**Florida Department of Education**
**2013-2014 Draft Curriculum Frameworks**
**GED® Mathematical Reasoning**

| | Adult General Education | |
|---|---|---|
| Program Title | GED® Preparation | |
| Program Number | 9900130 | |
| Program Length | Varies | |
| Course Title | GED® Mathematical Reasoning | |
| Course Number | 9900134 | |
| CIP Number | 1532.010207 | |
| Grade Level | 30, 31 | |
| Standard Course Length | Varies | |
| Teacher Certification | Bachelor's degree or higher | |

**PURPOSE**
The GED® Preparation Program consists of four content-area assessments: Reasoning through Language Arts, Mathematical Reasoning, Science, and Social Studies. The purpose of the 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. An additional performance level will certify that the student is career and college ready. This program strives to motivate students not only to obtain a GED® diploma, but to continue their education to earn a postsecondary degree, certificate, or industry certification.

The purpose of the Mathematical Reasoning course of the GED® program is to prepare students to pass the GED® Mathematical Test. This test will focus on the fundamentals of mathematics in two major content areas: quantitative problem solving and algebraic problem solving. Students will achieve a deeper conceptual understanding, procedural skill and fluency, and the ability to apply these fundamentals in realistic situations.

**THE 2014 GED® ASSESSMENT**
Information on the GED® 2014 Assessment and the performance targets and content topics are derived from the Assessment Guide for Educators provided by GED® Testing Service. The manual can be downloaded at http://gedtestingservice.org.

Students are currently enrolled in the GED® 2002 Series must schedule and take tests needed to earn a State of Florida diploma prior to December 31, 2013. Students will not be able to carry forward test scores from the 2002 test if they haven't completed all the required tests.

**Florida Department of Education**
**2013-2014 Draft Curriculum Frameworks**
**GED® Mathematical Reasoning**

The standards in this framework are based on the knowledge and skills that will be measured on the new assessment which will be launched January, 2014.  The GED® Mathematics test items are based on assessment targets derived from the Common Core State Standards (CCSS), found at http://www.corestandards.org/, and similar career-and-college readiness standards. These targets are the basis of the math standards included in this framework.  In addition to the content-based indicators listed with each performance target, the GED® mathematics test will also focus on reasoning skills, as embodied by the GED® Mathematical Practices.  These practices are based on The Standards for Mathematical Practice found in the Common Core State Standards for Mathematics and the Process Standards found in the Principles and Standards for School Mathematics, published by the National Council of Teachers of Mathematics.  The mathematical practices provide specifications for assessing real-world problem-solving skills in a mathematical context rather than requiring students only to memorize, recognize and apply a long list of mathematical algorithms. See Chapter Two more information on Mathematical Practices in the Assessment Guide for Educators which can be downloaded at http://gedtestingservice.org.

**Webb's Depth of Knowledge (DOK) Model**
Bloom's Taxonomy was used to guide the development of test items for the GED® 2002 series. The GED Testing Service is using Webb's Depth of Knowledge model to guide test item development for the GED® 2014 assessment.  In Bloom's Taxonomy, different verbs represent six levels of cognitive processes.  However, unlike Bloom's system, the DOK levels are not a taxonomical tool that uses verbs to classify the level of each cognitive demand.  The DOK is the cognitive demand required to correctly answer test questions.  The DOK level describes the kind of thinking involved in the task.  A greater DOK level requires greater conceptual understanding and cognitive processing by the students.  The DOK model includes 4 levels:  (1) recall, (2) basic application of skill/concept, (3) strategic thinking, and (4) extended thinking. Roughly 80 percent of the items across all four tests will be written to DOK levels two and three, and roughly 20 percent will require test-takers to engage level one DOK skills.  Level four entails skills required to successfully complete long-term research projects.  Therefore, DOK level four is beyond the scope of this assessment.

**Florida Department of Education**
**2013-2014 Draft Curriculum Frameworks**
**GED® Mathematical Reasoning**

**PROGRAM STRUCTURE**
The GED program is non-graded and characterized by open-entry/open-exit and/or managed enrollment, self-paced instructional modules, differentiated instruction, flexible schedules, and performance-based evaluation.  Agencies are awarded one LCP (A-D) per test passed by the student.  An agency will be awarded a bonus LCP E (for a total of five) for each student who successfully passes the entire battery of tests and earns a State of Florida High School Diploma.

