



GED CONNECTIONS

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MATHEMATICS - IT'S ABOUT MORE THAN JUST USING A CALCULATOR!

The GED 2002 Series Tests are in the final stages of preparation. Implementation is only six months away. This issue focuses on the GED Mathematics Test. It is important that you begin now to prepare your GED students for the new tests. The following information is provided to help you understand the significance of some of these changes.

Content Changes

There are two major changes on the GED 2002 Mathematics Tests that teachers have been talking about:

- Using a scientific calculator
- Working with alternate format questions

However, the GED 2002 Mathematics Test is about much more than the calculator or alternate formats. As with the other four tests in the GED 2002 Series, the Mathematics Test will require higher order thinking skills.

The GED 2002 Mathematics Test will cover content in four strands:

- Number operations and number sense
- Geometry and measurement
- Data analysis, statistics and probability
- Algebra, functions and patterns

What Does This Mean To You?

Each of the content strands will represent from 20-30% of the total test. Students will have to master more than just number operations and number sense. Students will need to have an understanding of content in multiple strands in order to be successful on the test. Teachers should keep in mind that many problems on the GED Mathematics Test will cross strands, meaning they will include more than one content strand. If students are to be successful, they must be exposed to cross-strand problems.

Item Types

Roughly 90% of the items on the GED 2002 Mathematics Test will require problem solving on the part of the student. The student will often be responding to graphic-based problems that incorporate charts, tables and graphs. However, about 10% of the test items will be strictly computation problems.

What Does This Mean to You?

Provide students opportunities to practice solving real-world problems that will enhance their graphic literacy skills—such as interpreting data from a chart, table or graph. Provide students with an opportunity to use the scientific calculator to calculate computation problems. The more comfortable the student is in using the calculator – the better.

Format Changes

The GED 2002 Mathematics Test will incorporate the use of alternate format or open-ended problems. These problems will require the student to use grids to record their answers.

What Does This Mean To You?

The greatest challenge to you will be the inclusion of sufficient opportunities for students to practice working with alternate or open-ended problems. Provide students with a mix of questions, some requiring multiple-choice, others requiring the use of the grids. Practice with students the proper method for completing grids and the necessity for correctly bubbling-in information.

Scientific Calculator

Students will have an opportunity on Part 1 of the Mathematics Test to use the Casio fx-260 Solar Scientific Calculator. The calculator is used merely as a tool to help students avoid the tediousness of computing real-life numbers using paper and pencil. Students must understand the basics about problem solving and math concepts or the calculator will be of little help during the test.

What Does This Mean To You?

Provide students with opportunities to practice using the scientific calculator. Give them opportunities to explore the various keys and functions. But – don't forget that they need to understand mathematical concepts first.

We hope that you enjoy this issue of *GED Connections*. If you have any comments or questions, please contact:

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For more information on dyscalculia and learning disabilities in math, refer to: **Focus on Basics, Volume 4, Issue B, September 2000, Accommodating Math Students with Learning Disabilities** by Rochelle Kenyon. For an online full-text version, go to: <http://gseweb.harvard.edu/~ncsall/fob/2000/kenyon>.

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THE SPECIAL CONNECTION

DR. ROCHELLE KENYON

Mathematics and Learning Disabilities

There are probably more learning disabled students in your math class than you realize. If you have learners who read numbers backwards, have trouble telling time, confuse part-whole relationships, have difficulty keeping score in a game, and have difficulty remembering math facts, concepts, rules, formulas, sequences and procedures, they may be learning disabled. *Dyscalculia* refers to a learning disability where the neurological dysfunction results in difficulty performing math. It is not as commonly diagnosed as dyslexia in school because of the lack of any strict or measurable criteria. The problem is addressed for prospective examinees in the GED Testing Center's brochure, "How to Request Accommodations When Taking the GED High School Equivalency Tests if You Have a Learning Disability." Common characteristics listed are:

- Confusing right and left, up and down

- Confusing similar numbers, reversing them or misreading their order
- Reversing numbers in a checkbook or having a hard time balancing it

Other characteristics that can be seen in the classroom include:

