



Problem-Solving Like a Pro

High-Impact GED® Math Prep

Facilitator: Ronald Cruz

THURSDAY | JULY 30 | 9:15 – 10:30 AM





PRESENTER



Ron Cruz

Supervisor of CTAE Operations,
Hillsborough County Schools

GED® National Trainer

- Mathematics and Physics Teacher
- Consultant, Trainer and Content Developer, Florida IPDAE, ACE of Florida, Florida Department of Corrections and the Florida Department of Education
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Session Goals



Identify the key mathematical reasoning skills assessed on the GED® Math test and common learner challenges that affect performance.



Apply evidence-based instructional strategies to help students decode word problems, organize information, and solve multi-step equations with confidence.

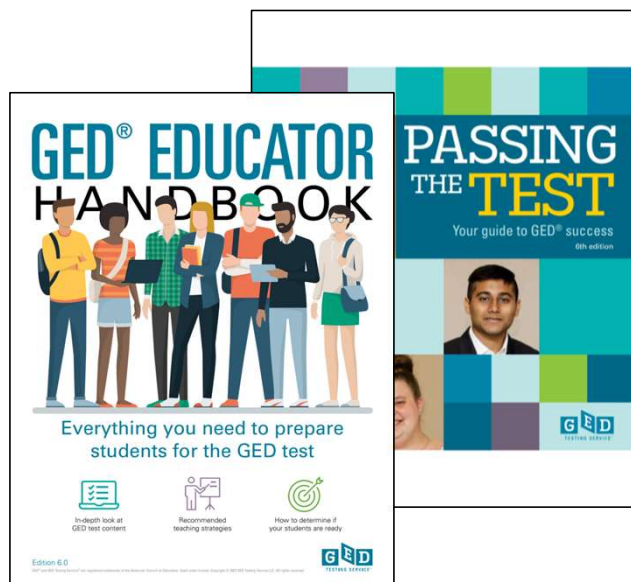


Model practical, classroom-ready problem-solving frameworks that strengthen students' conceptual understanding and test-taking efficiency.



Integrate high-impact tools and resources—including digital and AI-powered supports—to create engaging, differentiated GED® Math lessons that build lasting confidence and success.

Session Overview



Understanding the GED® Math Framework

GED
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High Impact Indicators

All of the indicators listed in the GED® Assessment Target Indicators describe the critical thinking skills essential to test-taker success in college, career training, and the workforce. However, those we are highlighting in the **High Impact Indicators** may be useful for educators to emphasize in their instruction.

We selected the following skills as High Impact Indicators because:

- They represent particular **foundational skills** that are the basis for the development of other skills covered in the GED® Assessment Targets and have **broad usefulness** that can be applied in multiple contexts.
- They are a **good fit for classroom instruction** because they are not complicated but are important for students to know and use.
- GED® testing data suggests that **educators may not be currently focusing on these skills** in their GED® test preparation.

While focused classroom instruction on these High Impact Indicators may quickly and positively impact your students' test performance, **educators should note that the High Impact Indicators are not more important than the rest of the indicators.** Proficiency with all of the indicators is essential for test-takers to perform well on the GED® test.

Reasoning Through Language Arts – High Impact Indicators

Indicator	What to look for in student work: Students' work shows they have...
R.3.1: Order sequences of events in texts. <i>Primarily measured with literary texts.</i>	• located a single, discrete event or plot point in texts. • identified chronological and non-chronological sequences of events within texts. • described the progression from one event to the next in a text. • re-ordered events presented in non-chronological order in texts into chronological order. • re-ordered events provided in chronological order texts into a different order (e.g. cause-and-effect, etc.) in order to determine the text's meaning.

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High-Impact Instructional Strategies

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Toothpick Houses

Build or draw the following sequence of houses made from toothpicks.

- Fill in the following table:

Houses	1	2	3	4	7
Number of Toothpicks					
- See if you can come up with a way to predict the number of toothpicks needed to build any number of houses. Describe your method.
- Using your method, see if you can fill in the missing parts of the table:

Houses	5	6	8	12	20	100	
Toothpicks						51	76
- How can you calculate the number of houses you can build if you know the number of toothpicks you have? Explain.
- How would you write your method for question 4 in symbolic form?

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Problem-Solving Frameworks for GED® Success

TAKING THE
GED® TEST

WHAT YOU NEED TO KNOW

YOU CAN TAKE THE GED TEST IF YOU:

- ☐ Are at least 18 years old
- ☐ Are 16 or 17 years old and have the completed paperwork that your state may require
- ☐ Aren't enrolled in high school

Check your state policies for any additional requirements to take the GED test in your area.

WHY SHOULD I TAKE THE GED TEST?

Didn't finish high school? Don't let that stop you! Taking the GED test is your first step to a better future.

Take the GED test if you want to:

- Go to college
- Go to career or vocational training
- Get a better job
- Have a career doing something you love
- Make more money
- Make your family proud

Whatever your dream is, the GED test will help you make it happen.

The test is offered in
2 languages

English

Spanish
(in most states)

TEST COST

\$0 — \$50
per test subject

The cost varies by state, but you can pay for it one subject at a time. Check your state policies to see if free or discounted testing is available.

There are **20 million** grads and counting. **You could be next!**

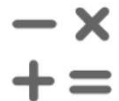
The GED test is made up of **4 test subjects**



Reasoning
Through
Language
Arts (RLA)



Science



Mathematical
Reasoning



Social
Studies

To pass the GED test, get a score of **145** in each subject.



Both the GED College Ready and the GED College Ready + Credit scores mean you are ready to take college level courses. Earn the GED College Ready + Credit score and you could receive up to 10 college credits to apply to your course of study.

WILL IT HELP ME GET A JOB OR GET INTO COLLEGE?

You bet!

97%

The percentage of colleges and employers that accept the GED credential.

That's because it's been the **leading high school equivalency program** for more than 75 years!

GET YOUR
SCORES IN **3** HOURS OR LESS!



The test is delivered on computer at an authorized testing center. Many states also offer the online proctored test, which you can take from home.

WHAT'S ON THE TEST?