Program procedures include the following:

A.  Determining eligibility for enrollment:
 1.  Must be 16 years of age or older.
 2.  Legal withdrawal from the elementary or secondary school with the exceptions noted in Rule 6A-6.014, FAC.
 3.  Student does not have a State of Florida diploma.
 4.  Student must be functioning at or above a 9.0 grade level
B.  Diagnosing learning difficulties as necessary.
C.  Prescribing individualized instruction.
D.  Managing learning activities.
E.  Evaluating student progress.

*Note:  F.S. 1003.435 (4) states that " 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."*

| Course Number | Course Title | Length | LCP Level |
|---|---|---|---|
| 9900134 | GED Mathematical Reasoning | Varies | D |

**ACCOMMODATIONS**
When a student with a disability is enrolled in an adult education class with modifications to the curriculum framework, the particular accommodations must be specified in the student's Section 504 Accommodation Plan or any other accommodation plan.

Federal and state legislation requires the provision of accommodations for students with disabilities to meet individual needs and ensure equal access.  **Students with disabilities in adult education programs must self-identify, provide documentation, and request accommodations, if needed.**  It is recommended that accommodations be identified on a Transition Individual Educational Plan (TIEP), a Section 504 Accommodations Plan, or the

development of a plan with their service provider. Accommodations received in secondary education may differ from those received in adult education.

Accommodations change the way the student is instructed. Students with disabilities may need accommodations in such areas 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.

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**Special Notes:**

**Career Development Standards**

The Adult Career Pathways System includes the following career development standards for students to achieve in their career exploration and planning. Students can access Florida CHOICES or a comparable system for career exploration and planning activities. Agencies determine if the career plan is developed at intake or integrated into classroom instruction. If the student is preparing for all four GED® tests, agencies determine in which course the career plan should be developed.

The following is the list of career development standards:

CP.01  Develop skills to locate, evaluate, and interpret career information.

CP.02  Identify interests, skills, and personal preferences that influence career and education choices.

CP.03  Identify career cluster and related pathways that match career and education goals.

CP.04  Develop and manage a career and education plan.

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| References | Mathematical Practices |
|---|---|
| M1, M3, M4,M5<br><br>N2, N5, N6, N8 | **MP.1  Building Solution Pathways and Lines of Reasoning**<br><br>Search for and recognize entry points for solving a problem.<br><br>Plan a solution pathway or outline a line of reasoning.<br><br>Select the best solution pathway, according to given criteria.<br><br>Recognize and identify missing information that is required to solve a problem.<br><br>Select the appropriate mathematical technique(s) to use in solving a problem or a line of reasoning. |
| M2, M4<br><br>N2, N3 | **MP2.  Abstracting Problems**<br><br>Represent real world problems algebraically.<br><br>Represent real world problems visually.<br><br>Recognize the important and salient attributes of a problem. |
| M3<br><br>N7, N9 | **MP.3  Furthering Lines of Reasoning**<br><br>Build steps of a line reasoning or solution pathway, based on previous step or givens.<br><br>Complete the lines of reasoning of others.<br><br>Improve or correct a flawed line of reasoning. |
| M2, M4, M6<br><br>N1, N2, N9 | **MP.4  Mathematical Fluency**<br><br>Manipulate and solve arithmetic expressions.<br><br>Transform and solve algebraic expressions.<br><br>Display data or algebraic expressions graphically. |
| M3<br><br>N7 | **MP.5  Evaluating Reasoning and Solution Pathways**<br><br>Recognize flaws in others' reasoning.<br><br>Recognize and use counterexamples.<br><br>Indentify the information required to evaluate a line of reasoning. |