- Using a calculator or counting on fingers to answer simple questions
- Unable to do math in his/her head
- Confusing math symbols and misinterpreting graphs or charts
- Leaving out steps in math calculation
- Having trouble making change and budgeting
- Not translating real-life problems appropriately
- Having trouble distinguishing numbers on a watch or clock and following a schedule
- Having inconsistent mastery of math facts due to problems with long-term memory
- Having limited strategic planning ability

MATHEMATICS STRATEGIES FOR THE LD ADULT

The following strategies as suggested by Garnett can be used in the GED classroom to teach math to learning disabled students:

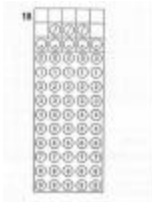
- Avoid memory overload by assigning manageable amounts of practice work as skills are learned.
- Build retention by providing review within a day or two of the initial learning of difficult skills, and by providing supervised practice to prevent students from practicing misconceptions and "misrules."
- Reduce interference between concepts or applications of rules and strategies by separating practice opportunities until the discriminations between them are learned.
- Make new learning meaningful by relating practice of sub-skills to the performance of the whole task, and by relating what the student has learned about mathematical relationships to what the student will learn.
- Reduce processing demands by pre-teaching component skills of algorithms and strategies, and by teaching easier knowledge and skills before teaching difficult knowledge and skills.
- Help students to "visualize" math problems by drawing a picture to help them understand the problem.
- Use visual and auditory examples.
- Use real-life situations that make problems functional and applicable to everyday life.

- Do math problems on graph paper to keep the numbers in line.
- Use uncluttered worksheets to avoid too much visual information.
- Use rhythm or music to help students memorize.
- Teach thinking strategies from one fact to another.
- Use interactive and intensive practice with age-appropriate games as motivational materials.
- Have students track their progress; which facts are mastered and which are still to be learned.
- Challenge critical thinking about real problems with problem solving.
- Use manipulatives and technology.
- Keep students engaged and challenged.

According to Bliss, (The Math Page at: http://www.conknet.com/~p_bliss/Math.htm) "Mathematics learning disabilities do not often occur with clarity and simplicity. Rather, they can be combinations of difficulties which may include language processing problems, visual spatial confusion, memory and sequence difficulties and or unusually high anxiety." Finding the best strategies to use so that students' strengths can be enhanced is a challenge. Increasing students' abilities to progress in math is a positive experience for both student and teacher.

ALTERNATE FORMATS, GRIDS AND COORDINATE PLANES!

The GED 2002 Mathematics Test will consist of two equally weighted parts. Both parts will include alternate format or open-ended questions. These alternate formats will require that students use grids to report their answers. The first part of the test will include six standard grids, the second part of the test will include two standard grids.



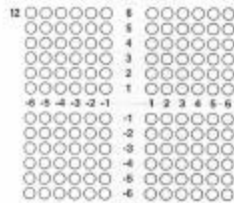
Standard Grid

Students should write and bubble-in response. Scanner reads bubbles, not written response.

Teach Student to:

1. Write in response first, then bubble-in so numbers align correctly
2. Decide on either left-justification or right justification
3. Avoid leaving spaces between numbers
4. Check the accuracy of answer before filling in the grid
5. Round-off appropriately, if the problem does not specify rounding to a specific point, make sure students understand that they have only five spaces in which to write the response
6. Make sure bubbles are filled in correctly

The GED 2002 Mathematics Test will also include coordinate plane grids. There will be a coordinate plane grid on each part of the test.



Coordinate Plane Grid

Teach Student to:

1. Identify the x-axis and y-axis
2. Read the problem carefully to identify whether the coordinates are positive or negative
3. Understand the order in which coordinates are written, i.e. the first coordinate represents point on the x-axis; the second coordinate represents point on the y-axis.
4. Check work and erase any stray marks

Remember, practice makes permanent—provide students with lots of opportunities to sharpen their gridding skills. Twenty percent (20%) of the math problems will involve gridded response items.

Did You Know?

