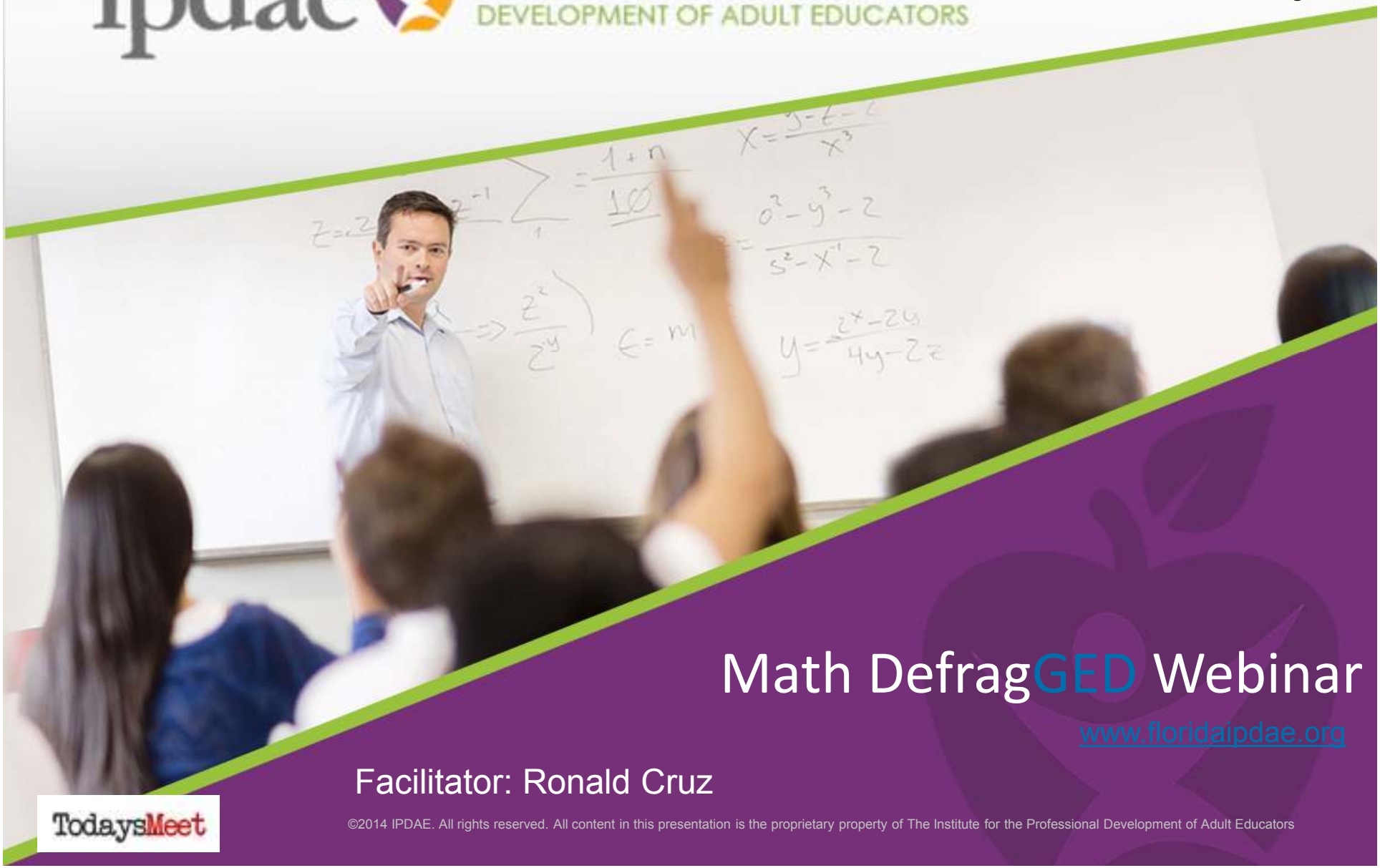
ipdae INSTITUTE FOR THE PROFESSIONAL DEVELOPMENT OF ADULT EDUCATORS

#MathDefragGED



Math DefragGED Webinar

www.floridaipdae.org

Facilitator: Ronald Cruz

TodaysMeet

Ronald Cruz (Training Facilitator)

- Administrative Coordinator of the CARIBE Refugee Program
- Hillsborough County Public Schools Peer Evaluator 2010-2013
- Mathematics Teacher (Pre-Algebra, Algebra 1 & 2, Advanced Mathematics, Pre-Calculus, Selected Topics in Mathematics, AP Calculus AB & BC, Physical Science and Physics) 2001-2010
- Math and Science Department Head 2005-2008
- Supervising Teacher 2001-2003
- Robotics Coach
- Grant Coordinator Learn and Serve America
- Adult Education Credit Teacher 2008-2013
- Hillsborough County Master Trainer (Technology in the Classroom, Lesson Planning, Teacher Evaluation, Using Data to Improve Programs, Smart Board, GED Mathematics and PLC Facilitation)

Linkedin:

www.linkedin.com/in/oneroncruz/

Email:

