.
15. To identify possible roots of a function and whether they are positive or negative using Descartes Rule of Signs
16. To solve rational equations and inequalities.
17. To solve radical equations and inequalities..
18. To model real world data with polynomial functions using the TI-83 calculator.
19. To convert between decimal degrees and degrees-minutes-seconds.
20. To calculate the number of degrees in a given rotation.
21. To calculate the 6 trig ratios of a triangle if given one of the ratio values or if given a point on the angle's terminal side.
22. To apply trig ratios to solve word problems involving right triangles.
23. To use inverse trig to solve for missing angles in a right triangle.
24. To solve non-right triangles using the Law of Sines and the Law of Cosines.
25. To calculate the area of any triangle if 2 sides and the angle between is given.
26. To calculate the area of a triangle if all three sides are given.
27. To convert between degrees and radians.
28. To calculate angular and linear velocities.
29. To graph and define the properties of the sine, cosine, tangent, cotangent, secant, and cosecant functions.
30. To find the amplitude, period, phase shift, and vertical translations of the sine and cosine curves and use them to write an equation for the given graph.
31. To model real world data using sine and cosine functions.
32. To be able to identify and use trig identities to verify other identities.
33. To solve trig equations and inequalities.
34. To use properties of exponents to simplify expressions and solve equations.
35. To graph and use exponential functions to solve problems involving growth and decay.
36. To simplify expressions and solve equations involving logarithms and natural logarithms.
37. To write equations for and to graph circles, ellipses, parabolas, and hyperbolas.
38. To calculate the nth term and sum of n terms of an arithmetic and geometric series.
39. To find limits and convert repeating decimals to fractions.
40. To use sigma notation to represent a sum of a series.
41. To use the binomial theorem to expand binomials.
42. To approximate e^x and trig values using series.

COURSE DESCRIPTION:

This course deals with solving and graphing many functions and learning about circular and triangular trigonometric functions, their graphs, and their identities.

WHAT THE STUDENTS IS EXPECTED TO DO:

1. Take notes on lectures and example problems..
2. Complete daily assignments nearly and on time.
3. Actively participate in class.
4. Maintain a successful average on tests and quizzes.

EVALUATION:

The students will be evaluated on successful completion of daily assignments, quizzes, and tests.

ADVANCED PLACEMENT CALCULUS

Subject: A.P. CALCULUS

Grade: 11, 12

Length of Course: First and Second Semester

Prerequisite: Complete Math Analysis with a B+ or better or an ACT math score of 25.

CURRICULUM BENCHMARKS:

1. Write an equation of a line
2. Find the domain and range of a function
3. Graph a piece-wise function
4. Graph a parametric function
5. Find the cartesian equation of a parametric function
6. Find the inverse of a function
7. Use calculator to find a regression equation
8. Find left/right hand limits of a graph
9. Find the limit of a function using substitution
10. Find infinite limits using tables and graphs
11. Find points of discontinuity
12. Find the slope of a curve at a given point
13. Write an equation for tangent and normal lines to a point on a curve
14. Graph a function given the graph of its derivative
15. Identify points where the derivative does not exist
16. Find the first and second derivative of a function
17. Given information about a function and its derivative, find values using product and quotient rules
18. Find displacement, average velocity, instantaneous velocity and acceleration of a function at a given time
19. Find derivatives of trig functions
20. Find derivatives of implicit functions
21. Find derivatives of inverse trig functions
22. Find derivatives of exponential functions.
23. Find derivatives of log functions

24. Find extreme values and where a function is increasing/decreasing based on a graph
25. Use analytic methods to find where a function is increasing/decreasing, concave up/down, extreme values, and points of inflection
26. Find a production level that maximizes profits
27. Find the linearization of a function
28. Use Newton's Method to find the zeros of a function
29. Find the differential of a function and use given values to estimate it
30. Use MRAM, RRAM, or LRAM to estimate the area under a curve.
31. Use the calculator to calculate integrals
32. Use analytic methods to find definite integrals
33. Use analytic methods to find definite integrals of trig functions
34. Find the total area between the graph of a function and the x-axis analytically
35. Use trapezoidal Rule to estimate an integral
36. Use Simpson's rule to estimate an integral
37. Find indefinite integrals
38. Find indefinite integrals of trig functions
39. Solve initial value problems
40. Use substitution to find indefinite integrals
41. Determine when a particle is moving to the left, right and stopped, its displacement, and total distance traveled.
42. Find the area of a shaded region on a graph analytically
43. Find the area of a region enclosed by the given functions
44. Find the volume of a region generated by revolving it about the x or y-axis
45. Find the surface area of a region generated by revolving it about the x or y-axis
46. Find the length of a curve analytically

COURSE DESCRIPTION:

This class is designed to prepare the students for their first year of college calculus. Concepts in this course will also be applied to other mathematical disciplines like physics and economics.

WHAT THE STUDENTS IS EXPECTED TO DO:

1. Take notes on lectures and example problems.
2. Complete daily assignments neatly and on time.
3. Actively participate in class.
4. Maintain a successful average on tests and quizzes.

EVALUATION:

The students will be evaluated on successful completion of daily assignments, quizzes and tests.

APPLIED MATH

Subject: Applied Math

Grade: 11, 12

Length of Course: First and Second Semester

Prerequisite: None

CURRICULUM BENCHMARKS:

1. Use basic measuring devices.
2. Express word statements as mathematical expressions.
3. Evaluate numbers expressed in scientific notation.
4. Convert measures within and between English and metric units.
5. Perform arithmetic operations with English and metric units.
6. Use ratios and direct/inverse proportions to solve application problems.
7. Perform signed number operations.
8. Use basic algebraic operations to evaluate algebraic expressions.
9. Use equations to solve application problems.
10. Rearrange formulas to solve application problems.
11. Apply angular measures and identify types of angles.
12. Solve problems such as perimeter, area, volume, radius, and circumference.

COURSE DESCRIPTION:

This course is designed to acquaint the student with the mathematics necessary to function within technical careers and to become a more aware consumer. Topics include: review of arithmetic operations, measurement, metric system, fundamentals of geometry, and elementary algebra concepts with emphasis on applications.

WHAT STUDENTS ARE EXPECTED TO DO:

1. Complete homework on time with acceptable quality.
2. Be prepared for class and take notes over examples.
3. Actively participate in classroom examples and discussion.
4. Maintain a successful average on tests and quizzes.

EVALUATION:

The students will be evaluated on successful completion of daily assignments, quizzes and tests.