

**Florida Department of Education
Adult General Education
Curriculum Frameworks**

GED® PREPARATION MATHEMATICAL REASONING	
Program Title	GED® Preparation
Program Number	9900130
Course Title	GED® Mathematical Reasoning
Course Number	9900134
CIP Number	1532020207
Grade Equivalent	9.0-12.9
Grade Level	30, 31
Program Length	Varies (See Program Length Section)

PURPOSE

Adult General Education Program: The Florida Department of Education (FDOE) administers the Adult General Education (AGE) Program in accordance with the statutory framework outlined in the following state and federal laws: Section (s.) 1004.02 Florida Statutes (F.S.),¹ s. 1004.93, F.S.,² and Title II of the Workforce Investment and Opportunity Act (WIOA), also known as the Adult Education and Family Literacy Act (AEFLA).³

As administered by FDOE, AGE encompasses the following programs, services and activities:

- Academic Skills Building (ASB) Program
- Adult Basic Education (ABE) Program
- Adult High School (AHS) Program
- Adult English for Speakers of Other Languages (ESOL) Program
- GED® Program
- Integrated Education and Training (IET) Service Approach
- Integrated English Literacy and Civics Education (IELCE) Service Approach
- 2-Generation and Family Literacy Service Approaches
- Workforce Preparation Activities

The AGE Program is designed to serve the following objectives:

- Provide literacy instruction to adults to obtain the knowledge and skills necessary for employment and economic self-sufficiency.
- Facilitate adult learners to attain a secondary school diploma and progress to postsecondary education and training, including career pathways.
- Empower parents to obtain the education and skills that are necessary to participate as full partners in the educational development of their children and to achieve sustainable economic opportunities for their families.
- Deliver English language instruction to adult English language learners whose native language is other than English or who live in a family or community environment where a language other than English is the dominant language, to achieve competence in reading, writing, speaking and comprehension of the English language.

¹ http://www.leg.state.fl.us/Statutes/index.cfm?App_mode=Display_Statute&URL=1000-1099/1004/Sections/1004.02.html

² http://www.leg.state.fl.us/statutes/index.cfm?App_mode=Display_Statute&URL=1000-1099/1004/Sections/1004.93.html

³ <https://www.congress.gov/113/bills/hr803/BILLS-113hr803enr.pdf>

GED® Preparation Program: The purpose of the GED® Comprehensive Preparation Program is to prepare students to obtain the knowledge and skills necessary to pass the Official GED® Tests and be awarded a State of Florida High School Diploma. The program prepares students in four content-area assessments: Reasoning through Language Arts, Mathematical Reasoning, Science and Social Studies.

GED® Mathematical Reasoning course: The purpose of the GED® Mathematical Reasoning course is to prepare students to pass the GED® Mathematical Reasoning subtest. This test focuses on quantitative problem solving and algebraic problem solving. Students acquire a deeper conceptual understanding, procedural skill and fluency and the ability to apply these fundamentals in context.

STUDENTS

Per State Board Rule 6A-6.014, Florida Administrative Code (F.A.C.) - General Requirements for Adult General Education⁴, students eligible to enroll in the GED® Mathematical Reasoning Course are those who:

- Are 16 years of age or older.
- Are not enrolled in the K12 educational system.
- Obtain pre-test scores that place them within National Reporting System (NRS) ABE Levels 5 or 6 on a state-approved math test.

Per 1003.435(4), F.S.,⁵ “A candidate for a high school equivalency diploma shall be at least 18 years of age on the date of the examination, except that in extraordinary circumstances, as provided for in rules of the district school board, a candidate may take the examination after reaching the age of 16.”

EDUCATIONAL FUNCTIONING LEVELS

Educational Functioning Level (EFL) is a term found in WIOA (Code of Federal Regulations Title 34 Subtitle B Chapter IV Part 462)⁶ that refers to the literacy levels in the GED® Math program. The GED® Mathematical Reasoning program has two EFLs, each representing a specific set of GED® Mathematical Reasoning skills. Additional information on the term EFL is available in the official NRS Technical Assistance Guide.⁷

Table 1: NRS EFLs for the GED® Mathematical Reasoning course in relation to the Grade Equivalent for each level

Course Title	NRS Educational Functioning Levels	Grade Equivalent
GED® Mathematical Reasoning	ABE Level 5	9.0 – 10.9
GED® Mathematical Reasoning	ABE Level 6	11.0 – 12.9

PROGRAM LENGTH

The maximum number of instructional hours recommended by the FDOE for the GED® Mathematical Reasoning course is 250 hours per EFL. Acknowledging the individualized nature of learning, some students may finish an EFL in fewer (or more) hours than the recommended maximum duration indicated.