ronald.cruz@live.com

Learning Objectives

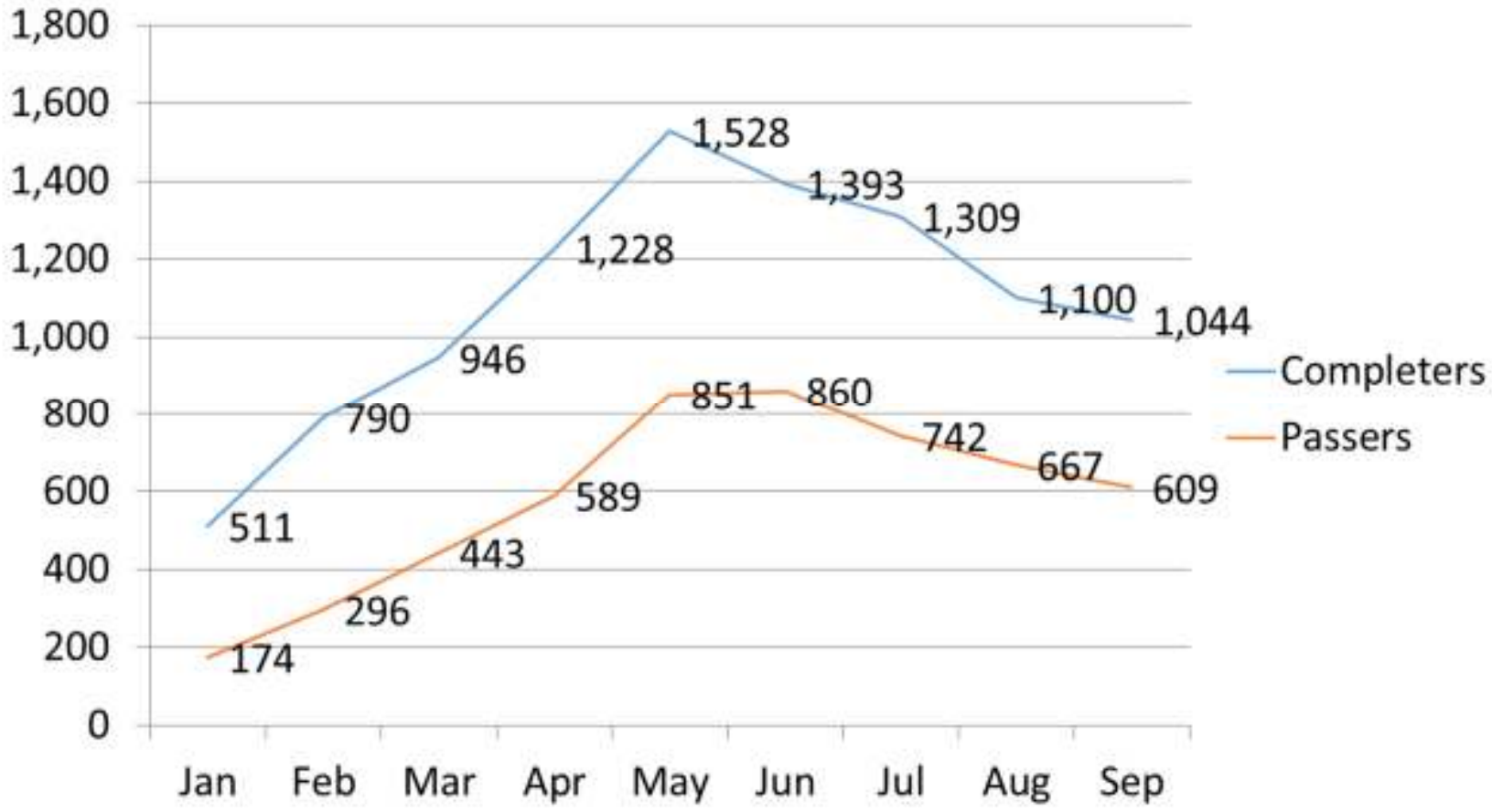
By the end of this training participants must be able to:

- Demonstrate increased understanding of the 2014 GED Test
- Become familiarized with the format and content of the 2014 GED Test
- Identify the level Webb's Depth of Knowledge in classroom activities
- Apply strategies implementing the five Mathematical Practices outlined in the 2014 GED Assessment Guide
- Apply TI-30XS calculator skills when solving problems
- Identify and address weakest content indicators released by GED Testing Service.
- Solve similar problems to the 2014 GED Released Sample Items
- Implement a plethora of strategies and develop ways to implement certain strategies to meet various students' needs.

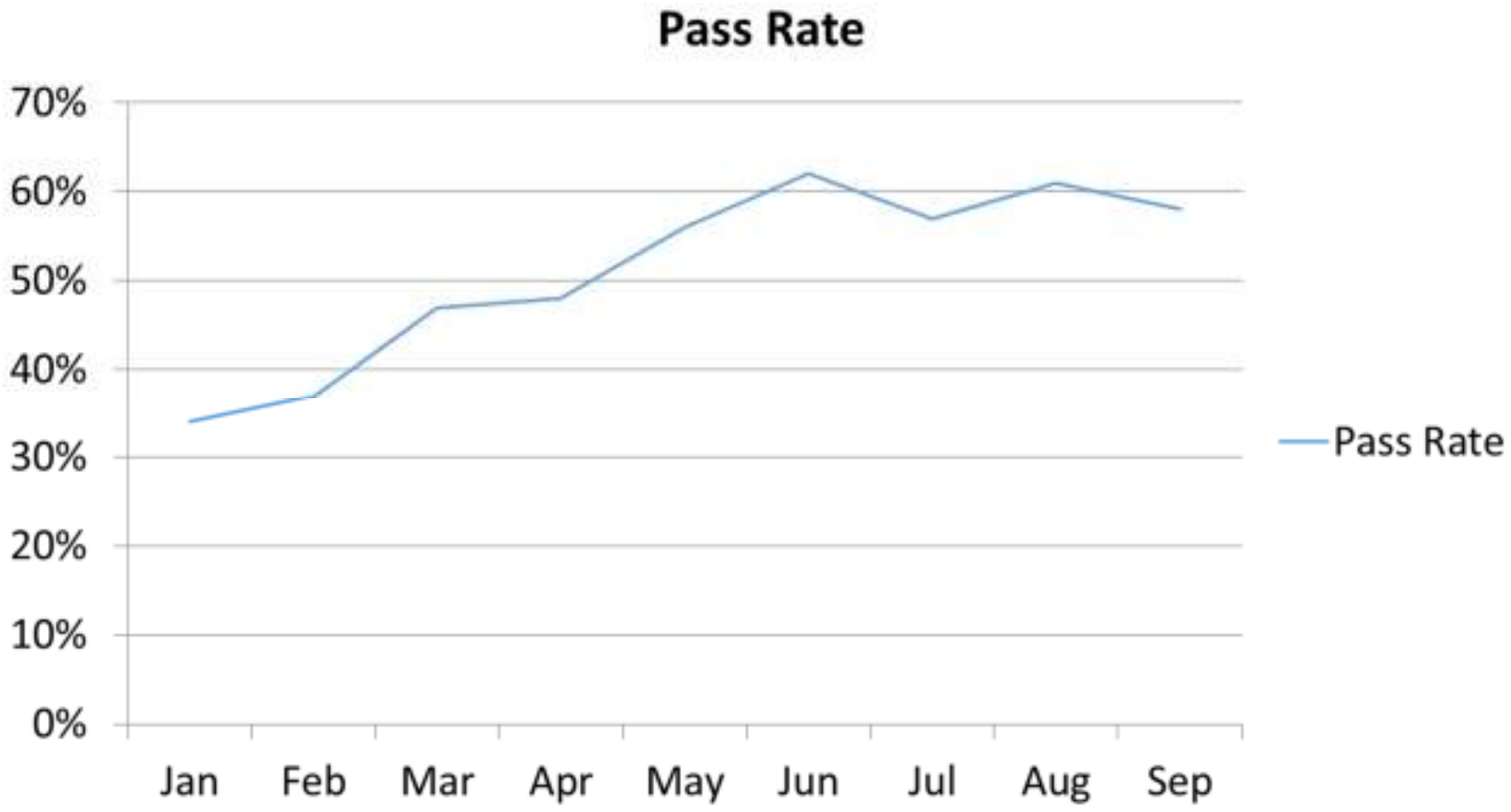
Testing Statistics:
January 1 – September 26, 2014

