Mathematics Support Class Can Succeed and Other Projects to Assist Success

Georgia Department of Education
Divisions for Special Education Services and Supports
1870 Twin Towers East
Atlanta, Georgia 30334

GEORGIA DEPARTMENT OF EDUCATION

Overall Content

- **Foundations for Success (Math Panel Report)**
- **Effective Instruction**
- **Mathematical Support Class**
- **Resources**
- **Technology**

FOUNDATIONS FOR SUCCESS

National Mathematics Advisory Panel

Final Report, March 2008

Math Panel Report

- Two Major Themes
- Curricular Content
- Learning Processes
- Instructional Practices

Two Major Themes

First Things First

- Positive results can be achieved in a reasonable time at accessible cost by addressing clearly important things now
- A consistent, wise, community-wide effort will be required.

Learning as We Go Along

- In some areas, adequate research does not exist.
- The community will learn more later on the basis of carefully evaluated practice and research.
- We should follow a disciplined model of continuous improvement.

Curricular Content

Streamline the Mathematics Curriculum in Grades PreK-8:

- **Focus on the Critical Foundations for Algebra**
  - Fluency with Whole Numbers
  - Fluency with Fractions
  - Particular Aspects of Geometry and Measurement
- **Follow a Coherent Progression, with Emphasis on Mastery of Key Topics**

❖ **Avoid Any Approach that Continually Revisits Topics without Closure**

Learning Processes

- **Scientific Knowledge on Learning and Cognition Needs to be Applied to the classroom to Improve Student Achievement:**
  - To prepare students for Algebra, the curriculum must simultaneously develop conceptual understanding, computational fluency, factual knowledge and problem solving skills.
  - Limitations in the ability to keep many things in mind (working memory) can hinder mathematics performance.

Learning Processes

- **Children's goals and beliefs about learning are related to their mathematics performance.**
  - Children's beliefs about the relative importance of effort and ability can be changed.
  - Experimental studies have demonstrated that changing children's beliefs from a ***focus on ability*** to a ***focus on effort*** increases their engagement in mathematics learning, which in turn improves mathematics outcomes.

Instructional Practices

- **Instructional Practice should be informed by high quality research, when available, and by the best professional judgment and experience of accomplished classroom teachers.**

- **Use of technology shows promise but more research is needed.**

Instructional Practices

- **Research on students who are low achievers, have difficulties in mathematics, or have learning disabilities related to mathematics tells us that the effective practice includes:**
  - Explicit methods of instruction available on a regular basis.
  - Clear problem solving models.
  - Carefully orchestrated examples/ sequences of examples.
  - Concrete objects to understand abstract representations and notation.
  - Participatory thinking aloud by students and teachers.

Poor Math Performance

- **Students with disabilities experience difficulties learning in all areas of math.**
- **Problems surface early and continue throughout their education**
- **Higher order thinking skills, such as problems solving, are major hurdles for students with disabilities**
- **Experience difficulty in high school math courses.**

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Mathematical Proficiency Defined

National Research Council (2002) defines proficiency as:

1. **Understanding mathematics**
2. **Computing Fluently**
3. **Applying concepts to solve problems**
4. **Reasoning logically**
5. **Engaging and communicating with mathematics**

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What We Know that Works

- **Effective Instruction!**
- **School-wide behavior supports**
- **Focus on adjusting school climate rather than changing students**
- **Reading & Math Instruction**
- **Progress Monitoring**

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Ten Effective Teaching Principles

1. Engaged Time
2. Success Rate
3. Content Coverage/Opportunity to Learn
4. Grouping for Instruction
5. Scaffolded Instruction

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Ten Effective Teaching Principles

6. Addressing Forms of Knowledge
7. Activating & Organizing Knowledge
8. Teaching Strategically
9. Making Instruction Explicit
10. Teach Sameness

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Components of Mathematics Support Class

- A positive disposition toward learning mathematics.
- A reduced class size is recommended.
- All students should be enrolled in the same regular mathematics course.
- Continual progress monitoring should be used.