Find out what's on each test subject



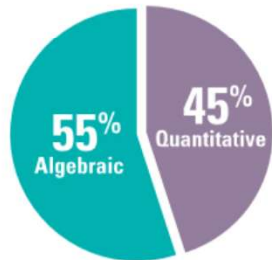
Reasoning Through Language Arts

- 150 minutes
- Includes a 10-minute break
- Includes one essay that you have 45 minutes to write
- Measures your:
 - » Ability to read closely, write clearly, and edit and understand written text
 - » Ability to understand, interpret, and answer questions based on text
 - » Ability to use evidence to support an argument
 - » Understanding of basic English skills at a level needed to succeed in college or a job



Mathematical Reasoning

- 115 minutes
- 2 parts with a short break
 - » No calculator allowed on the first part
 - » You can use a TI-30XS calculator for the remaining questions
- Math formulas and a calculator reference guide provided
- Measures your problem-solving abilities in the following areas:

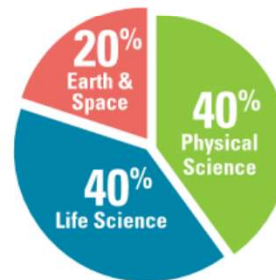


4



Science

- 90 minutes
- No break
- Can use a TI-30XS calculator
- Measures your:
 - » Ability to read, understand, and interpret science-related texts
 - » Problem-solving abilities in science-related situations

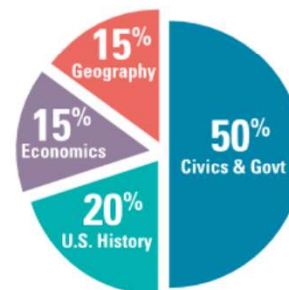


5



Social Studies

- 70 minutes
- No break
- Can use a TI-30XS calculator
- Measures your:
 - » Ability to read, understand, and interpret social studies-related texts
 - » Problem-solving abilities in social studies-related situations



WHAT DO MY SCORES LOOK LIKE?

Log into your GED account to see your scores and get your Enhanced Score Report

What is included in my score report?

My Score – See how you did on your test. Your GED Ready practice test score will also tell you how likely you are to pass the GED.

Personal Study Plan – See exactly what you should work on to score higher with your personal study plan! Link your study material and get the pages and chapters you need to study.

Written Response & Resources – Access resources for scoring higher on the written response, as well as:

- GED test — See your written response scores (for Reasoning Through Language Arts only)
- GED Ready practice test — Working with a teacher? Show your written answers to your teacher so they can grade your responses



When can I expect my scores?

GED Ready practice test scores will be ready as soon as you finish the test.

GED test scores are usually ready in 3 hours or less. Sometimes it can take a few days. You'll get an email letting you know when your scores are ready.

GED Ready practice test

Likely to Pass (145–200)



You're ready and should schedule your test.

Too Close To Call (134–144)



You may be ready, but should study more before you take the test.

Not Likely to Pass (100-133)



You need to study more before you take the test.

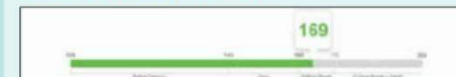
GED test

GED College Ready + Credit (175-200)



You passed and scored in the highest possible range. Not only did you show that you are ready to take college level courses, you may be eligible for up to 10 college credit hours.

GED College Ready (165-174)



You passed and showed that you are ready to take college level courses, and you may qualify for waivers from placement testing.

Pass / High School Equivalency (145-164)



Congratulations! You passed and showed the same skills as a graduating high school senior.

Below Passing (100-144)



You did not pass and need to retake the test.

GED® High Impact Indicators

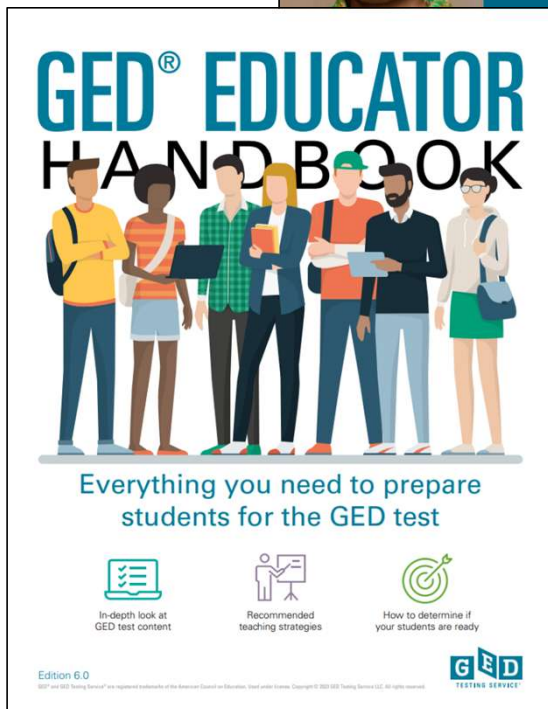
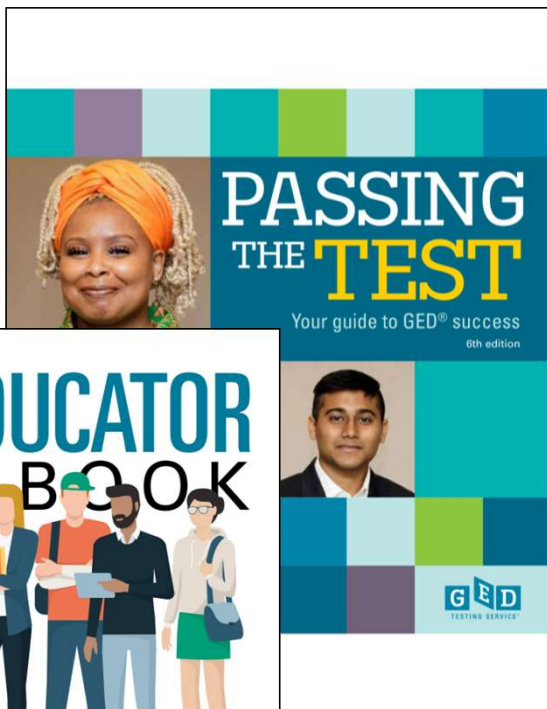
Skills are not all created equal! Improving certain skills can help students improve in other areas. These resources provide detailed guidance on how you can best help improve student performance.

