

GED

TESTING

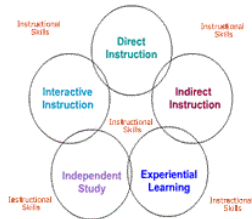
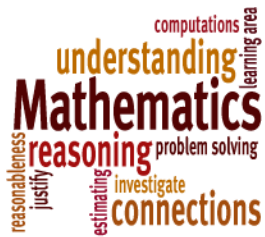
SERVICE®



**Exploring the Mathematical Reasoning Module
of the 2014 GED® test**

January 2013

Today's Learning Objectives



- Identify similarities and differences between the 2002 and 2014 GED® test for Mathematics
- Explore essential mathematical practices and behaviors
- Discuss beginning strategies for the classroom
- Identify resources that support the transition to the next generation assessment



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» The 2014 GED® test will . . .



- Align with *college and work expectations*
- Provide *evidence of readiness*
- Provide information about a candidate's *strengths and areas of developmental need*

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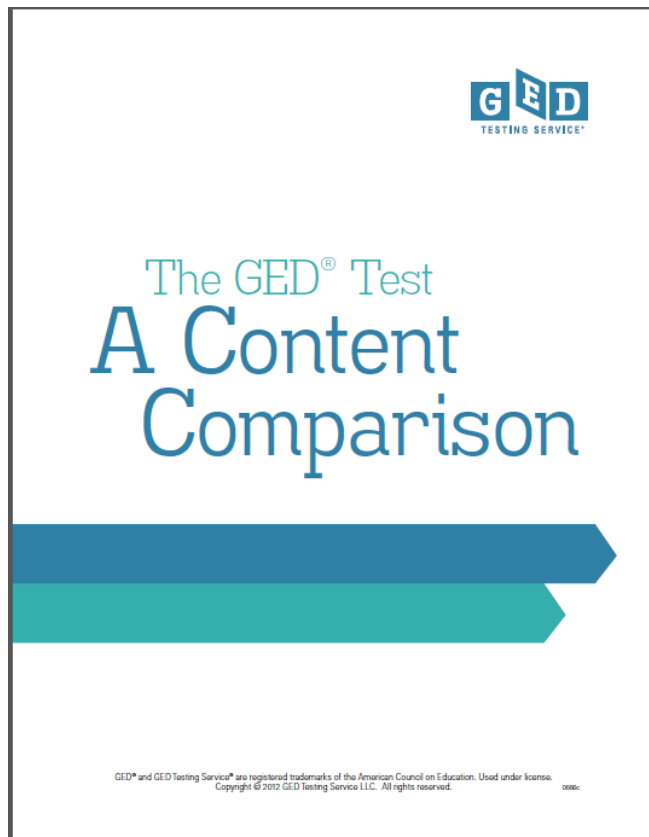
Exploring the Mathematical Reasoning module of the 2014 GED[®] test



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Tools for Content/Context/Comparison



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The new assessment is a stepping-stone to a brighter future.

ASSESSMENT GUIDE FOR EDUCATORS | ASSESSMENT DEVELOPMENT | ITEM SAMPLERS | SIGN UP FOR ASSESSMENT ALERTS |

Assessment Guide for Educators (Updated: November 2012)

The *Assessment Guide for Educators* is a frontline resource for adult educators and administrators to better understand the new GED® assessment, from the ground up. We'll dissect the new assessment and explain the decisions behind new item types, assessment targets, and other issues.

The new assessment—being launched in 2014—will continue to measure high school equivalency. But it doesn't stop there. GED Testing Service takes a giant step forward by measuring skills associated with success in a variety of pathways, including college coursework and job training programs.

The *Assessment Guide for Educators* will guide you through the new assessment and highlight item types, assessment targets, guidelines for how items will be scored, and much more.

More than 6,000 people downloaded one of the three chapters in the *Assessment Guide for Educators* when it was released in March 2012. It's your turn to hear directly from the experts at GED Testing Service about what will be in the new assessment. As a result of feedback from the field, the *Guide* has been newly updated as of November 2012 to answer your questions and provide additional clarity. Download the guide today and start talking to colleagues about how we can work together to prepare adults for a brighter future.

DOWNLOAD

UPDATED ASSESSMENT GUIDE
What teachers, examiners, and administrators need to know about the new assessment in 2014. **Newly updated version!**

DOWNLOAD

JOIN

JOIN THE CLOSEOUT CAMPAIGN

CLOSEOUT REGISTRATION
Join the 2002 Series Closeout Campaign and get a free poster and campaign button.



