FORUM FOR Excellence
Illinois Community College Board
Career Technical and Adult Education: Building Pathways for All Students

Empower Students to Pass the GED® Math Test
(Even If You're Not a Math Expert)

September 2023: East Peoria, IL
CTAE: Stronger Together

SESSION PRESENTERS

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Empower Students to Pass the GED Math Test (Even If You're Not a Math Expert)
Instructors don't have to be math experts to be effective teachers of the math covered on the GED. But we know that math is the final test to pass for over 80% of GED test-takers. We need a new approach. Teaching students how to use their reading and critical thinking skills can be as important to passing the Math test as the calculations. Join us for this interactive session where we learn the ins-and-outs of the GED math test and the resources available to prepare for it, as well as how to activate critical thinking skills that students already have and apply them to math. Let's arm ourselves with as much GED math information as possible so we can then empower our students to pass the test and transition to their next step!

- **Learn the ins-and-outs of the GED math test** (About the Test page, study guide, test preview)
- **Identify resources available to prepare students for math test** (non-calculator skills, indicators, formula sheet, calculator tutorial and reference page)
- **Activate critical thinking skills and apply them to math** (three-read strategy, What's Going on in this Graph?)

Messaging: This is targeted for teachers of ASE students who are prepping for the GED.
This is ultimately a session about multidisciplinary instruction.

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Session Objectives

- **Learn the ins-and-outs of the GED® math test**
- **Identify resources available to prepare students for the math test**
- **Enable students to activate critical thinking skills and apply them to the math test**

This session is targeted for teachers of students who are prepping for the GED® math test.

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Poll Questions

Online participants: Find the poll in Whova and take a minute to answer both questions.
In-person participants: Turn & talk to your neighbor

How do you feel about teaching math?

AND

Think about a student you've had recently who struggled with math/struggled to pass the GED math test. What would you identify as a major reason for their struggle?

The Ins-and-Outs of the GED® Math Test

Learn the Ins-and-Outs of the GED® Math Subject Test

www.ged.com

GED® home page ➡ About the Test tab

https://ged.com/about_test/test_subjects/

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Learn About Resources for GED® Math

www.ged.com Educators & Admins tab
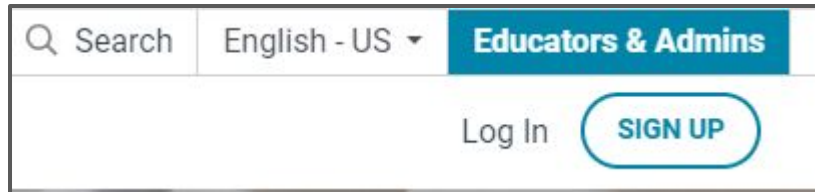
The "No-Calculator" Skills

Essential Resources for Math Instruction

Research shows that students struggle with non-calculator items on the GED Math test. Use these resources to target your instruction and improve student performance.

Calculator-Prohibited Indicators   View in Spanish

Tips for Calculator-Prohibited Section   View in Spanish

Tips for Attaining High School Equivalency   View in Spanish

GED® Educators & Admins tab ➡ Teaching Resources

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

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GED Non-Calculator Section - Helpful Tips

Become familiar with the [8 calculator-prohibited indicators](#)

Total number of questions on that portion varies but does not exceed 7

Non-calculator section of the test can only be reviewed at the end of that section.

Tips & Tricks!

TEST--TAKER RECOMMENDATIONS FOR CALCULATOR--PROHIBITED INDICATORS

The first several questions of the GED® Mathematical Reasoning test assess eight indicators covering various concepts in number sense and computation (Q.1.a through Q.1.d and Q.2.a through Q.2.d) that prohibit the use of the calculator. GED Testing Service has analyzed data on these calculator--prohibited items, resulting in the following comments and recommendations:

Indicator	Background	Recommendations for Test--takers
Q.2.b Perform computations and write numerical expressions with squares and square roots of positive, rational numbers.	This indicator tests one or more of a number of skills, all involving numerical squares or square roots (without the use of variables). Skills that test takers can expect to encounter include • squaring a number, • taking the root of a perfect square, • simplifying and computing with non--perfect square roots, and • computing with squares, roots, and other rational numbers in combination. While test takers do fairly well with simple squares and square roots, there is a sharp drop--off in performance on items involving additional or more complex computations.	• Memorize the first 12 perfect squares (1, 4, 9, …, 144), • Understand the inverse relationship between pairs of squares and square roots; i.e., $12^2 = 144$ and $\sqrt{144} = 12$. • Understand the difference in squaring a negative number, such as $(-3)^2 = 9$, and the negative of a square number, such as $-3^2 = -9$. • Practice computing with squares and square roots that include fractions and decimals. • Strengthen skills at simplifying, and computing with, non--perfect square roots (e.g., $\sqrt{12} = 2\sqrt{3}$)

Equivalent Exponents

March 19, 2020

openmiddle.com

Directions: Using the digits 0-9 only once each, create as many true equations as possible.

$$\square^{\square} = \square^{\square}$$

Hint

How can you use the fact that anything to the zero power equals one?