1. **Q.1** Apply number sense concepts, including ordering rational numbers, absolute value, multiples, factors, and exponents.
2. **Q.3** Calculate and use ratios, percents and scale factors.
3. **Q.4** Calculate dimensions, perimeter, circumference, and area of two-dimensional figures.
4. **Q.5** Calculate dimensions, surface area, and volume of three-dimensional figures.
5. **A.3** Write, manipulate, solve, and graph linear inequalities.
6. **A.7** Compare, represent, and evaluate functions.

Tips for Achieving High School Equivalency

Achieving the level of performance required for high school equivalency does not necessarily require a student to master the entire range of content covered on the test. Focus on the math skills and performance benchmarks most critical in helping students attain the high school equivalency performance level in math.

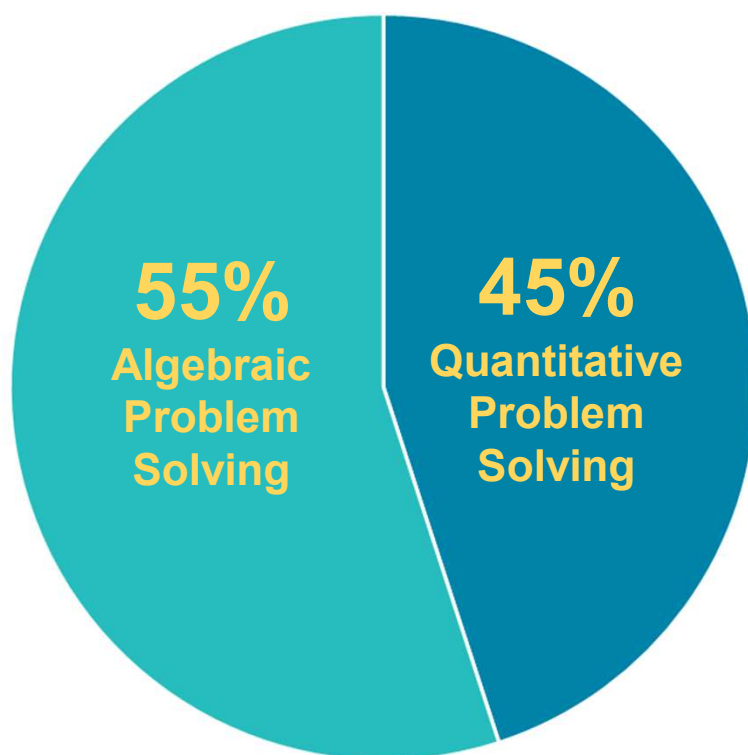
- Number Sense
- Consistency
- Fluency
- Algebraic Problem Solving
- Measurement with Geometric Figures
- Working in a Coordinate Plane
- Interpreting Graphics
- Mean, Median and Mode



Understanding the GED® Math Framework

GED® Test Structure

CONTENT AREAS



ITEM TYPES

- 1) Multiple Choice
- 2) Drag-and-Drop
- 3) Hot Spot
- 4) Fill in the Blank
- 5) Drop-Down

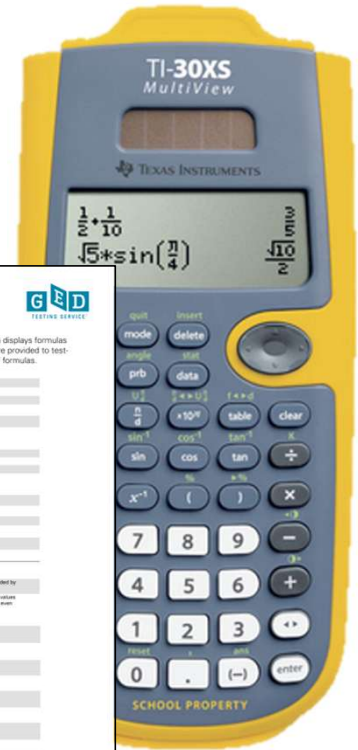
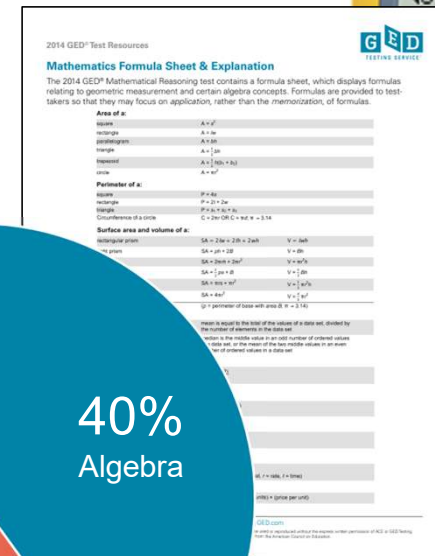
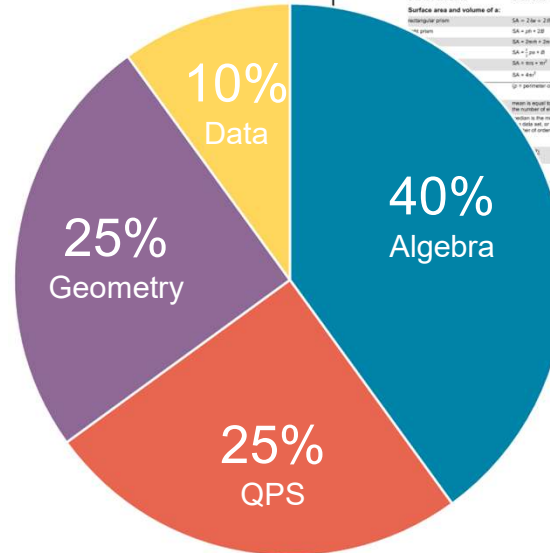
COMPETENCIES

The GED® Mathematical Reasoning Test strikes a balance between:

- 1) Conceptual Understanding
- 2) Procedural Skill and Fluency
- 3) Applications to Realistic Situations