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2002 Series GED® test

- One test with two parts, one of which allowed use of calculator
- Content
 - 25-30% Number Operations, Number Sense
 - 25-30% Measurement and Geometry
 - 25-30% Data, Statistics, and Probability
 - 25-30% Algebra, Functions and Patterns
- Casio fx260-Solar

2014 GED® test

- One test with calculator allowed on most items
- Content
 - 45% - Quantitative Problem Solving
 - Number operations
 - Geometric thinking
 - 55% - Algebraic Problem Solving
- Texas Instruments - TI 30XS
- Integration of mathematical practices



» Item Types

2002 Series GED® test

- Item types
 - Multiple choice
 - Gridded response
 - Coordinate plane grid

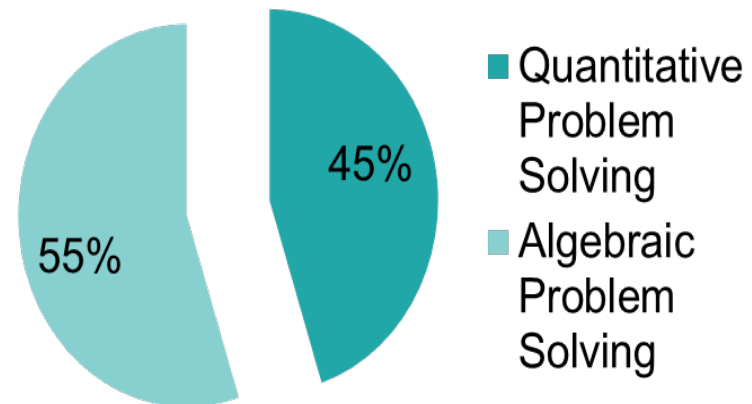
2014 GED® test

- Technology-Enhanced Items
 - Multiple choice
 - Fill-in-the-blank
 - Hot-spot
 - Drag-and-drop
 - Drop-down



» Mathematical Reasoning

- Some items require
 - procedural skill
 - fluency
 - problem solving
- Presented in academic and workforce contexts
- Statistics and data interpretation standards are also included in other tests



» Mathematical Reasoning: Similarities between the 2002 and 2014 Tests

2002 GED® test

- Represent and use numbers in a variety of forms
- Calculate mentally, on paper, and with a calculator
- Represent, analyze, and apply whole numbers, decimals, fractions, percents in a wide variety of situations.
- Use Pythagorean Theorem



2014 GED® test

- Apply number sense concepts with rational numbers
- Perform operations on rational number
- Solve multistep, arithmetic, real-world problems with rational numbers, ratios or proportions, percents.
- Use Pythagorean Theorem



» Mathematical Reasoning: Similarities between the 2002 and 2014 Tests

2002 GED® test

- Solve and estimate solutions to problems involving, length, perimeter, area, surface area, volume
- Evaluate formulas

2014 GED® test

- Compute surface area and volume of composite 3-D geometric figures, given formulas as needed
- Evaluate linear, polynomial, and rational expressions by substituting integers for unknown quantities



» What's new on the 2014 Mathematical Reasoning Test?

- Identify absolute value of a rational number
- Determine when a numerical expression is undefined
- Factor polynomial expressions
- Solve linear inequalities
- Identify or graph the solution to a one variable linear inequality
- Solve real-world problems involving inequalities
- Write linear inequalities to represent context
- Represent or identify a function in a table or graph



» What's not on the 2014 Mathematical Reasoning Test?

- Select the appropriate operations to solve problems
- Relate basic arithmetic operations to one another
- Use estimation to solve problems and assess the reasonableness of an answer
- Identify and select appropriate units of metric and customary measures
- Read and interpret scales, meters, and gauges
- Compare and contrast different sets of data on the basis of measures of central tendency
- Recognize and use direct and indirect variation



2002 Sample Item

Ms. Nguyen is a real estate agent. One of her clients is considering buying a house in the Silver Lakes area, where 6 houses have recently sold for the following amounts: \$160,000; \$150,000; \$185,000; \$180,000; \$145,000; \$190,000. What should Ms. Nguyen report as the **Median** price of these houses?

- 1) \$160,000
- 2) \$170,000
- 3) \$180,000
- 4) \$190,000
- 5) Not enough information is given.

Note: Method for determining median provided in the test booklet.



2014 Sample Item

Mathematical Reasoning - Candidate Name

Question 11 of 12

Answer Explanation Calculator

Flag for Review

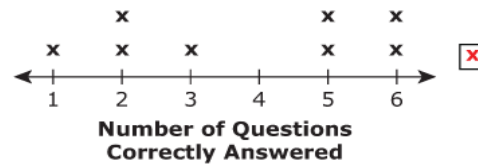
Formula Sheet

Calculator Reference

A speech pathologist collects data from 10 people for an experiment. Each person answers 6 questions. The speech pathologist records the number of questions that each person correctly answered and puts each person's data in the line plot. The median of the data is 3.5, and the mode of the data is 2. Complete the line plot so that the plot matches the pathologist's data.

