Ninth Grade - Twelfth Grade Mathematics Milestones

Students lean to "do math" through real-world situations and focus on connecting topics presented in a logical progression that leads to readiness for education, employment, and enlistment.

Prescribed Mathematics Credits

Algebra I and Geometry OR Math I and Math II

- Solve linear equations
- Solve simple exponential and quadratic equations
- Solve systems of equations
- Summarize, represent, and interpret data
- Understand and use functions to analyze data
- Utilize mathematical reasoning to prove theorems
- Explore congruence through rigid motions and transformations
- Use the understanding of similarity to define trigonometry
- Apply geometric concepts to solve problems
- Compute probabilities and use them to make decisions

Personalized Mathematics Credit Options

- Advanced Mathematical Modeling
- Applied Statistics
- Calculus
- Computer Science and Mathematics
- Financial Algebra/Mathematics
- High School Algebra II-Mathematics III
- High School Trigonometry/Pre-calculus-Mathematics IV
- Introduction to Mathematical Applications
- Quantitative Reasoning
- Statistics
- Transition Mathematics for Seniors

Additional course options, which may be substituted for an equivalent Mathematics credit, include AP®, Dual Credit, or IB® mathematics course, County-created and Approved mathematics courses above Mathematics III or Algebra II, or mathematics college courses. Students should consult with their post-secondary educational/training institution and scholarship program requirements when choosing course options and electives. School teams should confer with the student and his/her guardian(s) to decide what two personalized mathematics courses best meet the needs of the student.

Family Engagement

How to help your student succeed in mathematics:

Make mathematics a part of your student's daily routine by:

- Computing gas mileage
- Calculating discounts and sales tax on purchases
- Calculating interest paid on a credit card bill
- Comparing the cost of cell phone plans
- Examining how mathematics is used in careers

Talk with the teacher about the problem-solving strategies and content your student is learning and practice those strategies at home.

Visit the *math4life* website at: wvde.us/math4life for information about:

- Resources for families
- Examples of fostering success in mathematics
- Information about what your student should master in each grade level
- Activities to help with mathematics fluency and understanding
- Links to the best apps and sites for practice and assistance in mathematics

math4life UNITe with numeracy

What Students Will Learn

9TH – 12TH GRADE

College- and Career-Readiness

Students in 11th grade will take the SAT as the high school summative assessment. The SAT Math Test is intended to collect evidence in support of the following claim about student performance. The SAT Math Test assesses students in four content areas.

Algebra

- Analyzing and fluently solving linear equations and systems of linear equations
- Creating linear equations and inequalities to represent relationships between quantities and to solve problems
- Understanding and using the relationship between linear equations and inequalities and their graphs to solve problems

Problem-Solving and Data Analysis

- Creating and analyzing relationships using ratios, proportional relationships, percentages, and units
- Representing and analyzing quantitative data
- Finding and applying probabilities in context

Advanced Math

- Identifying and creating equivalent algebraic expressions
- Creating, analyzing, and fluently solving quadratic and other nonlinear equations
- Creating, using, and graphing exponential, quadratic, and nonlinear functions

Geometry and Trigonometry

- Solving problems related to area and volume
- Applying definitions and theorems related to lines, angles, triangles, and circles
- Working with right triangles, the unit circle, and trigonometric functions

Sample Problems for High School

Sample Problem #1

Anthony is staying at a hotel charging $99.95 per night plus tax for a room. A tax of 8% is applied to the room rate, and an additional one-time untaxed fee of $5 is charged by the hotel. Which of the following represents Anthony's total charge, in dollars, for staying x nights?

a. $(99.95 + 0.08x) + 5$
b. $1.08(99.95x) + 5$
c. $1.08(99.95x + 5)$
d. $1.08(99.95x + 5)x$

We know that it will cost Anthony $99.95 per night multiplied by x nights, which is 99.95x. The 8% tax is an additional amount. The amount of the room rate including the tax is represented by 100% (room rate) + 8% (tax applied to the room rate) = 108%, which is 1.08 as a decimal. The $5 untaxed fee is an amount that does not vary and will remain the same regardless of how many nights Anthony stays at the hotel. Therefore, the expression that represents this situation is $1.08(99.95x) + 5$.

Sample Problem #2

A survey was conducted among a randomly chosen sample of U.S. citizens about U.S. voter participation in the most recent presidential election.

Reported Voting by Age (in thousands)

Age Group	# Who Voted	# Surveyed
18- to 34-year-olds	30,329	63,008
35- to 54-year-olds	47,085	74,282
55- to 74-year-olds	43,075	59,998
Older than 74	12,459	17,794

We can calculate the rate of number who voted to number surveyed. This will give us a decimal approximation to multiply by 100 to get the percent of people who reported they had voted. The age group with the highest percentage of voters (approximately 72%) is the 55- to 74-year-olds.

Mathematical Habits of Mind Thinking Skills for Life

MHM1: Make sense of problems and persevere to solve them.
Identify what the problem is asking and continue working until a solution is found.

MHM2: Reason abstractly and quantitatively.
Use reasoning to examine and connect numbers and ideas.

MHM3: Construct viable arguments and critique the reasoning of others.
Explore, explain, discuss, and share thinking and reasoning used to solve problems.

MHM4: Model with Mathematics.
Represent problems in multiple ways using drawings, objects, charts, and equations.

MHM5: Use appropriate tools strategically.
Use math tools that will help solve a problem, such as blocks, manipulatives, rulers, protractors, drawings, etc.

MHM6: Attend to precision.
Use clear and accurate language, units, calculations, and symbols to solve problems and check the reasonableness of answers.

MHM7: Look for and make use of structure.
Look for patterns and structure to gain understanding and speed in problem solving. Ex. 4 + 7 and 7 + 4 both equal 11.

MHM8: Look for and express regularity in repeated reasoning.
Look for repeated patterns in calculations to make generalizations and solve problems.