In what ways are 3 and 9 are connected, as are 2, 4 and 8?

How can we use this knowledge to build on creating equivalent expressions?

Math Formula Sheet

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 $C = \pi d$; $\pi \approx 3.14$

GED® Educators & Admins tab ➡ Free Classroom Materials

https://ged.com/educators_admins/teaching/classroom_materials/

Using the Calculator

Calculator Tutorial 123

View Now   View Now - In Spanish

TI-30XS Calculator Reference Sheet

The calculator reference sheet is provided on most items on the 2014 GED® Mathematical Reasoning Mathematical Reasoning test, as well as certain items on the Scientific Reasoning and Social Studies tests. The calculator reference sheet is provided to test-takers in order to demonstrate the functionality of the onscreen calculator, specifically in terms of what order to click the buttons in complex problems, such as order of operations or calculating with fractions.

BASIC ARITHMETIC

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

EXAMPLE

$8 \times {}^{-}4 + 7 =$

[8] [×] [(−)] [4] [+] [7] [enter]

The correct answer = **-25**

GED® Educators & Admins tab ➡ Free Classroom Materials

https://ged.com/educators_admins/teaching/classroom_materials/

Calculator videos on YouTube

TI-30XS Multi-view You Tube Video List

OVERVIEW

Below are links to several videos posted on You Tube and the TI site that provide demonstrations of some of the basic and more advanced uses of the TI-30XS Calculator that can be used on the TABE 11/12 and various HSE tests.

DOMAIN	BRIEF DESCRIPTION	VIDEO LINK
GENERAL	GED's basic video of using the TX-30XS on-screen calculator on the GED Math Test. Getting to know the various keys on the calculator.	https://www.youtube.com/watch?v=q0Vbz1i2X84&t=4s https://www.youtube.com/watch?v=YHwiBeJFqvY&t=84s
CHECKING THE MODE OF THE CALCULATOR	TI-30XS for Algebra and Calculus. Watch up to minute 2:25.	https://www.youtube.com/watch?v=YHwiBeJFqvY&t=84s
FRACTIONS	Larry Smith's Doing Fractions on the Multiview calculator	https://www.youtube.com/watch?v=K-Utf4dYG2Y&feature=youtu.be
EXPONENTS	Brenna Micheli's How to Enter Exponents video on the Multiview calculator	https://youtu.be/r0rRkSmX6jk

What is the difference between the buttons shown on the calculator?

There is no difference between the two buttons.

(—) is used to write negative numbers

— is used to subtract numbers

(—) is used to subtract numbers

— is used to write negative numbers

Instructional Strategies

High Impact Indicators

High Impact Indicators

Skills are not all created equal! Improving certain skills can help students improve in other areas. These resources provide detailed guidance on how you can best help improve student performance.

High Impact Indicators   View in Spanish

Relationship Across Content Areas

View in Spanish

GED® Educators & Admins tab ➡ Teaching Resources

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

High Impact Indicator	Related Indicators from Other Content Areas		
RLA	Social Studies	Science	Mathematical Reasoning
R.4.1/L.4.1: Determine the meaning of words and phrases as they are used in a text, including determining connotative and figurative meanings from context. Measured with both informational and literary texts.	SSP.4 a. Determine the meaning of words and phrases as they are used in context, including vocabulary that describes historical, political, social, geographic, and economic aspects of social studies.	SP.2.a Identify possible sources of error and alter the design of an investigation to ameliorate that error	MP.1 d. Recognize and identify missing information that is required to solve a problem. MP.1 e. Select the appropriate mathematical technique(s) to use in solving a problem or a line of reasoning. MP.5 c. Identify the information required to evaluate a line of reasoning.
R.5.3: Analyze transitional language or signal words (words that indicate structural relationships, such as consequently, nevertheless, otherwise) and determine how they refine meaning, emphasize certain ideas, or reinforce an author's purpose. Measured with both informational and literary texts.	SSP.3 a. Identify the chronological structure of a historical narrative and sequence steps in a process. **SSP.3.c: Analyze cause-and-effect relationships and multiple causation, including action by individuals, natural and societal processes, and the influence of ideas.**	**SP.2.b: Identify and refine hypotheses for scientific investigations.** **SP.2.e: Identify and interpret independent and dependent variables in scientific investigations.**	MP.1 e. Select the appropriate mathematical technique(s) to use in solving a problem or a line of reasoning. MP.5 c. Identify the information required to evaluate a line of reasoning.