- 9,849 Completers
- 5,233 Passers
- 53% Pass Rate

Completers & Passers

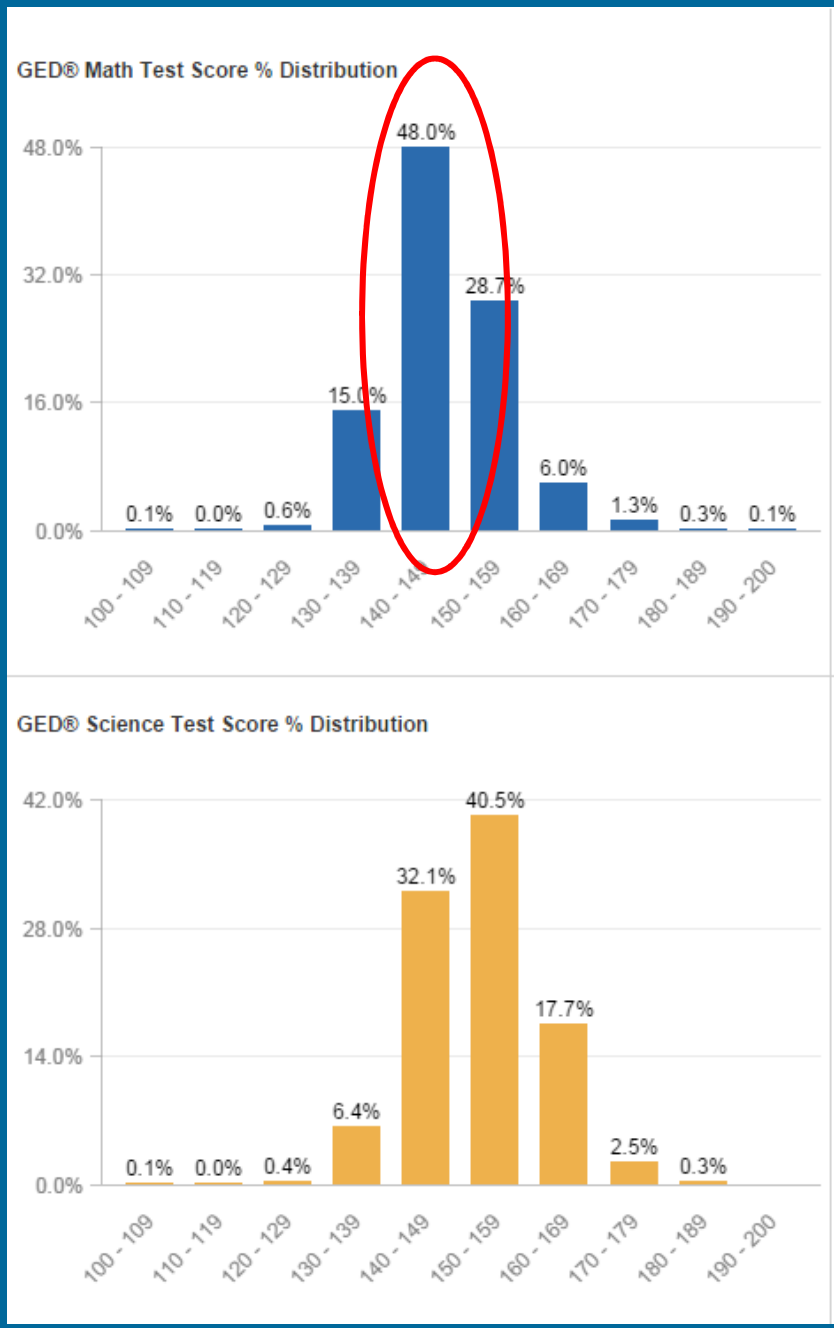


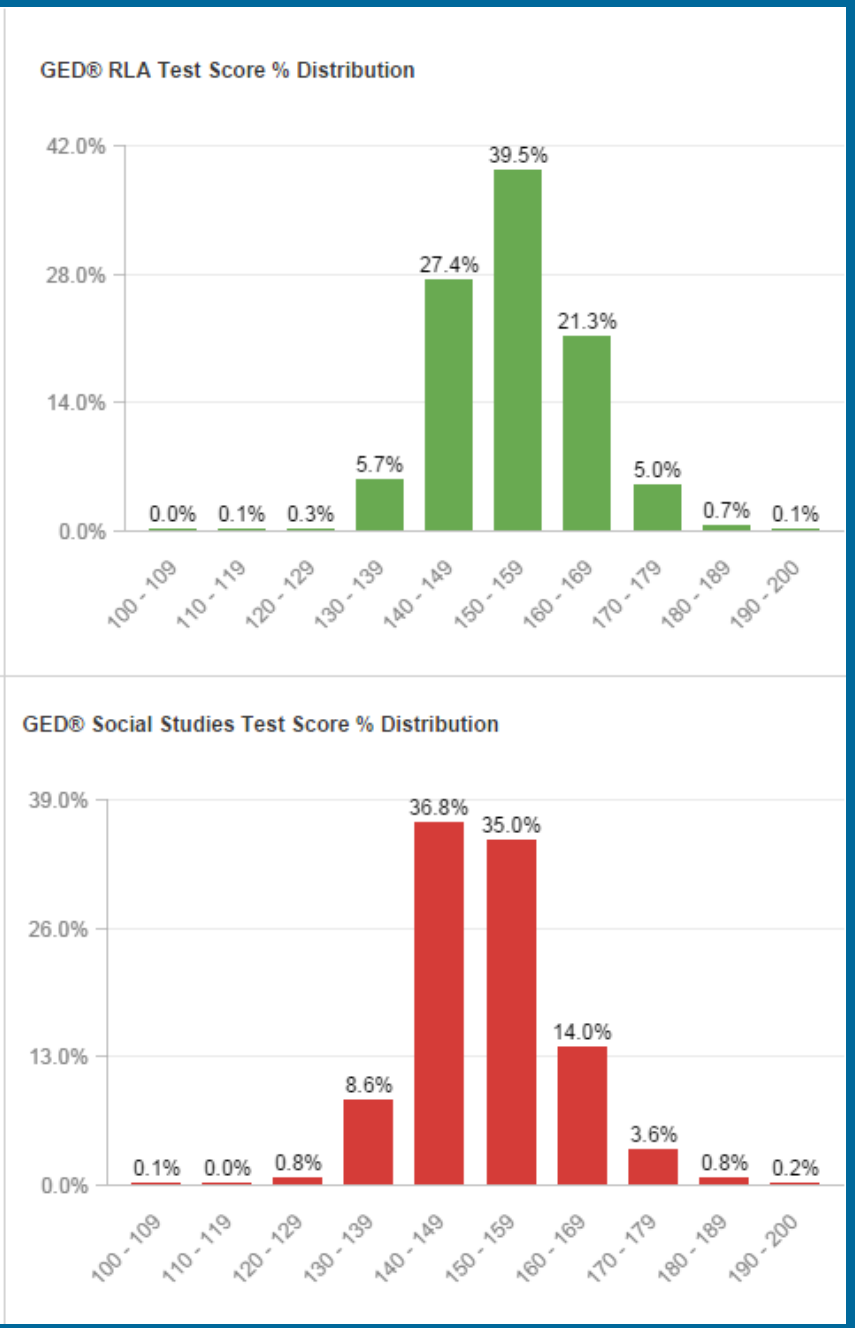
Pass Rates



GED® Test Taker Performance Distribution

	Math	RLA	Science	Social Studies
Below Passing	48%	24%	28%	34%
Passed	52%	76%	72%	66%
High School Equivalent	49%	69%	68%	61%
Passed With Honors	2%	6%	3%	6%