Table 2: Recommended Maximum Number of Hours by Educational Functioning Level

⁴ <https://www.flrules.org/gateway/ruleno.asp?id=6A-6.014>

⁵ <https://www.flsenate.gov/laws/statutes/2012/1003.435>

⁶ <https://www.ecfr.gov/current/title-34/subtitle-B/chapter-IV/part-462>

⁷ <https://nrsweb.org/policy-data/nrs-ta-guide>

Course Title	NRS Educational Functioning Levels	Recommended Maximum Hours
GED® Mathematical Reasoning	ABE Level 5	250
GED® Mathematical Reasoning	ABE Level 6	250

CURRICULUM AND INSTRUCTION

The FDOE disseminates the GED® Mathematical Reasoning curriculum framework to agencies statewide, empowering local agency personnel to craft a curriculum relevant to the objectives of their students and instructors. Below is a structured outline of elements to consider when creating the local agency’s curriculum:

1. **Educational Outcomes:**
 - Clearly defined outcomes that students are expected to achieve upon completion of the course.
2. **Core Instructional Materials:**
 - A set of materials (both print and digital) aligned with the defined educational outcomes. This can include textbooks, workbooks, online resources and multimedia materials.
3. **Needs Assessment Tools:**
 - Create a set of needs assessment tools to help teachers identify the specific learning needs and educational goals of individual students. This will aid in prioritizing standards and tailoring instruction to meet the varying needs of learners.
4. **Supplementary Textbooks:**
 - Provide workbooks covering the content of the GED® Mathematical Reasoning course.
5. **Pacing Guides and Matrices:**
 - Develop pacing guides and matrices that outline the scope and sequence of the curriculum. This helps in organizing the content over the duration of the course and ensures a logical progression of skills.
6. **Recommended Resources:**
 - Compile a list of recommended websites, films and dictionaries that can be utilized by teachers to supplement the curriculum. Ensure that these resources are relevant, up-to-date and support the varying needs of adult learners.
7. **Overview of Content:**
 - Provide an overview of the content to be covered in the course based on the four subtests of the GED® Mathematical Reasoning Test.
8. **Learning Activities:**
 - Describe a variety of learning activities that can be used regularly for reinforcement. Include a mix of individual and group activities, hands-on projects, discussions and real-world application exercises.
9. **Vocabulary Lists:**
 - Utilize widely available vocabulary lists⁸ designed specifically for the GED® Mathematical Reasoning course that focus on math terminology, such as “real numbers” and “imaginary numbers.”
10. **Grammar and Language Skills:**
 - Provide instructors and students with widely available free educational products, such as the GED® Assessment Guide for Educators⁹ designed specifically to enhance skills in grammar and language relevant to the GED® Mathematical Reasoning course, such as use of common words for math functions and symbols for arithmetical operations and algebraic equations.

It is recommended to continuously assess and update the agency’s curriculum based on feedback, changes in educational standards and the evolving needs of learners. Regular collaboration with instructors and seeking input from the FDOE Bureau of Adult Education can further enhance the quality and effectiveness of the agency’s curriculum.

Instructors are not obligated to follow the standards sequentially. The distinct needs of each group of students can guide instruction, empowering instructors to modify the sequence of teaching the standards.

⁸ <https://www.vocabulary.com/lists/sqwixtkp/ged>

⁹ https://ged.com/educators_admins/teaching/teaching_resources/

ASSESSMENT

For guidance on the assessment guidelines and requirements for GED® Mathematical Reasoning, see State Board Rule 6.A-6.014, F.A.C.¹⁰

References for Assessment and Reporting: For complete information regarding assessment procedures and policies, see the FDOE Assessment Technical Assistance Paper.¹¹ For guidelines on the procedures for reporting data related to student test results, see the Florida DOE Division of Career and Adult Education (DCAE) Office of Research and Evaluation.¹²

Pre-testing: Federal and state regulations mandate that local adult education agencies conduct pre-tests for all new students within the initial 12 hours of enrollment activity. The FDOE defines a new student as someone not previously enrolled in the local agency during the current or preceding program year. GED® Mathematical Reasoning students are required to pre-test in math and obtain a score at or above NRS EFL 5. The agency is responsible for submitting the pre-test results to the FDOE in accordance with the guidelines outlined by the DCAE Office of Research and Evaluation.