**Florida Department of Education**
**2013-2014 Draft Curriculum Frameworks**
**GED® Mathematical Reasoning**

| | Quantitative Problem Solving Standards and Content Indicators | CCSS References |
|---|---|---|
| **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. | 4.NF.2; 6.NS.6; 6.NS.7 |
| 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. | 6.NS.4 |
| Q.1.c | Apply rules of exponents in numerical expressions with rational exponents to write equivalent expressions with rational exponents. | 8.EE.1; N-RN.2 |
| 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. | 6.NS.7; 7.NS.1 |
| **Q.2** | **Add, subtract, multiply, divide, and use exponents and roots of rational, fraction, and decimal numbers** | **CCSS References** |
| Q.2.a | Perform addition, subtraction, multiplication, and division on rational numbers. | 7.NS.1; 7.NS.2 |
| Q.2.b | Perform computations and write numerical expressions with squares and square roots of rational numbers. | 8.EE.2; N-RN.2 |
| Q.2.c | Perform computations and write numerical expressions with cubes and cube roots of rational numbers. | 8.EE.2; N-RN.2 |
| Q.2.d | Determine when a numerical expression is undefined. | 7.NS.2 |
| Q.2.e | Solve single-step or multistep real-world arithmetic problems involving the four operations with rational numbers, including those involving scientific notation. | 7.NS.3; 7.EE.3; 8.EE.4; N-Q.1 |
| **Q.3** | **Calculate and use ratios, percents, and scale factors** | **CCSS References** |
| 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. | 6.RP.3; 7.RP.1; G-MG.2 |
| Q.3.b | Use scale factors to determine the magnitude of a size change. Convert between actual drawings and scale drawings. | 7.G.1 |
| Q.3.c | Solve multistep, real-world arithmetic problems using ratios or proportions including those that require converting units of measure. | 6.RP.3; 7RP.1; 7.RP.2; 7.RP.3; N-Q.1 |
| Q.3.d | Solve two-step, real-world arithmetic problems involving percents. Examples include but are not limited to: simple | 7.RP.3 |

| | interest, tax, markups and markdowns, gratuities and commissions, percent increase and decrease. | |
|---|---|---|
| **Q.4** | **Calculate dimensions, perimeter, circumference, and area of two-dimensional figures** | **CCSS References** |
| Q.4.a | Compute the area and perimeter of triangles and rectangles. Determine side lengths of triangles and rectangles when given area or perimeter. | 7.G.6 |
| Q.4.b | Compute the area and circumference of circles. Determine the radius or diameter when given area or circumference. | 7.G.4 |
| 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. | 6.EE.2; 7.G.6 |
| Q.4.d | Compute perimeter and area of 2-D composite geometric figures, which could include circles, given geometric formulas as needed. | 6.EE.2; 7.G.6; 8.G.9 |
| Q.4.e | Use the Pythagorean theorem to determine unknown side lengths in a right triangle. | 8.G.7 |
| **Q.5** | **Calculate dimensions, surface area, and volume of three-dimensional figures** | **CCSS References** |
| 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. | 6.EE.2; 7.G.6; 8.G.9 |
| 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. | 6.EE.2; 7.G.6; 8.G.9 |
| 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. | 6.EE.2; 7.G.6; 8.G.9 |
| 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. | 6.EE.2; 7.G.6; 8.G.9 |
| Q.5.e | When given geometric formulas, compute volume and surface area of spheres. Solve for radius or diameter when given the surface area. | 6.EE.2; 8.G.9 |
| Q.5.f | Compute surface area and volume of composite 3-D geometric figures, given geometric formulas as needed. | 6.EE.2; 8.G.9 |
| **Q.6** | **Interpret and create data displays** | **CCSS References** |
| Q.6.a | Represent, display, and interpret categorical data in bar graphs or circle graphs. | 7.RP.2; 3.MD.3 |
| Q.6.b | Represent, display, and interpret data involving one variable | S-ID.1 |