GED® Math Test Score % Distribution
48.0%
32.0%
16.0%
0.0%
0.1%
0.0%
0.6%
15.0%
48.0%
28.7%
6.0%
1.3%
0.3%
0.1%
100 - 109
110 - 119
120 - 129
130 - 139
140 - 149
150 - 159
160 - 169
170 - 179
180 - 189
190 - 200


GED® RLA Test Score % Distribution
42.0%
28.0%
14.0%
0.0%
0.0%
0.1%
0.3%
5.7%
27.4%
39.5%
21.3%
5.0%
0.7%
0.1%
100 - 109
110 - 119
120 - 129
130 - 139
140 - 149
150 - 159
160 - 169
170 - 179
180 - 189
190 - 200

GED® Science Test Score % Distribution
42.0%
28.0%
14.0%
0.0%
0.1%
0.0%
0.4%
6.4%
32.1%
40.5%
17.7%
2.5%
0.3%
100 - 109
110 - 119
120 - 129
130 - 139
140 - 149
150 - 159
160 - 169
170 - 179
180 - 189
190 - 200

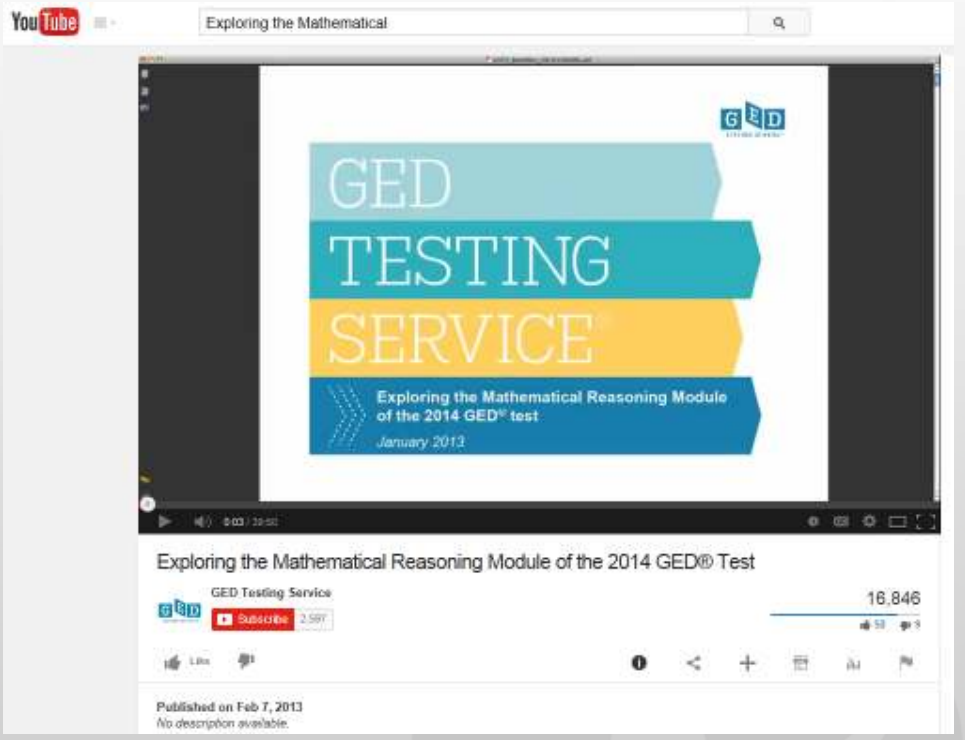
GED® Social Studies Test Score % Distribution
39.0%
26.0%
13.0%
0.0%
0.1%
0.0%
0.8%
8.6%
36.8%
35.0%
14.0%
3.6%
0.8%
0.2%
100 - 109
110 - 119
120 - 129
130 - 139
140 - 149
150 - 159
160 - 169
170 - 179
180 - 189
190 - 200

Average Scores by Test Subject

	Math	RLA	Science	Social Studies
Average Passing Score	156	159	158	158
Average Non-Passing Score	143	144	144	143
Overall Average	150	155	153	153

Exploring the Math Reasoning Module

Please visit myged.com to and view the webinar on Exploring the Mathematical Reasoning Module of 2014 GED Test to get more information on the framework, content and format of the 2014 series.



http://youtu.be/LtXOZCztq64

Differences

2002 Series GED® test

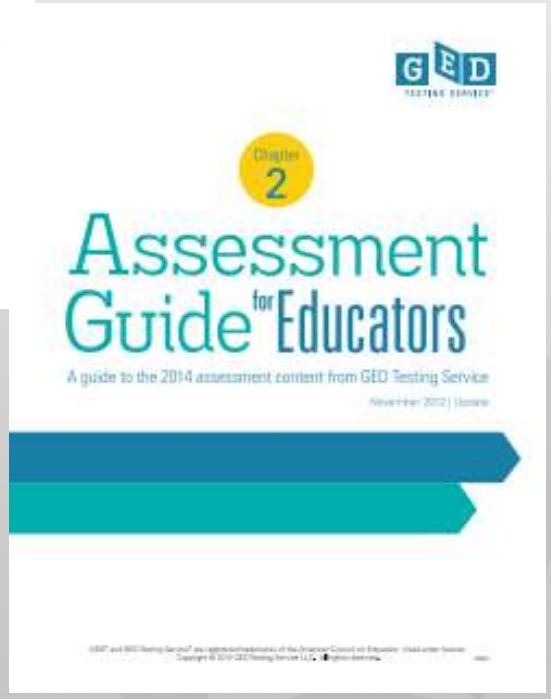
- One test with two parts, one of which allowed use of calculator
- Content
  - 25-30% Number Operations, Number Sense
  - 25-30% Measurement and Geometry
  - 25-30% Data, Statistics, and Probability
  - 25-30% Algebra, Functions and Patterns
- Casio fx260-Solar

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

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

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



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

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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