Post-testing: Agencies are not required to post-test students enrolled in the GED® Mathematical Reasoning course for NRS reporting purposes, however, students will benefit from a variety of assessments to gauge their knowledge and skills. The GED® Ready Test¹³ is an appropriate tool for determining when the student is likely to be able to pass the GED® Test.

Course Completion: Students complete the GED® Mathematical Reasoning course when they pass the GED® Mathematical Reasoning subtest. Upon passing all subtests of the GED®, the agency is responsible for reporting the course completion date as reflected by the date on the student's diploma. The agency is responsible for reporting the post-test results to the FDOE following the guidelines outlined by the DCAE Office of Research and Evaluation.

2014 GED® Assessment: For additional information on the GED® 2014 Assessment and the performance targets and content topics, see the GED® Comprehensive Testing Service Assessment Guide for Educators.¹⁴

ACCOMMODATIONS

Federal and state legislation requires the provision of accommodations for students with disabilities to meet individual needs and ensure equal access. Adult students with disabilities must self-identify, provide documentation and request such services. Students with disabilities may need accommodations in areas such as instructional methods and materials, assignments and assessments, time demands and schedules, learning environment, assistive technology and special communication systems. Documentation of the accommodations requested and provided should be maintained in a confidential file.

ADULT EDUCATION INSTRUCTOR CERTIFICATION

As per 1012.39 (1)(b), F.S.,¹⁵ each school district shall establish the minimal qualifications for part-time and full-time teachers in adult education agencies.

FLORIDA DOE IET SERVICE APPROACH¹⁶

¹⁰ <https://www.flrules.org/gateway/ruleno.asp?id=6A-6.014>

¹¹ <https://www.fldoe.org/core/fileparse.php/5398/urlt/2024FLAssessmentPolicy.pdf>

¹² <https://www.fldoe.org/academics/career-adult-edu/research-evaluation/>

¹³ https://ged.com/study/ged_ready/

¹⁴ https://ged.com/educators_admins/teaching/teaching_resources/

¹⁵ <https://www.flsenate.gov/laws/statutes/2011/1012.39>

The FDOE promotes the planning, development and implementation of an IET service approach that provides concurrent and contextualized adult education and literacy activities in combination with workforce preparation activities and workforce training for a specific occupation or occupational cluster for the purpose of educational and career advancement.

Florida's IET service approach is well-suited for meeting the specific needs of GED® Mathematical Reasoning students. Agencies are encouraged to create opportunities that seamlessly integrate education and career-focused content and deliver workforce preparation and training for GED® Mathematical Reasoning students.

The IET service approach provides students at all levels of adult education with the opportunity to acquire the skills needed to:

- Shift to and complete postsecondary education and training programs.
- Obtain employment and advance in employment leading to economic self-sufficiency.
- Exercise the rights and responsibilities of citizenship.

All IET Programs must include the following three components as noted in the following sections of WIOA.¹⁷

- Adult education and literacy activities (WIOA Section 203(2)).
- Workforce preparation activities (WIOA Section 203(17)).
- Workforce training services (one or more) for a specific occupation or occupation cluster (WIOA Section 134(c)(3)(D)).

To meet the "integrated" requirement of IET, all services must include the following:

- Adult education and literacy activities run concurrently and contextually with workforce preparation activities and workforce training for a specific occupation or occupational cluster for the purpose of educational and career advancement.
- Activities are of sufficient intensity and quality, and based on the most rigorous research available, particularly with respect to improving reading, writing, mathematics and English proficiency of eligible individuals.
- Occur simultaneously.
- Use occupationally relevant instructional materials.

The IET program must have a single set of learning objectives that identifies specific adult education content, workforce preparation activities, workforce training competencies and that the program activities function cooperatively.

GED® MATHEMATICAL REASONING STANDARDS

The GED® Mathematical Reasoning Standards focus on the fundamentals of mathematics in two areas: quantitative problem-solving and algebraic problem-solving. Students acquire a deeper conceptual understanding, procedural skills and mathematical fluency in realistic situations. In addition to the Mathematical Reasoning Standards and Indicators, students also focuses on the GED® Mathematical Practices that are based on real-world problem-solving skills in a mathematical context.