Critical Thinking Skills on the Math Test

A scientist is studying red maple tree growth in a state park. She measured the trunk diameters of a sample of trees in the same month every other year. The tables show the data for two of the trees.

Tree 1

Year	Trunk Diameter (inches)
1	18.6
3	19.2
5	19.8
7	20.4
9	21.0
11	21.6
13	22.2

Tree 2

Year	Trunk Diameter (inches)
1	11.4
3	12.0
5	12.6
7	13.2
9	13.8
11	14.4
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 will put tree wrap around tree 1 to protect it from the winter snow. The height of the tree wrap needs to be 45 inches.

Tree Wrap

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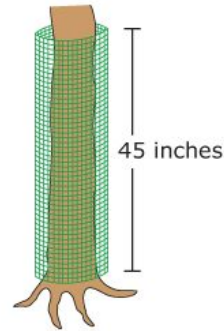
The wrap is priced by the square foot. To the nearest square foot, how many square feet of wrap does she need?

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

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What Doesn't Work for Word Problems?

CUBES

Story Problem Solving Strategy

Circle the #s

Underline the ?

Box the words that are *keywords*

Eliminate info not needed

Solve by showing your work
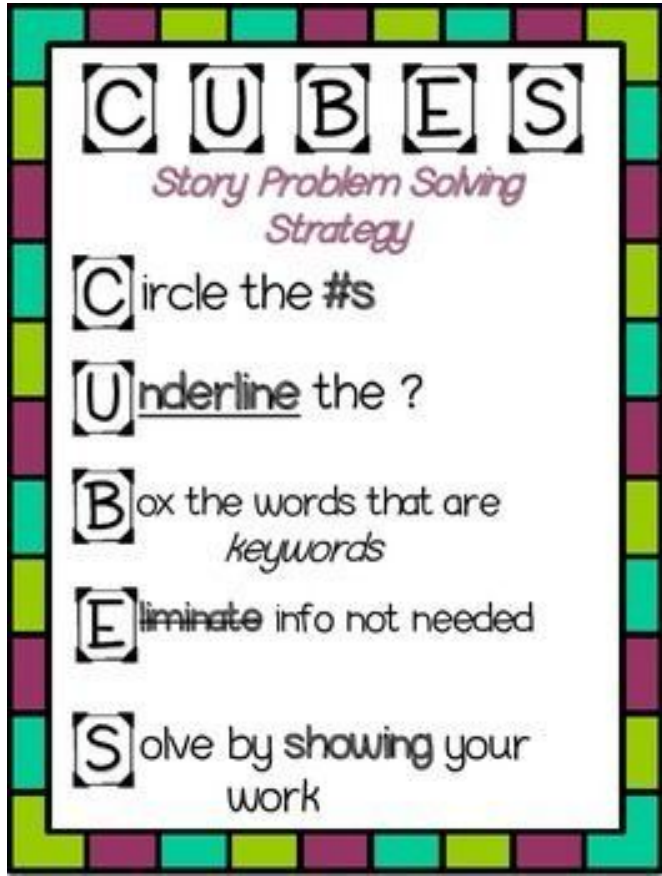
Elementary level students can benefit from a strategy like this because it can be helpful for organizing information when first learning to read.

However, it isolates the information instead of making sense of it.

Annie is planning a business meeting for her company. She has a budget of $1,325 for renting a meeting room at a local hotel and providing lunch. She expects 26 people to attend the meeting. The cost of renting the meeting room is $270. Which inequality shows how to find the amount, x, Annie can spend on lunch for each person?

○ A. $26x + 270 \geq 1,325$

Annie is planning a business meeting for her company. She has a budget of $1,325 for renting a meeting room at a local hotel and providing lunch. She expects 26 people to attend the meeting. The cost of renting the meeting room is $270. Which inequality shows how to find the amount, x, Annie can spend on lunch for each person?