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Mathematical Practices

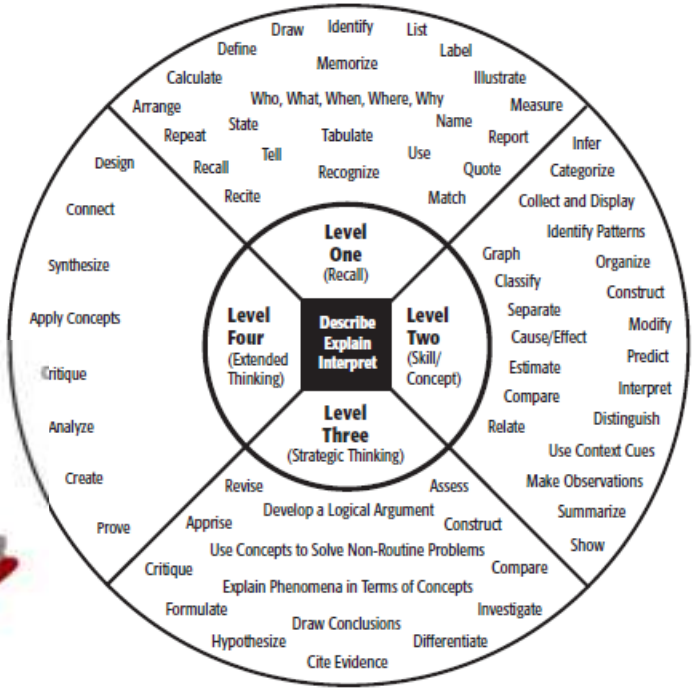
References[22]	Mathematical Practices	Range of Depth of Knowledge (DOK)[23]
	MP.1 Building Solution Pathways and Lines of Reasoning	
M1, M3, M4, M5 N2, N5, N6, N8	Search for and recognize entry points for solving a problem.	1-2
	Plan a solution pathway or outline a line of reasoning.	1-3
	Select the best solution pathway, according to given criteria.	2-3
	Recognize and identify missing information that is required to solve a problem.	1-2
	Select the appropriate mathematical technique(s) to use in solving a problem or a line of reasoning.	1-3
	MP.2 Abstracting Problems	
M2, M4	Represent real world problems algebraically.	1-2
N2, N3	Represent real world problems visually.	1-2
	Recognize the important and salient attributes of a problem.	2-3
	MP.3 Furthering Lines of Reasoning	
M3	Build steps of a line of reasoning or solution pathway, based on previous step or givens.	1-3
N7, N9	Complete the lines of reasoning of others.	1-3
	Improve or correct a flawed line of reasoning.	2-3
	MP.4 Mathematical Fluency	
M2. M4, M6	Manipulate and solve arithmetic expressions.	1-2
N1, N2, N9	Transform and solve algebraic expressions.	1-2
	Display data or algebraic expressions graphically.	1-2
	MP.5 Evaluating Reasoning and Solution Pathways	
M3	Recognize flaws in others' reasoning.	2-3
N7	Recognize and use counterexamples.	2-3
	Identify the information required to evaluate a line of reasoning.	2-3

Webb's Depth of Knowledge

Level 1: Recall
Level 2: Skill/Concept
Level 3: Strategic Thinking
Level 4: Extended Thinking

Webb's DOK Handout

Depth of Knowledge (DOK) Levels



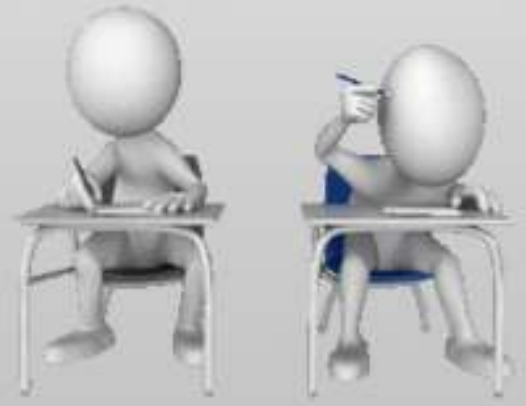
Level One Activities	Level Two Activities	Level Three Activities	Level Four Activities
Recall elements and details of story structure, such as sequence of events, character, plot and setting.	Identify and summarize the major events in a narrative.	Support ideas with details and examples.	Conduct a project that requires specifying a problem, designing and conducting an experiment, analyzing its data, and reporting results/ solutions.
Conduct basic mathematical calculations.	Use context cues to identify the meaning of unfamiliar words.	Use voice appropriate to the purpose and audience.	Apply mathematical model to illuminate a problem or situation.
Label locations on a map.	Solve routine multiple-step problems.	Identify research questions and design investigations for a scientific problem.	Analyze and synthesize information from multiple sources.
Represent in words or diagrams a scientific concept or relationship.	Describe the cause/effect of a particular event.	Develop a scientific model for a complex situation.	Describe and illustrate how common themes are found across texts from different cultures.
Perform routine procedures like measuring length or using punctuation marks correctly.	Identify patterns in events or behavior.	Determine the author's purpose and describe how it affects the interpretation of a reading selection.	Design a mathematical model to inform and solve a practical or abstract situation.
Describe the features of a place or people.	Formulate a routine problem given data and conditions.	Apply a concept in other contexts.	
	Organize, represent and interpret data.		

Most Missed Items on the Test

Quantitative Reasoning:

Indicator Code*	Skill/Description
Q.4.b	Compute the area and circumference of circles. Find the radius or diameter of a circle when given the area or circumference.
Q.4.c	Compute the perimeter and area of polygons. Find side lengths of a polygon when given the perimeter or area.
Q.4.d	Compute the perimeter and area of two-dimensional composite shapes, which could include circles.

Indicator Code*	Skill/Description
Q.3.b	Use scale factors to determine the magnitude of a size change. Convert between actual drawings and scale drawings.
Q.3.d	Solve two-step, arithmetic, real world problems involving percents. Examples include but are not limited to: simple interest, tax, markups and markdowns, gratuities and commissions, percent increase and decrease.



Skills Test Takers are Missing Handout

Most Missed Items on the Test

Algebraic Reasoning:

Indicator Code*	Skill/Description
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.d	Graph two-variable linear equations.

Mathematical Practice and Content Interaction: Create algebraic models that represent real-world situations

Indicator Code*	Skill/Description
A.1.c	Create linear expressions as part of word-to-symbol translations or to represent situations you have been given.
A.2.c	Create one- or two-variable linear equations to represent situations you have been given.
A.3.d	Create one-variable linear inequalities to represent situations you have been given.

Mathematical Practice and Content Interaction: Search for and recognize entry points for solving a problem

Indicator Code*	Skill/Description
A.2.a	Solve one-variable linear equations, and formulas with multiple variables.
A.3.a	Solve linear inequalities in one variable.
A.4.a	Solve one-variable quadratic equations with real solutions, using any appropriate method.