Table 3: The GED Mathematical Practices in relation to Webb's Depth of Knowledge

¹⁶ <https://www.fldoe.org/academics/career-adult-edu/adult-edu/adult-edu-career-pathways.stml>

¹⁷ <https://www.congress.gov/113/bills/hr803/BILLS-113hr803enr.pdf>

DOK Ranges	Mathematical Practices
1-2 1-3 2-3 1-2 1-3	MP.1 Building Solution Pathways and Lines of Reasoning a. Search for and recognize entry points for solving a problem. b. Plan a solution pathway or outline a line of reasoning. c. Select the best solution pathway, according to given criteria. d. Recognize and identify missing information that is required to solve a problem. e. Select the appropriate mathematical technique(s) to use in solving a problem or a line of reasoning.
1-2 1-2 2-3	MP2. Abstracting Problems a. Represent real world problems algebraically. b. Represent real world problems visually. c. Recognize the important and salient attributes of a problem.
1-3 1-3 2-3	MP.3 Furthering Lines of Reasoning a. Build steps of a line reasoning or solution pathway, based on previous step or givens. b. Complete the lines of reasoning of others. c. Improve or correct a flawed line of reasoning.
1-2 1-2 1-2	MP.4 Mathematical Fluency a. Manipulate and solve arithmetic expressions. b. Transform and solve algebraic expressions. c. Display data or algebraic expressions graphically.
2-3 2-3 2-3	MP.5 Evaluating Reasoning and Solution Pathways a. Recognize flaws in others' reasoning. b. Recognize and use counterexamples. c. Identify the information required to evaluate a line of reasoning.

Quantitative Problem-Solving Standards and Content Indicators	
Q.1	Apply number sense concepts, including ordering rational numbers, absolute value, multiples, factors and exponents
Q.1.a	Order fractions and decimals, including on a number line.
Q.1.b	Apply number properties involving multiples and factors, such as using the least common multiple, greatest common factor or distributive property to rewrite numeric expressions.
Q.1.c	Apply rules of exponents in numerical expressions with rational exponents to write equivalent expressions with rational exponents.
Q.1.d	Identify absolute value or a rational number as its distance from zero on the number line and determine the distance between two rational numbers on the number line, including using the absolute value of their difference.
Q.2	Add, subtract, multiply, divide and use exponents and roots of rational, fraction and decimal numbers
Q.2.a	Perform addition, subtraction, multiplication and division on rational numbers.
Q.2.b	Perform computations and write numerical expressions with squares and square roots of rational numbers.
Q.2.c	Perform computations and write numerical expressions with cubes and cube roots of rational numbers.
Q.2.d	Determine when a numerical expression is undefined.

Q.2.e	Solve single-step or multistep real-world arithmetic problems involving the four operations with rational numbers, including those involving scientific notation.
Q.3	Calculate and use ratios, percent and scale factors
Q.3.a	Compute unit rates. Examples include but are not limited to: unit pricing, constant speed, persons per square mile, BTUs (British thermal units) per cubic foot.
Q.3.b	Use scale factors to determine the magnitude of a size change. Convert between actual drawings and scale drawings.
Q.3.c	Solve multistep, real-world arithmetic problems using ratios or proportions including those that require converting units of measure.
Q.3.d	Solve two-step, real-world arithmetic problems involving percentages. Examples include but are not limited to: simple interest, tax, markups and markdowns, gratuities and commissions, percent increase and decrease.
Q.4	Calculate dimensions, perimeter, circumference and area of two-dimensional figures
Q.4.a	Compute the area and perimeter of triangles and rectangles. Determine side lengths of triangles and rectangles when given area or perimeter.
Q.4.b	Compute the area and circumference of circles. Determine the radius or diameter when given area or circumference.
Q.4.c	Compute the perimeter of a polygon. Given a geometric formula, compute the area of a polygon. Determine side lengths of the figure when given the perimeter or area.
Q.4.d	Compute perimeter and area of 2-D composite geometric figures, which could include circles, given geometric formulas as needed.
Q.4.e	Use the Pythagorean theorem to determine unknown side lengths in a right triangle.
Q.5	Calculate dimensions, surface area and volume of three-dimensional figures
Q.5.a	When given geometric formulas, compute volume and surface area of rectangular prisms. Solve for side lengths or height, when given volume or surface areas.
Q.5.b	When given geometric formulas, compute volume and surface area of cylinders. Solve for height, radius or diameter when given volume or surface area.
Q.5.c	Use geometric formulas to compute volume and surface area of right prisms. Solve for side lengths or height, when given volume or surface area.
Q.5.d	When given geometric formulas, compute volume and surface area of right pyramids and cones. Solve for side lengths, height, radius or diameter when given volume or surface area.
Q.5.e	When given geometric formulas, compute volume and surface area of spheres. Solve for radius or diameter when given the surface area.
Q.5.f	Compute surface area and volume of composite 3-D geometric figures, given geometric formulas as needed.
Q.6	Interpret and create data displays
Q.6.a	Represent, display and interpret categorical data in bar graphs or circle graphs.
Q.6.b	Represent, display and interpret data involving one variable plots on the real number line including dot plots, histograms and box plots.
Q.6.c	Represent, display and interpret data involving two variables in tables and the coordinate plane including scatter plots and grants.
Q.7	Calculate and use mean, median, mode and weighted average