○ A. $26x + 270 \geq 1,325$

○ B. $26x + 270 \leq 1,325$

○ C. $270x + 26 \geq 1,325$

○ D. $270x + 26 \leq 1,325$

NO More Keywords!

Keywords can be dangerous.

Sometimes there is no keyword.

Teaching keywords does not allow students to think about math in context.

Most GED math problems require more than one step and are more advanced.

Julie left $9 on the table. Her brother left $6 on the table. How much money was left on the table?

Maria had 10 flower petals. Four were green and the rest were orange. How many orange flower petals does Maria have?

Let's walk through a math problem-solving strategy called the three-reads protocol.

1) Read for Context
2) Read to understand the quantities and their relationship
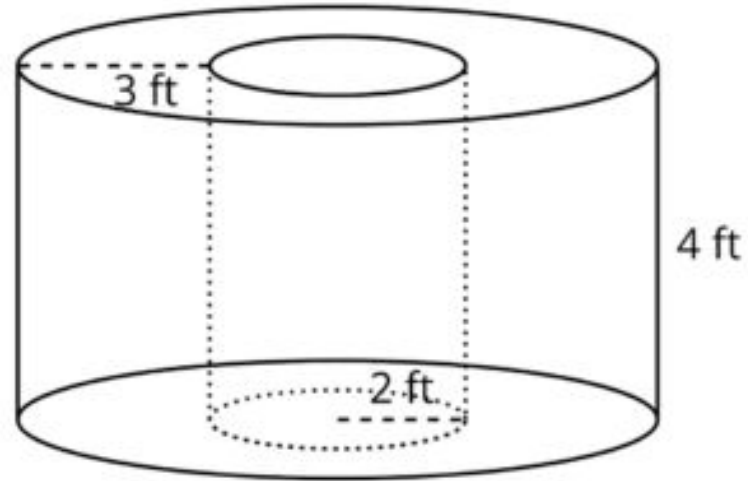3) Read to reveal the questions and plan solution strategies

AMPLIFY LANGUAGE!

Let's try it! Read for Context

An aquarium manager drew a blueprint for a cylindrical fish tank. The tank has a vertical tube in the middle in which visitors can stand and view the fish.

The best average density for the species of fish that will go in the tank is 16 fish per 100 gallons of water.

This provides enough room for the fish to swim while making sure that there are plenty of fish for people to see.

The aquarium has 275 fish available to put in the tank.
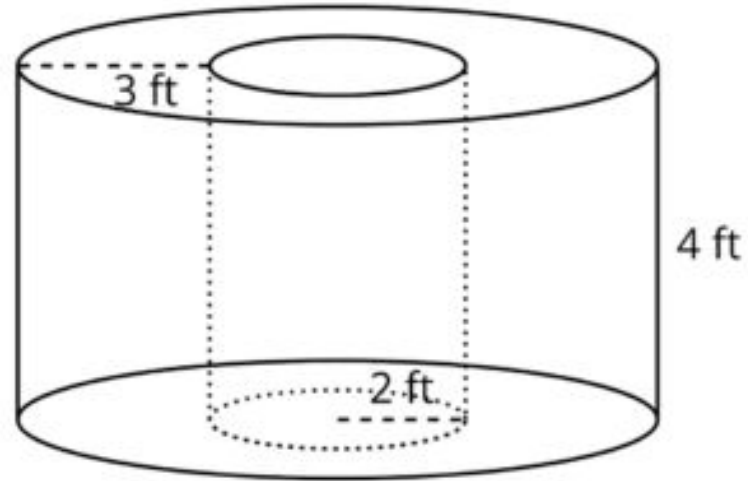
Let's try it! Read to identify quantities

An aquarium manager drew a blueprint for a cylindrical fish tank. The tank has a vertical tube in the middle in which visitors can stand and view the fish.

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Let's try it! Reveal the question and plan a solution

An aquarium manager drew a blueprint for a cylindrical fish tank. The tank has a vertical tube in the middle in which visitors can stand and view the fish.

The best average density for the species of fish that will go in the tank is 16 fish per 100 gallons of water. This provides enough room for the fish to swim while making sure that there are plenty of fish for people to see.

The aquarium has 275 fish available to put in the tank.

Is this the right number of fish for the tank? If not, how many fish should be added or removed?