- Norming continues—more than 22,000 graduating high school seniors have participated in the GED 2002 Norming Process as of 5/15/01. The process continues until 6/15 as the GEDTS seeks to reach a total of 30,000.
- If 4 out of 10 graduating seniors cannot answer a question correctly—it cannot be included on the GED Test.
- The Official GED Practice Test will be awarded to a publisher in late June or early July, with an expected publication date in September.
- The GED Testing Service is in the process of establishing a national database that will provide information to GED programs on the areas within the test with which students are having the most difficulty. This information will help teachers structure their programs more effectively to target specific skills with which students have difficulty.

For Future Reference

- A student who receives “no score” on the GED 2002 Language Arts, Writing Test—scored a 1 or 1.5 on the Essay.
- A student who receives a numerical score on the GED 2002 Language Arts, Writing Test scored at least a 2 (marginal) on the Essay, but did not have sufficient points to pass the entire test. This will usually indicate a problem within the multiple-choice portion of the test.

WHY A SCIENTIFIC CALCULATOR?

Over the years, there have been many discussions about whether or not GED examinees should be allowed to use a calculator. On one side were those who felt that students should be able to demonstrate their skills by pencil and paper only. On the other side were those who acknowledged that examinees should be able to use a calculator to relieve them of the tediousness of long, involved computations. The GED Mathematics Specification Panel decided that both parts of the argument should be addressed.

The panel decided to divide the GED Mathematics Test into two parts. The first part permits the use of the calculator and will use more real-life numbers. While all problems can be solved without a calculator, the use of one enables the examinee to more quickly and accurately complete the problems. The second part will not permit use of the calculator and will assess among other things the students' ability to use estimation and mental computation skills. Both of these skills are viewed as “major and lasting

outcomes” of a high school education.

The Casio fx-260 Solar Scientific Calculator was selected for a variety of reasons, including:

- Price—at \$7.00 from the GED Testing Service, it is very affordable.
- Order of operations—the calculator completes all computations in the correct order (something most 4-function calculators do not do).
- Face validity—high school seniors use scientific or graphing calculators in their math classes, not 4-function calculators.
- Expandability—while only limited functions will be used on the GED 2002 Mathematics Test, the scientific calculator has many modes of operation and functions that could be added in coming years as high school students increase their level of skills.
- Solar power—no one wants an examinee's calculator to lose power in the middle of a test.

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4-STEPS TO PROBLEM SOLVING

One of the most difficult tasks for teachers is helping students increase their mathematical problem solving ability. Why? Most GED math teachers use one of the following methods for problem solving themselves.

- Guess, check and revise
- Check the answer key

It isn't that GED math teachers don't want to help their students expand their problem solving skills, but rather that many teachers who work with GED math students do not have a math background. Few teachers have had the opportunity to take a math pedagogy class. This combined with little if any planning time can create problems for teachers as they try to help students gain the skills they need to be good problem solvers.

So what can a GED teacher do to help students? Start by helping students understand that there are four basic steps to problem solving. If students master the four steps, they will be better problem solvers and thus more successful on the GED Mathematics Test.

Step 1 – Find Out

Help students find out what the problem means and what questions must be answered in order to solve it.

Step 2 – Choose a Strategy

Help students identify possible strategies for solving the problem, including steps such as developing a chart, table or list, drawing a diagram, making a model, working backwards or using the process of elimination.

Step 3 – Solve It

Have the students solve the problems using the strategy identified in Step 2. If the answer they get is unreasonable, try a different strategy.

Step 4 – Look Back

Teach students the importance of looking back to check their answer and see if it answers the questions presented by the problem.

INTERNET RESOURCES FOR THE GED MATHEMATICS TEST

The Internet is a valuable resource that anyone can use. The following websites may be used by teachers and students.

The Math Forum

<http://forum.swarthmore.edu/library/>

The Casio Classroom

<http://education.casio.com>

Mrs. Glossers' Math Goodies

<http://www.mathgoodies.com>

Funbrain

<http://www.funbrain.com>

Quia Top 20 Math Games

<http://www.quia.com/math.htm>

Teaching and Problem Solving Sites

<http://www2.hawaii.edu/suremath/sites.html>

Measure 4 Measure

<http://www.wolinskyweb.com/measure.htm>