The GED® Math Landscape

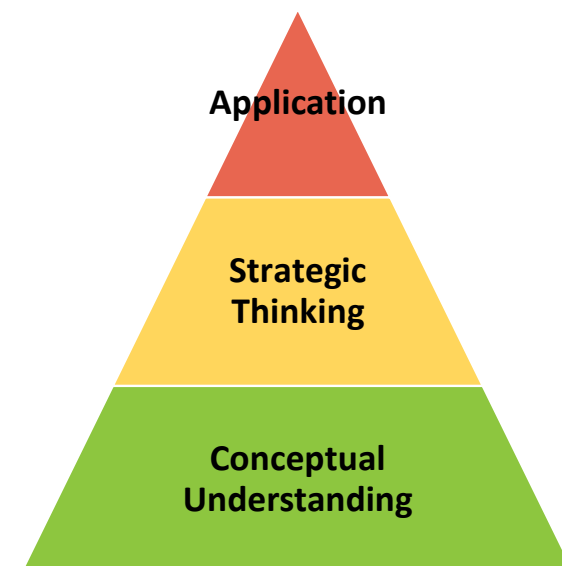
- 46 test questions (approx. 115 minutes)
- Two parts: Part 1 (No Calculator) - 5 questions | Part 2 (Calculator) - 41 questions
- Four content areas: Quantitative Problem Solving (QPS), Algebraic Problem Solving (APS), Geometry and Data Analysis & Statistics
- Embedded formula sheet provided
- 80% procedural & conceptual | 20% real-world applications



GED® Mathematical Reasoning Practices

The GED® Math Test measures reasoning, not rote memorization.

1. **Reason Abstractly and Quantitatively** – Move between words, symbols, and real-world contexts.
2. **Model with Mathematics** – Apply math to real-life situations.
3. **Construct Viable Arguments** – Explain and justify reasoning.
4. **Use Appropriate Tools Strategically** – Choose when to use calculators, graphs, or mental math.
5. **Attend to Precision** – Interpret results and units carefully.



Core Content Domains of GED® Math

1. Quantitative Problem Solving (QPS)

- Fractions, decimals, ratios, proportions, percentages
- Real-world applications of number sense

2. Algebraic Problem Solving (APS)

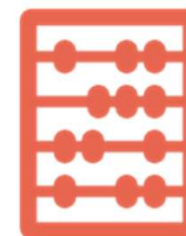
- Expressions, equations, inequalities, functions
- Translating verbal statements into algebraic models

3. Geometry

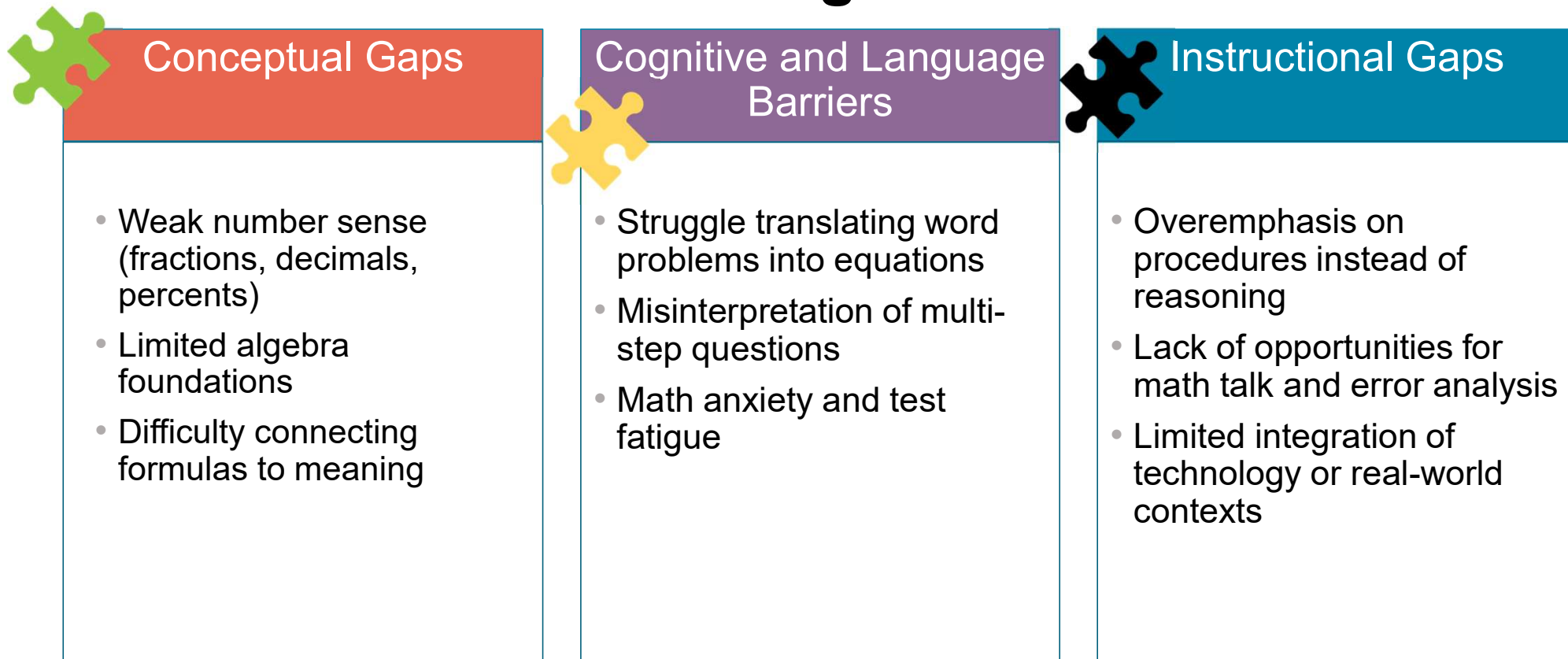
- Perimeter, area, volume, Pythagorean theorem
- Angles, transformations, and coordinate geometry

4. Data Analysis & Statistics

- Mean, median, mode, range
- Probability, graphs, and data interpretation



Common Learner Challenges in GED® Math



Error Analysis Quick Look

Example Problem:

A recipe calls for $\frac{3}{4}$ cup of sugar. If you double the recipe, how much sugar do you need?