**Florida Department of Education**
**2013-2014 Draft Curriculum Frameworks**
**GED® Mathematical Reasoning**

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| | 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. | 8.SP.1 |
| **Q.7** | **Calculate and use mean, median, mode, and weighted average** | **CCSS References** |
| 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. | 6.SP.3; S-MD.2 |
| **Q.8** | **Utilize counting techniques and determine probabilities** | **CCSS References** |
| Q.8.a | Use counting techniques to solve problems and determine combinations and permutations. | S-CP.9 |
| Q.8.b | Determine the probability of simple and compound events. | 7.SP.7; 7.SP.8; S-CP.1; S-CP.2 |
| | **Algebraic Problem Solving Standards and Content Indicators** | **CCSS References** |
| **A.1** | **Write, evaluate, and compute with expressions and polynomials** | |
| A.1.a | Add, subtract, factor, multiply, and expand linear expressions with rational coefficients. | 7.EE.1 |
| A.1.b | Evaluate linear expressions by substituting integers for unknown quantities. | 6.EE.2 |
| A.1.c | Write linear expressions as part of word-to-symbol translations or to represent common settings. | 6.EE.2; 6.EE.6 |
| A.1.d | Add, subtract, multiply polynomials, including multiplying two binomials, or divide factorable polynomials. | A-APR.1 |
| A.1.e | Evaluate polynomial expressions by substituting integers for unknown quantities. | 6.EE.2 |
| A.1.f | Factor polynomial expressions. | A-SSE.2; A-SSE.3; A-SSE.4 |
| A.1.g | Write polynomial expressions as part of word-to-symbol translations or to represent common settings. | 6.EE.2; 6.EE.6 |
| A.1.h | Add, subtract, multiply and divide rational expressions. | 6.EE.3 |
| A.1.i | Evaluate rational expressions by substituting integers for unknown quantities. | 6.EE.2 |
| A.1.j | Write rational expressions as part of word-to-symbol translations or to represent common settings. | 6.EE.2; 6.EE.6 |
| **A.2** | **Write, manipulate, solve, and graph linear equations** | **CCSS References** |

**Florida Department of Education**
**2013-2014 Draft Curriculum Frameworks**
**GED® Mathematical Reasoning**

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| 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. | 7.EE.4; 8.EE.7; A-REI.3 |
| A.2.b | Solve real-world problems involving linear equations. | 7.EE.4; A-CED.1; A-CED.2 |
| A.2.c | Write one-variable and multi-variable linear equations to represent context. | 6.EE.6; A-CED.1; A-CED.2 |
| 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. | 8.EE.6; A-REI.6 |
| **A.3** | **Write, manipulate, solve, and graph linear inequalities** | **CCSS References** |
| A.3.a | Solve linear inequalities in one variable with rational number coefficients. | A-REI.3 |
| A.3.b | Identify or graph the solution to a one variable linear inequality on a number line. | 6.EE.8; 7.EE.4 |
| A.3.c | Solve real-world problems involving inequalities. | 7.EE.4; A-CED.1; A-CED.2 |
| A.3.d | Write linear inequalities in one variable to represent context. | 6.EE.2; A-CED.1; A-CED.2 |
| **A.4** | **Write, manipulate, and solve quadratic equations** | **CCSS References** |
| 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, inspection). | A-REI.4 |
| A.4.b | Write one-variable quadratic equations to represent context. | A-CED.1 |
| **A.5** | **Connect and interpret graphs and functions** | **CCSS References** |
| A.5.a | Locate points in the coordinate plane. | 6.NS.6 |
| A.5.b | Determine the slope of a line from a graph, equation, or table. | 8.F.4 |
| A.5.c | Interpret unit rate as the slope in a proportional relationship. | 8.EE.5 |
| A.5.d | Graph two-variable linear equations. | A-CED.2; F-IF.7 |
| 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, | 8.F.3; 8.F.5; F-IF.5 |

| | and periodicity. | |
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| **A.6** | **Connect coordinates, lines, and equations** | **CCSS References** |
| A.6.a | Write the equation of a line with a given slope through a given point. | A-CED.2 |
| A.6.b | Write the equation of a line passing through two given distinct points. | A-CED.2 |
| A.6.c | Use slope to identify parallel and perpendicular lines and to solve geometric problems. | G-GPE.5 |
| **A.7** | **Compare, represent, and evaluate functions** | **CCSS References** |
| 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. | 8.EE.5 |
| 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). | 8.F.1; F-IF.1 |
| A.7.c. | Evaluate linear and quadratic functions for values in their domain when represented using function notation. | F-IF.2 |
| 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. | 8.F.2; F-IF.9 |

Notes:
- Information on the GED® tests is based on the *Assessment Guide for Educators*, GED® Testing Service, June 2012.
- Proposed Program, Course and CIP Numbers are subject to State Board of Education approval of 2013-2014 Course Code Directory and Curriculum Frameworks
- Note: See the Common Core State Standards for Mathematics at www.corestandards.org for more information on the reference codes listed in the CCSS References column.