Q.7.a	Calculate the mean, median, mode and range. Calculate a missing data value, given the average and all the missing data values but one, as well as calculating the average, given the frequency counts of all the data values, and calculating a weighted average.
Q.8	Utilize counting techniques and determine probabilities
Q.8.a	Use counting techniques to solve problems and determine combinations and permutations.
Q.8.b	Determine the probability of simple and compound events.
Algebraic Problem-Solving Standards and Content Indicators	
A.1	Write, evaluate and compute with expressions and polynomials
A.1.a	Add, subtract, factor, multiply and expand linear expressions with rational coefficients.
A.1.b	Evaluate linear expressions by substituting integers for unknown quantities.
A.1.c	Write linear expressions as part of word-to-symbol translations or to represent common settings.
A.1.d	Add, subtract, multiply polynomials, including multiplying two binomials, or divide factorable polynomials.
A.1.e	Evaluate polynomial expressions by substituting integers for unknown quantities.
A.1.f	Factor polynomial expressions.
A.1.g	Write polynomial expressions as part of word-to-symbol translations or to represent common settings.
A.1.h	Add, subtract, multiply and divide rational expressions.
A.1.i	Evaluate rational expressions by substituting integers for unknown quantities.
A.1.j	Write rational expressions as part of word-to-symbol translations or to represent common settings.
A.2	Write, manipulate, solve and graph linear equations
A.2.a	Solve one-variable linear equations with rational number coefficients, including equations for which solutions require expanding expressions using the distributive property and collecting like terms or equations with coefficients represented by letters.
A.2.b	Solve real-world problems involving linear equations.
A.2.c	Write one-variable and multi-variable linear equations to represent context.
A.2.d	Solve a system of two simultaneous linear equations by graphing, substitution or linear combination. Solve real-world problems leading to a system of linear equations.
A.3	Write, manipulate, solve and graph linear inequalities
A.3.a	Solve linear inequalities in one variable with rational number coefficients.
A.3.b	Identify or graph the solution to a one variable linear inequality on a number line.
A.3.c	Solve real-world problems involving inequalities.
A.3.d	Write linear inequalities in one variable to represent context.
A.4	Write, manipulate and solve quadratic equations
A.4.a	Solve quadratic equations in one variable with rational coefficients and real solutions, using appropriate methods (e.g., quadratic formula, completing the square, factoring and inspection).
A.4.b	Write one-variable quadratic equations to represent context.
A.5	Connect and interpret graphs and functions
A.5.a	Locate points in the coordinate plane.
A.5.b	Determine the slope of a line from a graph, equation or table.
A.5.c	Interpret unit rate as the slope in a proportional relationship.

A.5.d	Graph two-variable linear equations.
A.5.e	For a function that models a linear or nonlinear relationship between two quantities, interpret key features of graphs and tables in terms of quantities and sketch graphs showing key features of graphs and tables in terms of quantities and sketch graphs showing key features given a verbal description of the relationship. Key features include: intercepts; intervals where the function is increasing, decreasing, positive or negative; relative maximums and minimums; symmetries, end behavior and periodicity.
A.6	Connect coordinates, lines and equations
A.6.a	Write the equation of a line with a given slope through a given point.
A.6.b	Write the equation of a line passing through two given distinct points.
A.6.c	Use slope to identify parallel and perpendicular lines and to solve geometric problems.
A.7	Compare, represent and evaluate functions
A.7.a	Compare two different proportional relationships represented in different ways. Examples include but are not limited to: compare a distance-time graph to a distance-time equation to determine which of two moving objects has a greater speed.
A.7.b	Represent or identify a function in a table or graph as having exactly one output (one element in the range) for each input (each element in the domain).
A.7.c	Evaluate linear and quadratic functions for values in their domain when represented using function notation.
A.7.d	Compare properties of two linear or quadratic functions each represented in a different way (algebraically, numerically in tables, graphically or by verbal descriptions). Examples include but are not limited to: given a linear function represented by a table of values and a linear function represented by an algebraic expression, determine which function has the greater rate of change.