Click on the red X and drag it onto the graph as many times as necessary to represent the data.

Experiment Data



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Tools for Test-Takers

Mathematical Reasoning - Candidate Name

Question 10 of 16

Answer Explanation Calculator

Flag for Review

A scientist is studying red maple trees in a state park. She measured the trunk diameter of trees in the same month every other year. She shows the data for two of the trees.

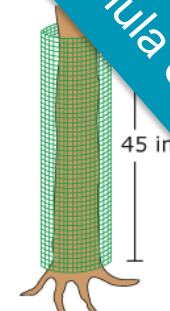
Tree 1		Tree 2	
Year	Trunk Diameter (inches)	Year	Trunk Diameter (inches)
1	18.6	1	11.4
3	19.2	3	12.0
5	19.8	5	12.6
7	20.4	7	13.2
9	21.0	9	13.8
11	21.6	11	14.4
13	22.2	13	15.0

This is the final year in which she will collect data. When her data collection is complete, she will predict future red maple tree growth.

Formula Sheet

Calculator Reference

In year 13, the scientist put tree wrap around tree trunk to protect it from winter snow. The height of the tree trunk that the wrap needs to be is 45 inches.



The wrap is priced by the square foot. To the nearest square foot, how many square feet of wrap does she need?

- A. 22
- B. 44
- C. 121
- D. 261

[Review Screen](#)

[Previous](#) [Next](#)



Formula Sheet

2014 GED® Test Mathematics Formula Sheet²⁴

Area of a:		
parallelogram	$A = bh$	
trapezoid	$A = \frac{1}{2}h(b_1 + b_2)$	
Surface Area and Volume of a:		
rectangular/right prism	$SA = ph + 2B$	$V = Bh$
cylinder	$SA = 2\pi rh + 2\pi r^2$	$V = \pi r^2 h$
pyramid	$SA = \frac{1}{2}ps + B$	$V = \frac{1}{3}Bh$
cone	$SA = \pi rs + \pi r^2$	$V = \frac{1}{3}\pi r^2 h$
sphere	$SA = 4\pi r^2$	$V = \frac{4}{3}\pi r^3$
	$(p = \text{perimeter of base } B; \pi = 3.14)$	
Algebra		
slope of a line	$m = \frac{y_2 - y_1}{x_2 - x_1}$	
slope-intercept form of the equation of a line	$y = mx + b$	
point-slope form of the equation of a line	$y - y_1 = m(x - x_1)$	
standard form of a quadratic equation	$y = ax^2 + bx + c$	
quadratic formula	$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$	
Pythagorean Theorem	$a^2 + b^2 = c^2$	
simple interest	$I = prt$	$(I = \text{interest, } p = \text{principal, } r = \text{rate, } t = \text{time})$

24. The Mathematics Formula Sheet contains basic, essential information necessary for answering items on the Mathematics test. It will be available to test-takers during the entire Mathematics Test.

Assessment Guide for Educators | Chapter 2

2.30

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Foundational Formulas





































- Area
 - Square
 - Rectangle
- Perimeter
- Circumference
- Measures of Central Tendency
- Distance
- Total Cost



Calculator



Calculator Reference

PERCENTAGES	<p>To calculate with percentages, enter the number, then  .</p> <p>EXAMPLE</p> <p>40% \times 560 =</p> <p>        </p> <p>The correct answer = 224</p>
SCIENTIFIC NOTATION	<p>To perform calculations with scientific notation, use the  key.</p> <p>EXAMPLE</p> <p>$7.8 \times 10^8 - 1.5 \times 10^8 =$</p> <p>           </p> <p>The correct answer = 630000000</p>
FRACTIONS	<p>To perform calculations with fractions, use the  key. The answer will automatically be formatted in reduced form.</p> <p>EXAMPLE</p> <p>$\frac{2}{9} \times \frac{3}{7} =$</p> <p>          </p>





Mathematical Practices: behaviors that are essential to the mastery of mathematical content