Skills Test Takers are Missing Handout

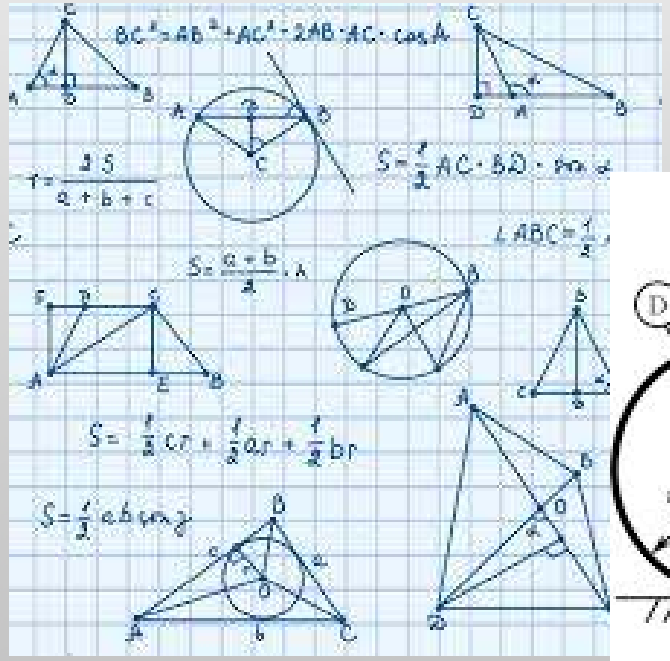
6-Hour Math GED Training

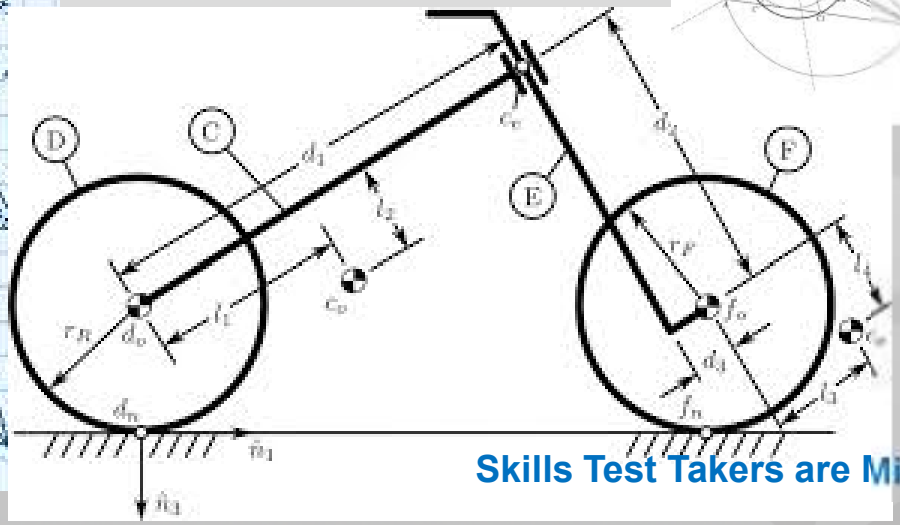
Objectives for the 6-hour Math GED Content and Strategies Training:

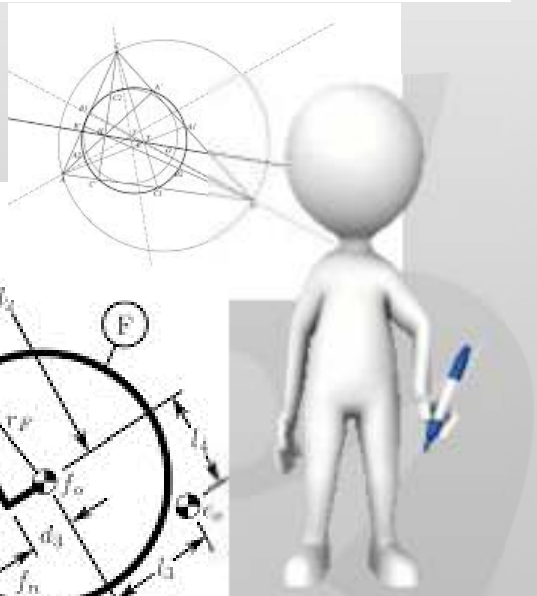
- Demonstrate increased understanding of the 2014 GED Test
- Understand the standards assessed by the 2014 GED Test
- Become familiarized with the format of the 2014 GED Test
- Demonstrate understanding of Webb's Depth of Knowledge Framework
- Apply strategies implementing the five Mathematical Practices outlined in the 2014 GED Assessment Guide
- Apply TI-30XS calculator skills when solving problems
- Identify and address weakest content indicators released by GED Testing Service.
- Identify and address common student misconceptions
- Solve 2014 GED Released Sample Items
- Implement a plethora of strategies and develop ways to implement certain strategies to meet various students' needs.
- Explore materials and resources that will engage students

Standards/Indicators: Area and Perimeter

Indicator Code*	Skill/Description
Q.4.b	Compute the area and circumference of circles. Find the radius or diameter of a circle when given the area or circumference.
Q.4.c	Compute the perimeter and area of polygons. Find side lengths of a polygon when given the perimeter or area.
Q.4.d	Compute the perimeter and area of two-dimensional composite shapes, which could include circles.







Skills Test Takers are Missing Handout

Silo Problem:

A farmer has three silos. The largest silo has a diameter of 24 feet. The radius of the smallest silo is one-third as big as the diameter of the largest. The middle-sized silo has a radius that is 2 feet greater than the radius of the smallest silo. What is the circumference of each silo?

14 π
16 π
18 π
20 π
24 π

Solution:

Mathematical Practices

MP1. Building Solution Pathways and Lines of Reasoning

- Search for and recognize entry points for solving a problem.
- Plan a solution pathway or outline a line of reasoning.
- Select the best solution pathway, according to given criteria.

MP2. Abstracting Problems:

- Represent real world problems visually and algebraically.
- Recognize the important and salient attributes of a problem.

MP4. Mathematical Fluency:

- Manipulate and solve arithmetic expressions.
- Transform and solve algebraic expression.
- Display data or algebraic expressions graphically.

Calculator Skills

- Students may now use hand-held TI-30XS calculators during the test.
- Individual testing centers are working with GED Testing Service regarding this implementation.

New Policy – Handheld Calculators allowed

- Effective October 6 for all test modules for which a calculator allowed
- TI-30XS Multiview Scientific Calculator
- Testing center can choose to provide the calculator, but is not required to do so
- Based on feedback we have received, this change is welcomed by adult educators.

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Content Group 1

Calculator Reference

GED Formula Sheet

2014 GED® PROGRAM

CALCULATOR REFERENCE GUIDE

Working with complex problems on the test is simple when you use this guide to understand what order to click the buttons in the on-screen calculator. The 2014 GED® test calculator is the TI-30XS.

BASIC ARITHMETIC

To perform basic arithmetic, enter numbers and operation symbols using the standard order of operations.

Example: 8 x −4 + 7 =

The correct answer = −25

SCIENTIFIC NOTATION

To perform calculations with scientific notation, use the EE key.