Explain your reasoning.
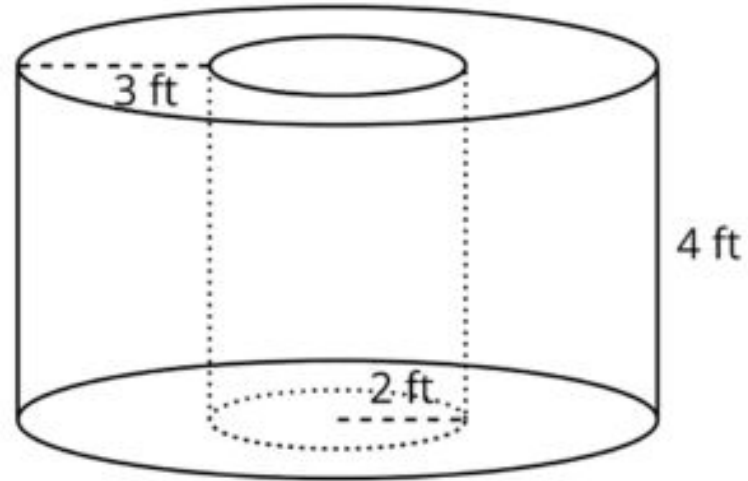
GED Math Vocabulary

The GED$^®$ test does not directly test math vocabulary definitions, BUT it does use math vocabulary in context.

If a math term is included in a GED$^®$ indicator, students are expected to understand the meaning of that word.

Test taking strategies

- Encourage to attack problems they are confident with and flag the ones they are unsure of.
- Eliminate 3 of 4 through estimation
- Restate the problem in your own words
- Reasonableness of answer (shepard problem)
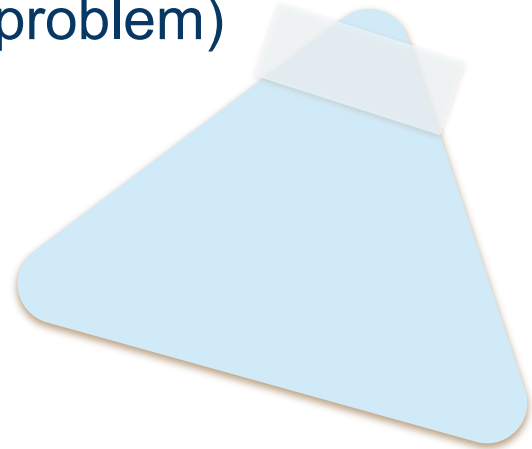
NYT What's Going On In This Graph?

- What do you notice?
- What do you wonder?
- What conclusions can you draw from this information?

Overall number of train cars derailed

Number of cars carrying hazardous materials on trains that derailed

Source: U.S. Department of Transportation

Additional Resources - Fast Track Math Materials

GED Success Academy from Kentucky U

Hopkinsville High Impact GED Study

Tri-County Math Study Booklet

Perimeter and Area

Let's look closer at different ways of measuring two and three-dimensional figures. All the formulas in this section are on the GED Math Formula Sheet. You do not need to memorize the formulas. You only need to understand how to apply them.
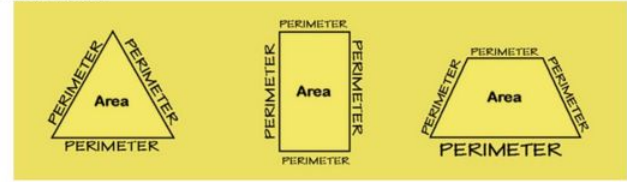
Perimeter is the distance around the edge of a flat, two-dimensional figure. When we calculate perimeter, we measure the distance around the border of the figure. Perimeter problems usually involve putting up a fence, putting a frame around something, putting trim or border around an area or room. To find the perimeter, **add** the lengths of the sides.
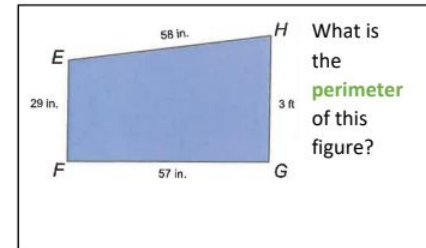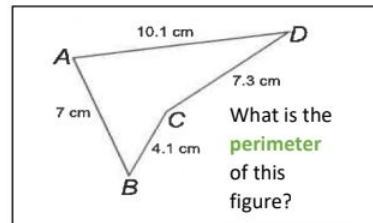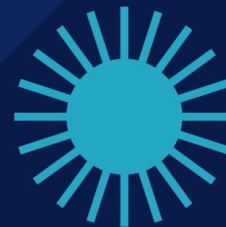
http://rebrand.ly/pdnlist

Thank you!

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Download the slides from the Whova app and use the resources linked throughout.

Feel free to reach out with questions!