


ipdae INSTITUTE FOR THE PROFESSIONAL DEVELOPMENT OF ADULT EDUCATORS



Math GED® Content and Strategies Training
www.floridaipdae.org

Training Facilitator: Ronald Cruz


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Content Group 3

**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 To Go and Meeting Materials


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**Hands-On Activity:
Mix and Match**

- Take out the packet of "mix and match" cards (blue cards) and answer grid (red cardstock).
- Use the answer grid to match verbal descriptions to tabular representations, graphs, and symbolic representations. Place matched cards in a single row on the answer grid.
- You may use the small laminated graph boards to plot points, graph equations or simplify equations.



**Answer Grid
Mix and Match Cards
Mix and Match Activity Sheet
Laminated Graph Boards
Wet-Erase Markers
Wet Wipes**

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Content Group 3


Mathematical Practices

MP4. Mathematical Fluency

- Display data or algebraic expressions graphically.

MP5. Evaluating Reasoning and Solution Pathways

- Recognize flaws in others' reasoning.
- Identify the information required to evaluate a line of reasoning.




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Common Student Errors or Misconceptions

1. Miscounting
2. Using incorrect data
3. Reversing the slope formula
4. Ignoring the negative slope
5. Misinterpreting the slope from standard form



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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
- Grapher –
http://nlvm.usu.edu/en/nav/frames_asid_109_g_4_t_2.html?open=activities&from=category_g_4_t_2.html

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Content Group 3

Calculator Skills



- Mathprint Mode
- Ask X Function
- Table Function
- Reciprocal Button


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Content Group 4

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.p	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

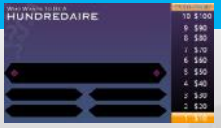
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Who Wants to be a Hundredaire?!

<http://www.math-play.com/Algebraic-Expressions-Millionaire/algebraic-expressions-millionaire.html>



Rags to Riches

<http://www.quia.com/rr/520475.html>



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Content Group 4

Mathematical Practices

MP2. Abstracting Problems

- Represent real-world problems algebraically

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Paper and Pencil Activities for your Students

- Kuta Software (Variable and Verbal Expressions)
- Translating Verbal Expressions or Equations Worksheet
- Inequality Key Words and AE Symbols
- Translating Mathematical Expressions Worksheet (It's All Just Math)

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


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AE Symbols

Symbol	Operation/Meaning
π	π , approx. 3.14, used in finding the area and circumference of circles
f	Symbol used to represent a function such as $f(x)$. Often referred to as y-values
\neq	Not equal to
2	Raised to the 2 nd power or squared
3	Raised to the 3 rd power or cubed
$ $	One side of the absolute value symbol, comes in pairs for example, $ 3 $ or $ -4 $
\pm	Plus/minus or positive/negative symbol, used to denote both positive and negative values of a number such as $x^2 = 4$, solved for x yields 2, meaning x can be both +2 or -2.
∞	Unlimited symbol, sometimes referred to infinity symbol
$\sqrt{\quad}$	Radical sign, used to denote roots
$\sqrt[n]{\quad}$	A superscript placed before a radical symbol denotes the nth root of a number such as in the example $\sqrt[3]{\quad}$ (cube or 3 rd root)




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Using Technology: Brain Genie

<https://braingenie.ck12.org/skills/105509>




Solving Problems Involving Graphing Linear Inequalities
 Writing, Graphing, and Solving Linear Inequalities Given Word Problems
 CK-12

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Common Student Errors or Misconceptions

1. Forgetting to flip the inequality sign when using the division/multiplication property to solve a linear inequality.
2. Taking 2 less than a number as $2 - n$ (or any variation of the verbal expression)
3. Differentiating between open and closed inequalities (open circle vs. closed circle)
4. Discrete vs. continuous data



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GED Item Sampler #3

Mathematics - Reading - Comprehension - Comprehension - Comprehension

Formal Student

There is a meeting at a business meeting by the company. She has a budget of \$1,225 for a group assignment at a local hotel and parking. She expects to receive the meeting. The cost of parking the meeting room is \$250. How much money does she have left to spend on the other expenses?

A. $250 - 270 = 1,225$
 B. $250 - 270 = 1,225$
 C. $270 - 250 = 1,225$
 D. $270 + 250 = 1,225$

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Content Group 1

Let's pause for a 10 minute break.

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Content Group 5

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.

$E = MC^2$

Skills Test Takers are Missing Handout

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Content Group 5

The Netflix Problem

- Consider the real-world situation below.

Netflix charges \$8.00 per month for membership and \$3.00 for every movie rental that is not included in the basic membership package.
- What are the most important questions students should ask prior to formulating a problem?

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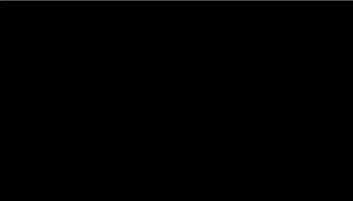
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Content Group 5

The Netflix Problem

Netflix charges \$8.00 per month for membership and \$3.00 for every movie rental that is not included in the basic membership package.

How much would a person spend renting 25 early release movies in a span of 3 months?



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Content Group 5

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.
- Recognize and identify missing information that is required to solve a problem.
- Select the appropriate mathematical technique(s) to use in solving a problem or a line of reasoning.




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Content Group 5

Common Student Errors or Misconceptions

1. Forgetting to apply the order of operations
2. Forgetting the order of solving linear equations/inequalities such as applying division/multiplication properties before addition and subtraction properties.
3. Adding/subtracting negative integers
4. Solving and applying absolute values
5. Forgetting the \pm symbol after solving one-variable quadratic equations with real roots/solutions
6. Raising negative integers to a certain power such as -2^3 versus $(-2)^3$
7. Misinterpreting powers as factors $(2)3 = 2 \times 3$ as supposed to $(2)3 = 2 \times 2 \times 2$



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Let's Play X-expression! *x-expression*

- Shuffle playing cards and x-expression cards separately.
- Place x-expression cards face down in a pack.
- Deal an equal number of playing cards to each player.
- Assign a scorekeeper and a dealer.
- Dealer turns up an x-expression card.
- The player to the left plays a card of any suit and calls out its value.
- The player with the greatest value card wins the trick.

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Content Group 4

GED Item Sampler #13

Mathematics: Reasoning - One-Step Equations Questions: 1 of 1

Answer Preparation: 11/1/2016 Log Out

Calculator Allowed

John wants to earn \$120 in one week selling items in his store. The company charges a flat fee per hour for 2 hours. He expects to sell 12 items in the number of hours he works. Consider the following equation. Simplify the number of terms and solve for x.

Write the number line to solve the problem.

NOTE: To answer this question, click the left mouse button.

1 2 3 4 5 6 7 8 9 10

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Content Group 4

Calculator Skills

- Scientific Notation

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Link to Practice Exercises:

- **Graphing Inequalities:**

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

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Final Thoughts

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!

GED TEACHERS ACQUIRED

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Final Thoughts

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 20008

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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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Final Thoughts

A Few Strategies to Get Started

strat-e-gy
strategies to get started
designed to achieve a particular goal

- 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

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Training Evaluation

Please complete the training evaluation sheet at this time.




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End of Afternoon Session

Thank you for your participation!



**Math GED® Content and Strategies Training
with Calculator Exercises**

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