Student Response: $1\frac{1}{4}$ cups

- ? *What went wrong?*
- ? *What might this tell us about the student's understanding?*
- ? *How could you help this student visualize or model the problem?*





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High-Impact Instructional Strategies

From Procedures to Problem Solving

- GED Math requires reasoning through a problem, not just following steps.
- Students must learn to explain why a method works.
- Focus on building transferable problem-solving skills across topics.
- Shift from “Can you solve it?” to “Can you make sense of it?”

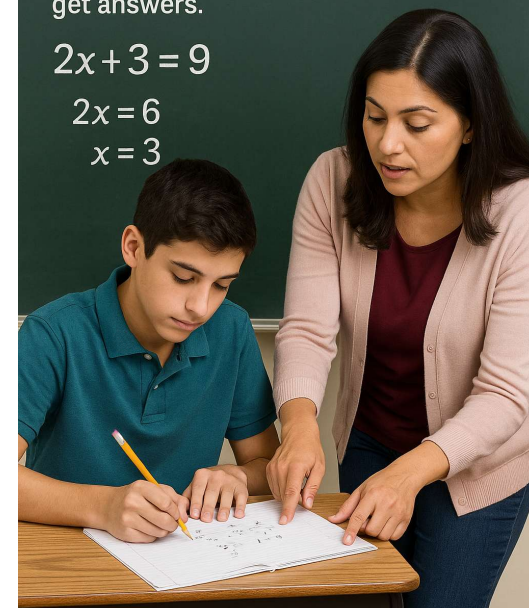
Procedural Teaching →

Memorize steps, plug numbers, get answers.

$$2x + 3 = 9$$

$$2x = 6$$

$$x = 3$$



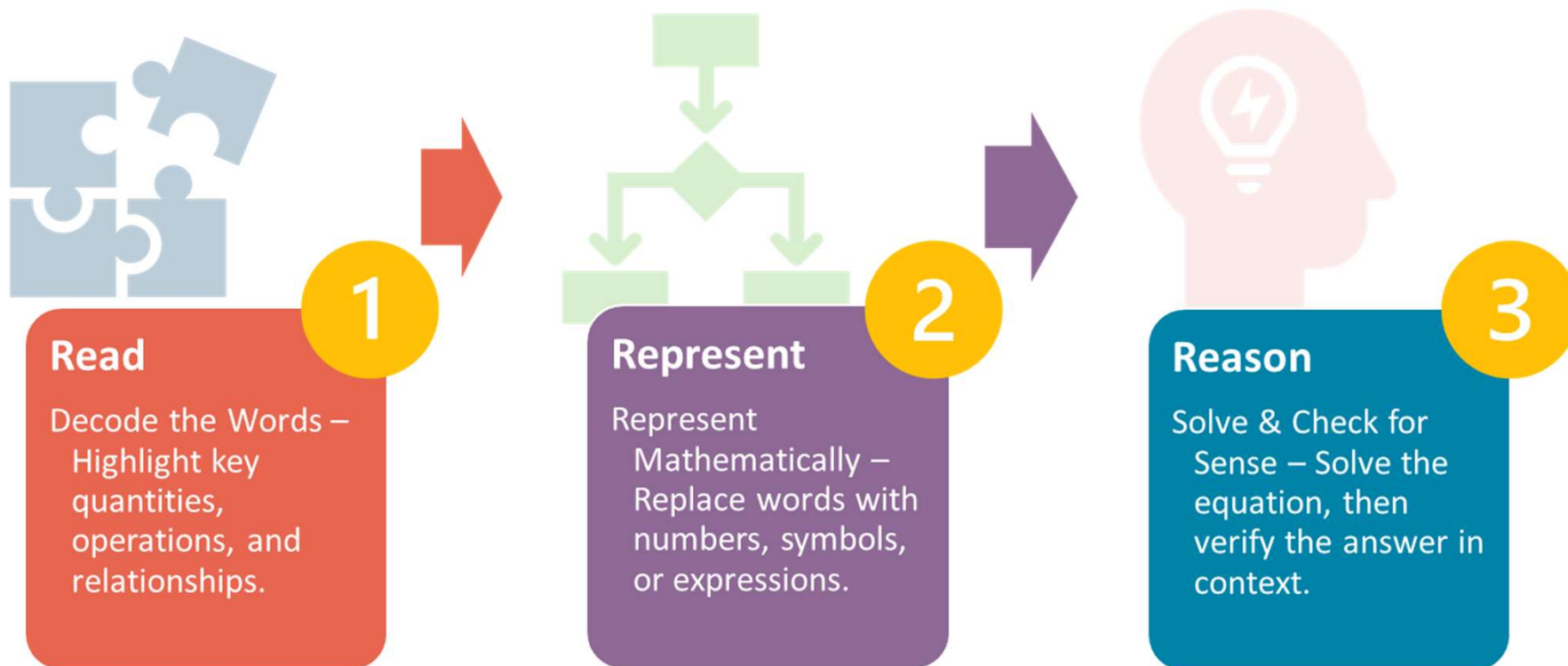
PROBLEM-SOLVING TEACHING

Understand relationships, visualize, justify reasoning.

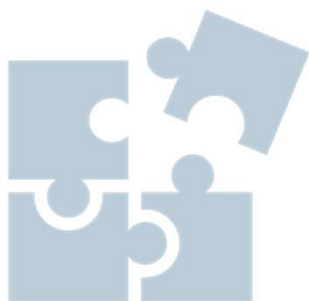


The Translation Strategy

Turn word problems into solvable math sentences.



Word Problem Translation Guide



1

Read

Decode the Words –
Highlight key
quantities,
operations, and
relationships.

Math Translation Guide

The chart below gives you some of the terms that come up in a lot of word problems. Use them in order to translate or "set-up" word problems into equations.