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» Mathematical Practices

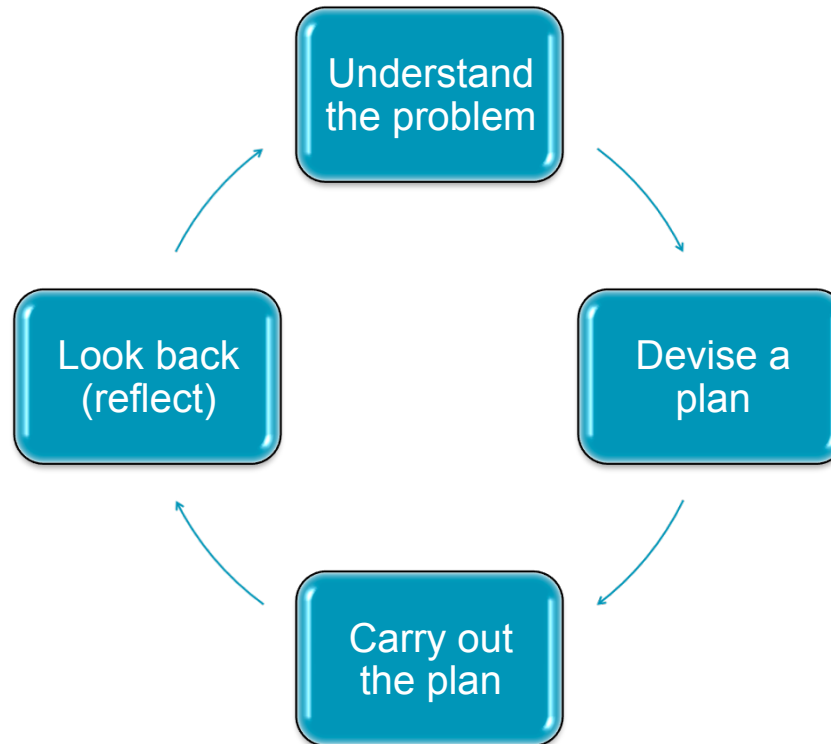


- Practices
 - Building solution pathways and lines of reasoning
 - Abstracting problems
 - Furthering lines of reasoning
 - Mathematical fluency
 - Evaluating reasoning and solution pathways
- Most practices are not specific to any one particular area of mathematics content



» Solution Pathways = Problem Solving

Polya's Four Steps to Problem Solving



Polya, George. *How To Solve It*, 2nd ed. (1957). Princeton University Press.



» Building the Foundation

Teaching of mathematics requires

- the use of the language of mathematics
- a concrete-to-representational-to-abstract sequence of instruction to ensure conceptual understanding
- a recognition that students must have mathematical fluency in basic operations

It's not just about teaching how, but rather why!



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» Algebraic Thinking in Adult Education

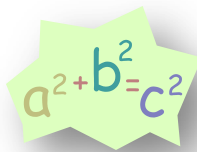


- Create opportunities for algebraic thinking as a part of regular instruction



- Integrate elements of algebraic thinking into arithmetic instruction

- Acquiring symbolic language
- Recognizing patterns and making generalizations



- Reorganize formal algebra instruction to emphasize its applications

Adapted from National Institute for Literacy, *Algebraic Thinking in Adult Education*, Washington, DC 20006



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» The Challenge Ahead!

- Move past basic arithmetic instruction
- Increase instruction in problem solving strategies
- Increase emphasis on geometric and algebraic thinking
- Provide instruction in higher order mathematics
- Shift focus from “rules or processes” of mathematics to deeper understanding of “why”



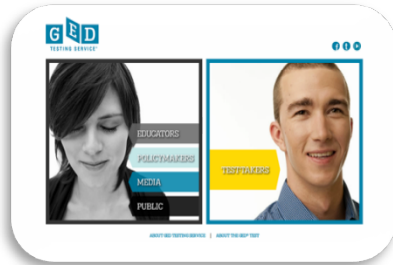
» A Few Strategies to Get Started



- Model, explain, and provide guided assistance, but move towards self-regulation.
- Provide opportunities for algebraic thinking.
- Keep it real – demonstrate how skills/ concepts are used in real-world situations
- Teach often to the whole class, in small groups, and with individual students
- Set high expectations



GEDTS Resources



<http://www.gedtestingservice.com/>



Online tutorials and training



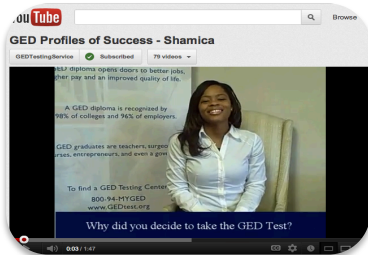
Test-taker resources



One-stop shop for practice materials



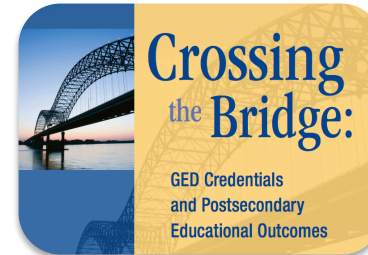
Multimedia outreach



Video profiles of success



Brand resources for local programs



Research on adult learners



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» Questions, insights, suggestions



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» We appreciate your participation!



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