Example: 7.8 x 10^8 − 1.5 x 10^8 =

The correct answer = 630000000

MIXED NUMBERS

To perform calculations with mixed numbers, use the Ab/c key. As with fractions, the answer will automatically be formatted in reduced form.

Example: $12\frac{5}{6} - 1\frac{1}{2} =$

The correct answer = $\frac{34}{3}$

FRACTIONS

To perform calculations with fractions, use the Ab/c key. The answer will automatically be formatted in reduced form.

Example: $\frac{2}{9} \times \frac{3}{7} =$

The correct answer = $\frac{2}{21}$

PERCENTAGES

To calculate with percentages, enter the number, then %.

Example: 40% x 560 =

The correct answer = 224

POWERS AND ROOTS

To perform calculations with powers and roots, you will use the following keys:

Example: $1.2^2 =$

The correct answer = 1.44

Example: $7^4 =$

The correct answer = 2401

Example: $\sqrt{529} =$

The correct answer = 23

Example: $\sqrt[3]{1728} =$

The correct answer = 12

TOGGLE KEY

The answer toggle key ⇔ can be used to toggle the display result between fraction and decimal answers, exact square root and decimal, and exact pi and decimal.

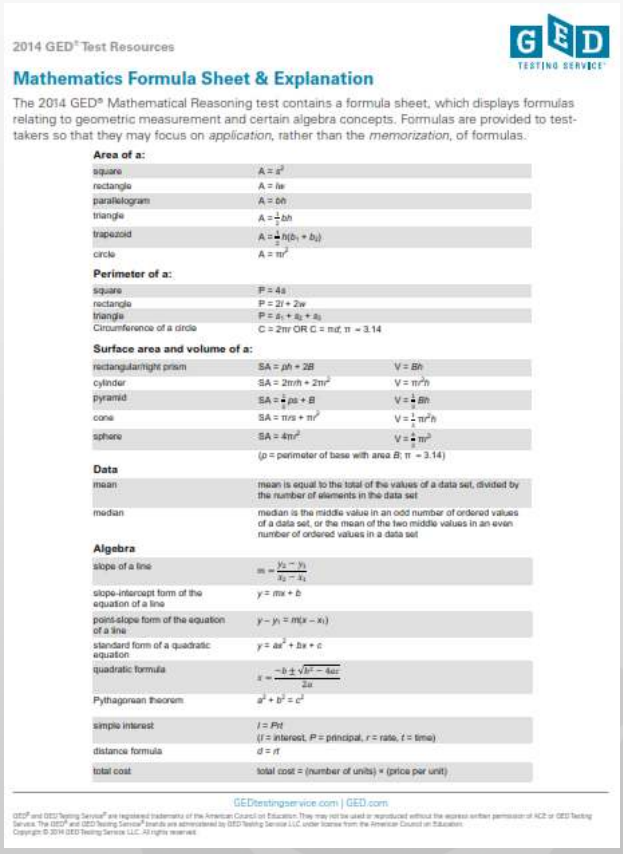
Example: $\frac{9}{10} =$

The correct answer = 0.9

This calculator reference sheet is provided for most items on the 2014 GED® test — Mathematical Reasoning, as well as certain items on the Science and Social Studies tests.

TEST WITH CONFIDENCE

GED TESTING SERVICE



2014 GED® Test Resources

GED TESTING SERVICE

Mathematics Formula Sheet & Explanation

The 2014 GED® Mathematical Reasoning test contains a formula sheet, which displays formulas relating to geometric measurement and certain algebra concepts. Formulas are provided to test-takers so that they may focus on *application*, rather than the *memorization*, of formulas.

Area of a:

square	$A = s^2$
rectangle	$A = lw$
parallelogram	$A = bh$
triangle	$A = \frac{1}{2}bh$
trapezoid	$A = \frac{1}{2}h(b_1 + b_2)$
circle	$A = \pi r^2$

Perimeter of a:

square	$P = 4s$
rectangle	$P = 2l + 2w$
triangle	$P = s_1 + s_2 + s_3$
Circumference of a circle	$C = 2\pi r$ OR $C = \pi d$; $\pi = 3.14$

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 = perimeter of base with area B; $\pi = 3.14$)	

Data

mean	mean is equal to the total of the values of a data set, divided by the number of elements in the data set
median	median is the middle value in an odd number of ordered values of a data set, or the mean of the two middle values in an even number of ordered values in a data set

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 = interest, P = principal, r = rate, t = time)
distance formula	$d = rt$
total cost	total cost = (number of units) × (price per unit)

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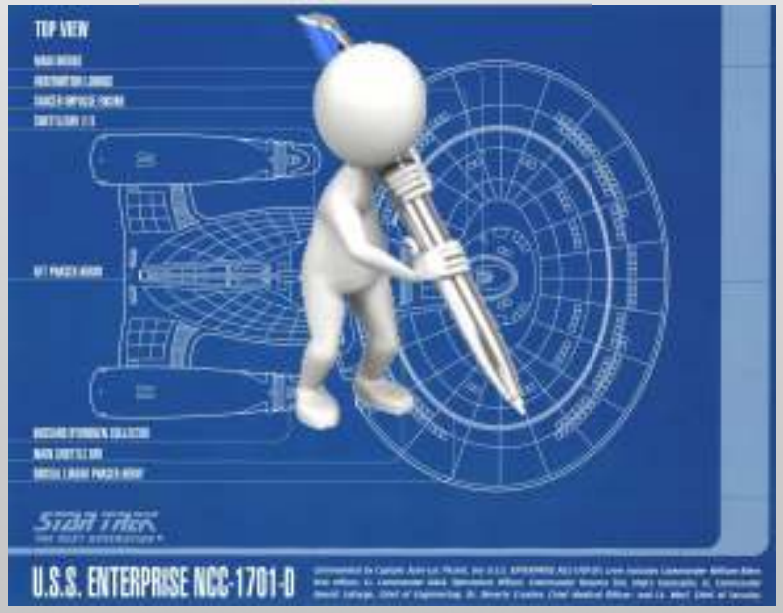
You may request a poster copy of this reference sheet by contacting: help@GEDtestingservice.com