English	Math	Example	Translation
What, a number	x, n , etc.	Three more than a number is 8.	$n + 3 = 8$
Equivalent, equals, is, was, has, costs	$=$	Danny is 16 years old. A CD costs 15 dollars.	$d = 16$ $c = 15$
Is greater than Is less than At least, minimum At most, maximum	$>$ $<$ $\geq$ $\leq$	Jenny has more money than Ben. Ashley's age is less than Nick's. There are at least 30 questions on the test. Sam can invite a maximum of 15 people to his party.	$j > b$ $a < n$ $t \geq 30$ $s \leq 15$
More, more than, greater, than, added to, total, sum, increased by, together	$+$	Kecia has 2 more video games than John. Kecia and John have a total of 11 video games.	$k = j + 2$ $k + j = 11$
Less than, smaller than, decreased by, difference, fewer	$-$	Jason has 3 fewer CDs than Carson. The difference between Jenny's and Ben's savings is \$75.	$j = c - 3$ $j - b = 75$
Of, times, product of, twice, double, triple, half of, quarter of	$\times$	Emma has twice as many books as Justin. Justin has half as many books as Emma.	$e = 2 \times j$ or $e = 2j$ $j = c \times \frac{1}{2}$ or $j = e/2$
Divided by, per, for, out of, ratio of ___ to ___	$\div$	Sophia has \$1 for every \$2 Daniel has. The ratio of Daniel's savings to Sophia's savings is 2 to 1.	$s = d \div 2$ or $s = d/2$ $d/s = 2/1$

Example 1

Jennifer has 10 fewer DVDs than Brad.

Step 1: j (has) = b (fewer) – 10

Remember, the word "has" is an equal sign and the word "fewer" is a minus sign, so:

Step 2: $j = b - 10$



Tooltip: Use a Word Problem Translation Guide to help struggling students make sense of word problems.

Your Turn

A GED preparation center charges a \$25 registration fee plus \$12 for each tutoring session. Jordan has at most \$109 to spend.

What is the greatest number of tutoring sessions Jordan can attend?

- A. 6
- B. 7
- C. 8
- D. 9

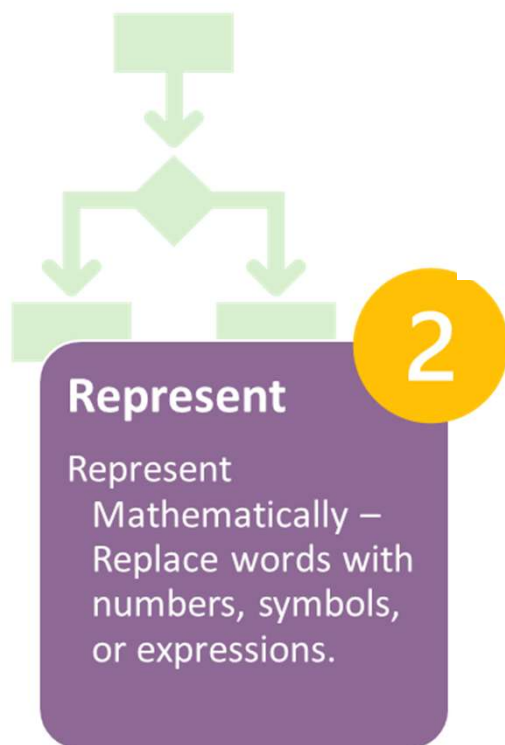
What's the High Impact Indicator?

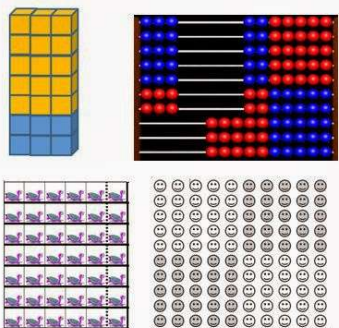
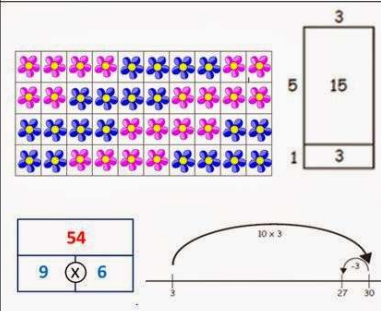
III: A.3 Write, manipulate, solve, and graph linear inequalities.

What's the Mathematical Reasoning Practice?

Reason Abstractly and Quantitatively and Model with Mathematics

Teach **Multiple Representations** of Math Concepts



Concrete	Representational	Abstract															
Students manipulate hands-on, concrete materials	Students draw and observe diagrams, or watch the teacher touching and moving hands-on materials	Numbers and mathematical symbols															
		<table><tr><th colspan="5">x 4 Patterns</th></tr><tr><td>4</td><td>8</td><td>12</td><td>16</td><td>20</td></tr><tr><td>24</td><td>28</td><td>32</td><td>36</td><td>40</td></tr></table> 8×5 $(4 \times 2) \times 5$ $4 \times (2 \times 5)$ 4×10 40 $45 \div 5$ $(50-5) \div 5$ $(50 \div 5) - (5 \div 5)$ $10-1$ 9	x 4 Patterns					4	8	12	16	20	24	28	32	36	40
x 4 Patterns																	
4	8	12	16	20													
24	28	32	36	40													



Tooltip: Move students from representing word problems from concrete to representational to abstract representations

Your Turn

The length of a rectangular community garden is 3 feet more than twice its width. The perimeter of the garden is 42 feet.

What is the width of the garden?

- A. 5 feet
- B. 6 feet
- C. 9 feet
- D. 15 feet

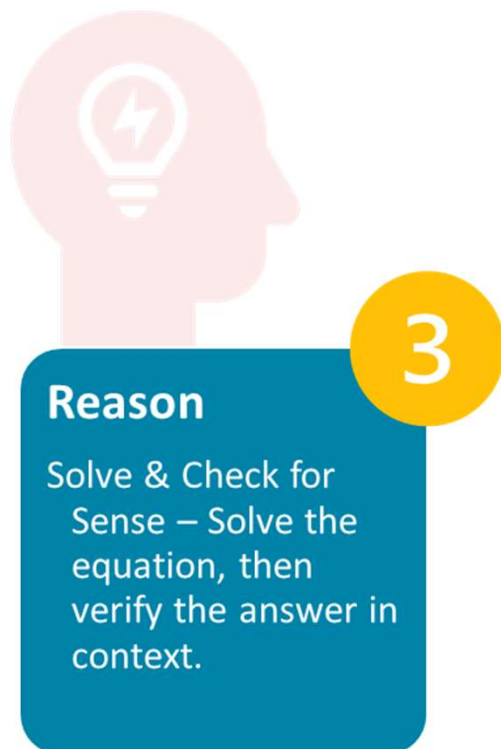
What's the High Impact Indicator?