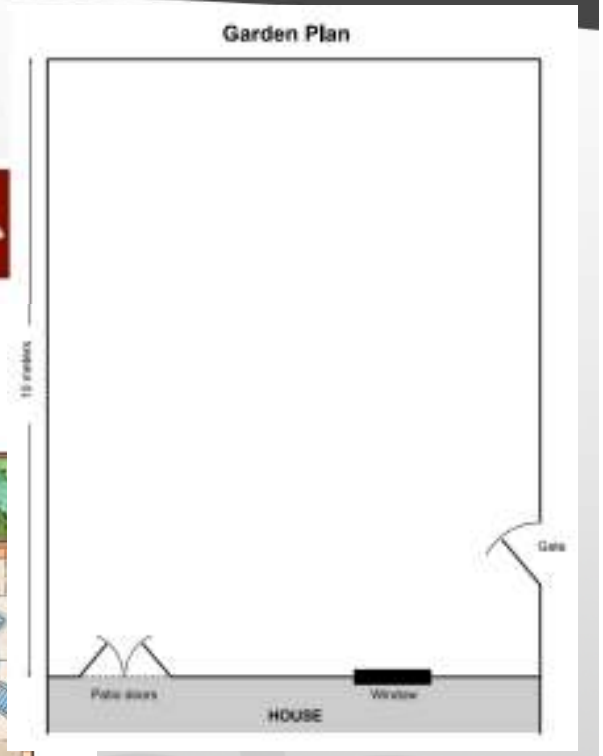
Standards/Indicators: Ratios, Proportions and Percents

Indicator Code*	Skill/Description
Q.3.b	Use scale factors to determine the magnitude of a size change. Convert between actual drawings and scale drawings.
Q.3.d	Solve two-step, arithmetic, real world problems involving percents. Examples include but are not limited to: simple interest, tax, markups and markdowns, gratuities and commissions, percent increase and decrease.



Skills Test Takers are Missing Handout

Hands-On Activity:

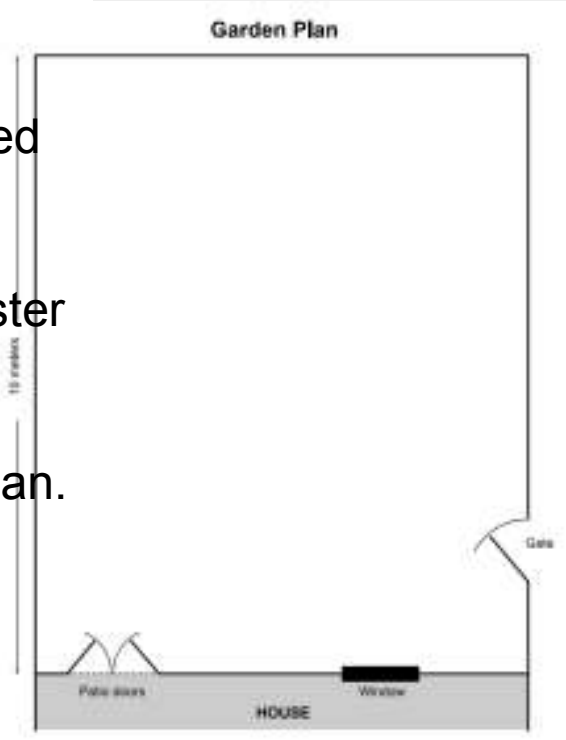


Designing a Garden Activity Sheet

Hands-On Activity:

Designing a Garden

1. Imagine your group as a team of garden designers.
2. Read the email you received from a customer.
3. Use the Garden Plan to sketch the features requested from the email. (3 minutes)
4. As a group decide on the final Garden Plan.
5. Draw your Garden Plan to scale on the provided poster paper, including your calculations and reasoning. (5 minutes)
6. Make sure to label the scale you used to draw the plan.
7. When your group is finished, post your work in a suitable wall space.



Designing a Garden Activity Sheet

Calculator Skills

- Fraction Button
- Toggle Button

Paper and Pencil Activities for your Students

- Interview
- Buying Concert Tickets
- Going Shopping
- Creating a Menu

*All these worksheets are also stored in your Math DefragGED USB Drive.

Technology Tip:

- **Scale Drawings and Scale Factors:**

http://www.ixl.com/math/grade-7/scale-drawings-and-scale-factors

Standards/Indicators: Coordinate Plane, Slope and Graphs of Linear Equations

Indicator Code*	Skill/Description
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.d	Graph two-variable linear equations.

Skills Test Takers are Missing Handout

Using Technology: National Library of Virtual Manipulatives

- Point Plotter – http://nlvm.usu.edu/en/nav/frames_asid_331_g_4_t_2.html?from=category_g_4_t_2.html
- Line Plotter - http://nlvm.usu.edu/en/nav/frames_asid_332_g_4_t_2.html?from=category_g_4_t_2.html

Standards/Indicators: Solving Linear Equations and Inequalities

Indicator Code*	Skill/Description
A.2.a	Solve one-variable linear equations, and formulas with multiple variables.
A.3.a	Solve linear inequalities in one variable.
A.4.a	Solve one-variable quadratic equations with real solutions, using any appropriate method.

Skills Test Takers are Missing Handout

Technology Tip:

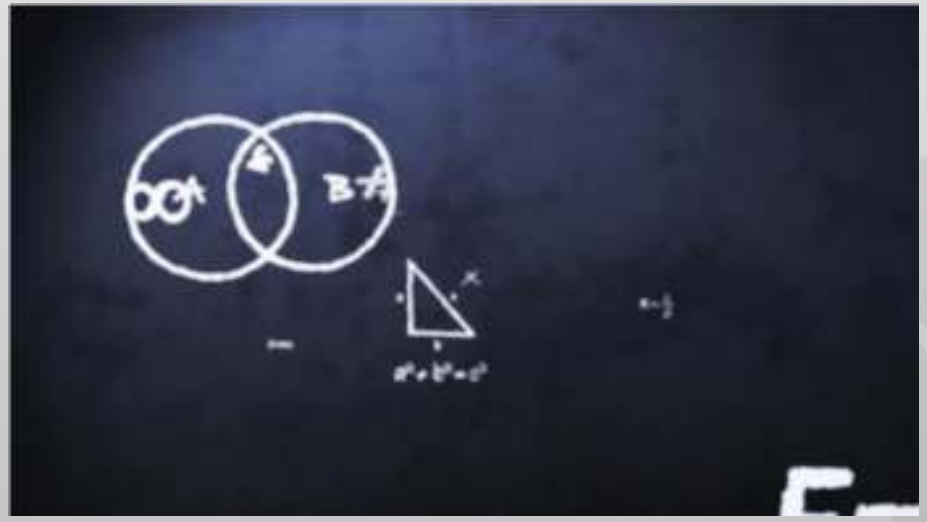
- **Graphing Inequalities:**

http://www.ixl.com/math/algebra-2/graph-a-linear-inequality-in-one-variable

http://www.ixl.com/math/algebra-2/graph-solutions-to-linear-inequalities

Standards/Indicators: Algebraic Representations

Indicator Code*	Skill/Description
A.1.c	Create linear expressions as part of word-to-symbol translations or to represent situations you have been given.
A.2.c	Create one- or two-variable linear equations to represent situations you have been given.
A.3.d	Create one-variable linear inequalities to represent situations you have been given.



Skills Test Takers are Missing Handout

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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Final Thoughts

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”

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End of Webinar

Thank you for your participation!

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