III: Q.4 Calculate dimensions, perimeter, circumference, and area of two-dimensional figures.

What's the Mathematical Reasoning Practice?

Reason Abstractly and Quantitatively, Model with Mathematics and Use Appropriate Tools Strategically

Teach Quick Sense-Check Strategies



- **Estimate First:** Before solving, round numbers to make a ballpark prediction.
- **Compare to Reality:** Ask, “Does my answer make sense in real life?” (e.g., Can a car travel 500 miles in 1 hour?)
- **Reverse It:** Plug your solution back into the equation to confirm accuracy.
- **Explain It:** Have students verbalize or write one sentence connecting the math to the situation (“The train’s speed is 40 mph because it travels 60 miles in $1\frac{1}{2}$ hours.”).



Tooltip: Take advantage of the Mathematical Reasoning Study Guide to reinforce Quick Sense-Check skills.

Let's Tie It Altogether

Strategies in Practice

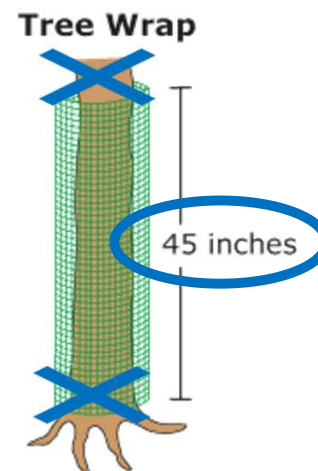
Use the strategies you have learned so far (Translation Strategy, Visual Thinking and Modeling and Math Talk Moves) to figure a solution to the problem below.

Example:

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.

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

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



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

Surface Area of a Cylinder:

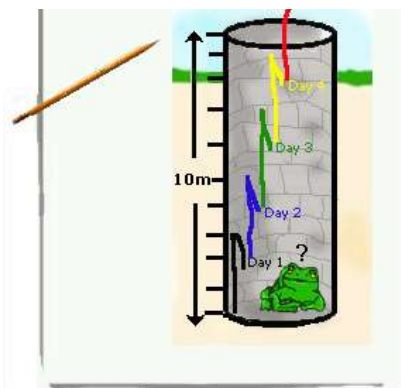
$$SA = 2\pi rh + 2\pi r^2$$

Visual Thinking and Modeling

Make math visible — and meaningful.

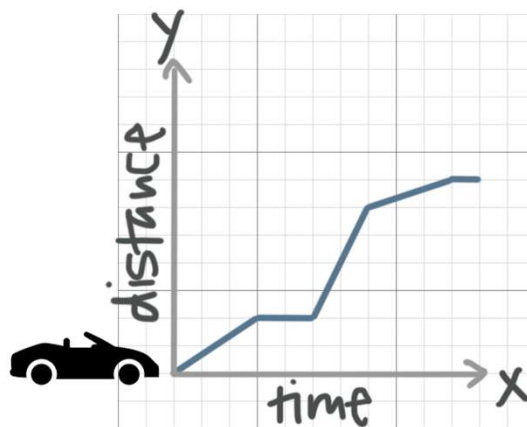
Draw It Out

- Use sketches, tables, and diagrams to represent relationships.



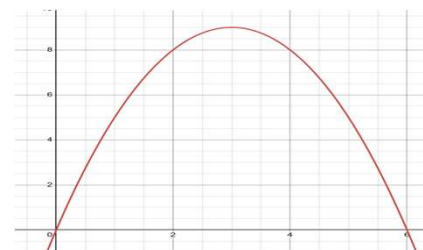
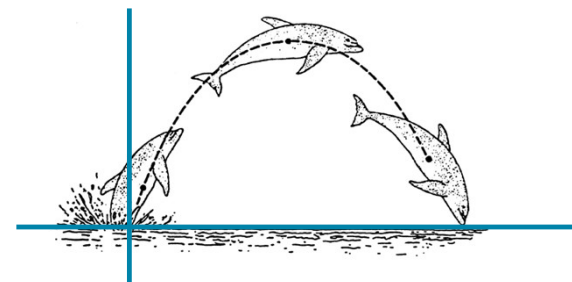
Model It

- Connect real-world objects (blocks, graphs, grids) to abstract equations.



Show Connections

- Compare multiple representations (verbal → visual → symbolic).



$$y = -x^2 + 6x$$

$$y = -x(x - 6)$$

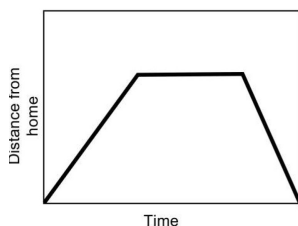
$$y = 0, \quad y = 6$$

Your Turn

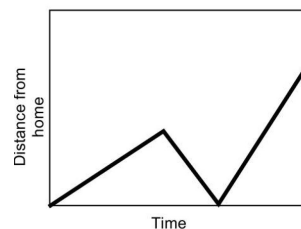
Mario went out to walk with some friends. Upon realizing he left his wallet, ran back home to get it. He then had to run to catch up with the others.

Which graph best represents Mario's distance travelled over time?

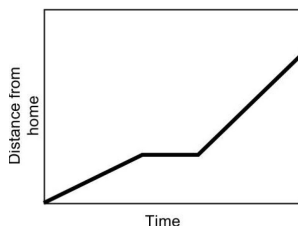
A.



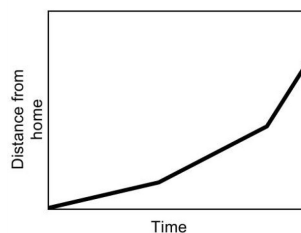
B.



C.



D.



Math Talk Strategies

Transform “getting the right answer” into “making mathematical sense.”

1. **Revoicing** 🗨️ – “So you’re saying the variable represents the number of tickets sold?”
2. **Restating** 🗣️ – “Can someone put that in their own words?”
3. **Reasoning** 🤔 – “Do you agree or disagree, and why?”
4. **Adding On** ➕ – “Who can add to what was just said?”
5. **Waiting & Noticing** ⌚ – Allow think time and celebrate reasoning, not speed.



Role Play: If $2x + 4 = 10$, what is x ? Role-play the five talk moves with a partner.

Debrief: Which talk move felt most natural to you? Which would most help your students?

Your Turn

Strategies in Practice

Mathematical Reasoning

Question 6 of 10

☒ Answer ☐ Explanation ☐ Calculator

☐ Flag for Review

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

$$m = \frac{(y_2 - y_1)}{(x_2 - x_1)}$$

$$m = \frac{(19.2 - 18.6)}{(3 - 1)}$$

$$m = \frac{(0.6)}{(2)}$$

$$m = 0.3$$

$$y = mx + b$$

$$18.6 = 0.3(1) + b$$

$$18.6 - 0.3 = b$$

$$18.3 = b$$

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

The scientist creates an equation that models her data for each tree so that she can predict the diameter in the future. Complete a linear equation that fits the data for tree 1, where x is the year and y is the trunk diameter, in inches.

Click on the variables and number you want to select and drag them into the boxes.

$$y = mx + b$$

Equation for Tree 1

$y =$ $+$

-0.6	-0.3	0.3	0.6
18.0	18.3	18.6	x

Your Turn

Strategies in Practice

Mathematical Reasoning

Question 6 of 10

☒ Answer Explanation ☐ Calculator

☐ Flag for Review

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

+2 +0.6

$$m = \frac{0.6}{2}$$

$$m = 0.3$$

The y-intercept is simply the trunk diameter at year 0.

$$b = 18.6 - 0.3$$

$$b = 18.3$$

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

The scientist creates an equation that models her data for each tree so that she can predict the diameter in the future. Complete a linear equations that fits the data for tree 1, where x is the year and y is the trunk diameter, in inches.

Click on the variables and number you want to select and drag them into the boxes.

$$y = mx + b$$

Equation for Tree 1

$$y = \boxed{} \boxed{} + \boxed{}$$

-0.6	-0.3	0.3	0.6
18.0	18.3	18.6	x

[< Previous](#) [Next >](#)

AI-Powered Practice & Explainer Tools

Turn AI into your digital co-teacher for differentiation and engagement.

1. **ChatGPT** – Generate GED-style practice problems, scaffolds, and explanations on demand.

Prompt Example: *“Create three GED-style word problems on proportions with step-by-step solutions.”*

2. **MagicSchool.ai** – Build quick, standards-aligned lessons, warm-ups, quizzes, and exit tickets with built-in differentiation tools for teachers.

Prompt Example: *“Create a mini lesson on slope for adult learners with misconceptions.”*



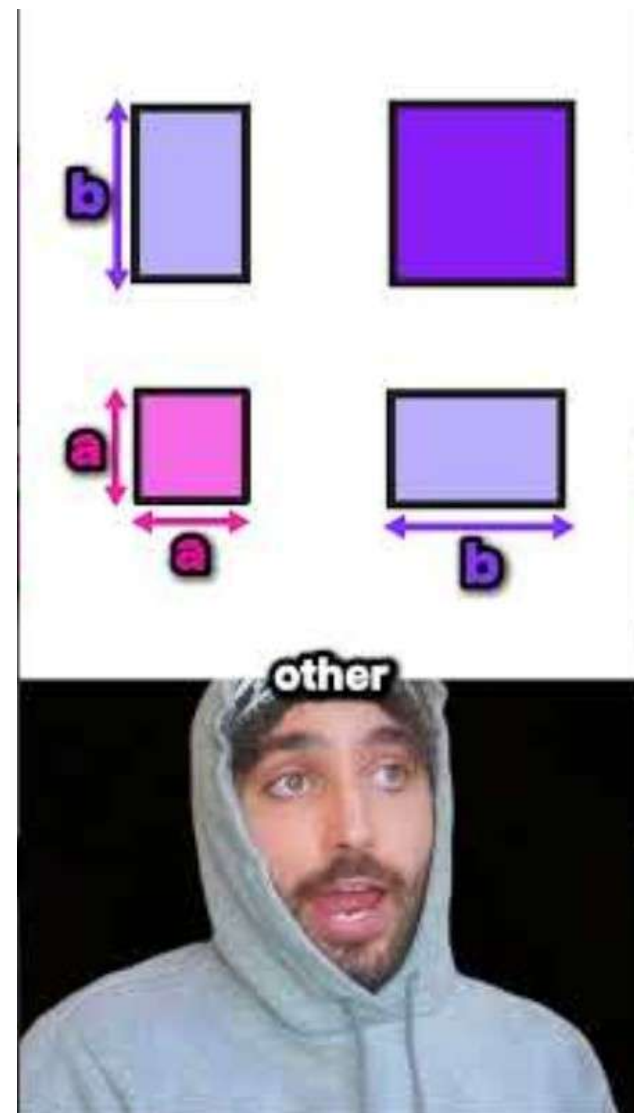
AI-Powered Practice & Explainer Tools

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3. **HeyGen or Pictory** 🎥 – Instantly create short, engaging explainer videos that visualize math concepts or walk through word problems (similar to Onlock Learning YouTube style).

Prompt Example: *“Generate a 45-second video explaining how to find the slope from two points with visuals and voiceover.”*

4. **Desmos Classroom** 📊 – Design interactive graphing explorations and real-world applications that make reasoning visible.



Five High-Impact Habits for GED® Math Instructors

1. Start with Reasoning

Begin every lesson with a real-world or visual problem before teaching procedures.

2. Model the Thinking Process

Use “think-alouds” to demonstrate how you interpret, plan, and check a problem.

3. Encourage Productive Struggle

Allow students time to wrestle with challenges before providing the answer.

4. Use Talk Moves and Visuals Daily

Reinforce reasoning through discussion and modeling.

5. Build Confidence Through Reflection

Have students explain how they solved, not just what they solved.



Thank You!

Session Survey

Your feedback is important. Please scan the QR code below to rate this session.



Ron Cruz

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Handouts