Components of Mathematics Support Class

- **Grading practices should emphasize mastery of standards through the frequent use of aligned assessments.**
- **Opportunities to:**
  - Preview
  - Drill basic skills
  - Review content not previously mastered
  - accelerate

What Students Should be Selected to be in Mathematics Support Class

- **Use local system criteria to determine students who are at risk for failing mathematics.**
- **Students placed in high school**
- **Students who did not pass 8th grade Mathematics CRCT/ low scores**
- **History of student's performance**
- **EOCT**

Who Should Teach the Course

- **Certified mathematics teacher**
- **Certified mathematics teacher and special education teacher**

What Scheduling Options are There?

- **Traditional Six Period Day**
  - One period of Mathematics I
  - One period of Mathematics I Support
- **Block Schedule**
  - Use A-B schedule
  - Use Skinnies to divide block
  - Use Modified-block

In Mathematics Support

- **60-70% of the instructional time on acceleration**
- **30-40% of the instructional time on remediation**

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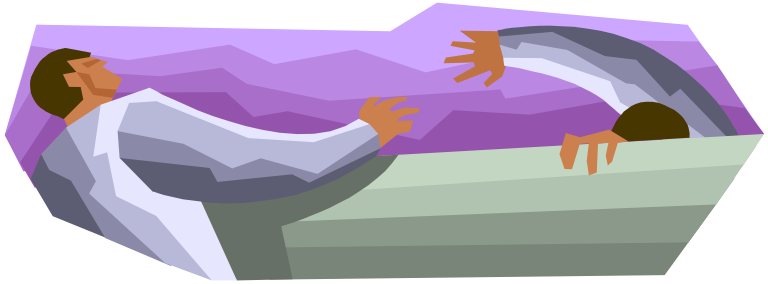
Learning That Works! Dr. Max Thompson, Dr. Julia Thomason

Mathematics 1 Support - Collaboratively Developed and Monitored by Mathematics 1 and Mathematics 1 Support Teachers

Strategies	Assessment/Grades
Previewing Vocabulary: ▪ Vocabulary words for the next unit/lesson are researched (perhaps online) by students. Students should be able to write definitions of the words, use them in appropriate contexts, represent them pictorially, and specify non-examples of them. Graphic organizers should be used with these student-made vocabulary representations. ▪ Use Reading Mazes* that incorporate the vocabulary to monitor student achievement. ▪ Six Step Process for Building Academic Vocabulary (Marzano)	▪ Grades may be assigned for proper use of the vocabulary words in all the formats described. Support teachers should monitor the student work in progress and give feedback (formative assessment) through questioning to guide students to proper use and application of the words. ▪ Reading Mazes may be used as pre- and post-tests as well as benchmarks of student comprehension of the pertinent vocabulary. Grades may be assigned based on growth in comprehension.
Student Reporting of Mathematical Understanding: ▪ Students will articulate their mathematical conceptual understanding developed during lessons in the Mathematics 1 class to the instructor in the Support class in both in verbal and written formats. ▪ The Support class teacher will use this articulation to diagnose student misunderstanding so that other strategies can be applied for student achievement.	▪ Support teachers will use the verbal and written student articulation to inform the use of other strategies to support student understanding. ▪ Grades may be assigned based on the completion of these articulations.
Previewing Tasks: ▪ Students will preview tasks from the Mathematics 1 class by working similar teacher-developed tasks (scaffolding tasks) that focus on building conceptual understanding.	▪ Support teachers will use the scaffolding tasks to provide commentary to students about their understanding of focused concepts. ▪ Grades may be assigned based on the completion of these scaffolding tasks.
Extended Time for Tasks from the Mathematics 1 Class: ▪ Mathematics 1 teachers may send unfinished tasks to the Mathematics 1 Support teacher for students to complete either individually or in newly developed small groups in the Support class.	▪ Support teachers may provide feedback to students as they complete the Mathematics 1 tasks through questioning. ▪ Grades may be assigned based on the completion of these Mathematics 1 tasks.

What is Acceleration?

- **Scaffolding for future learning**
- **Gives learners advance structure**
- **Organizes learning support**
- **Only accelerate those "most essential" concepts/skills**



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How Do Teachers Implement Acceleration?

- **A Content Map of the Unit**
  - Essential Questions
  - Critical Concepts and Skills
  - Vocabulary
- **Learn the Key Vocabulary**
  - Use a variety of strategies
- **Use Advance Organizers**
  - Link to prior knowledge
  - Build concepts prior to lesson
- **Put Vocabulary in the context of the lesson**
  - Vocabulary is taught twice, first at the beginning then second in context of the lesson

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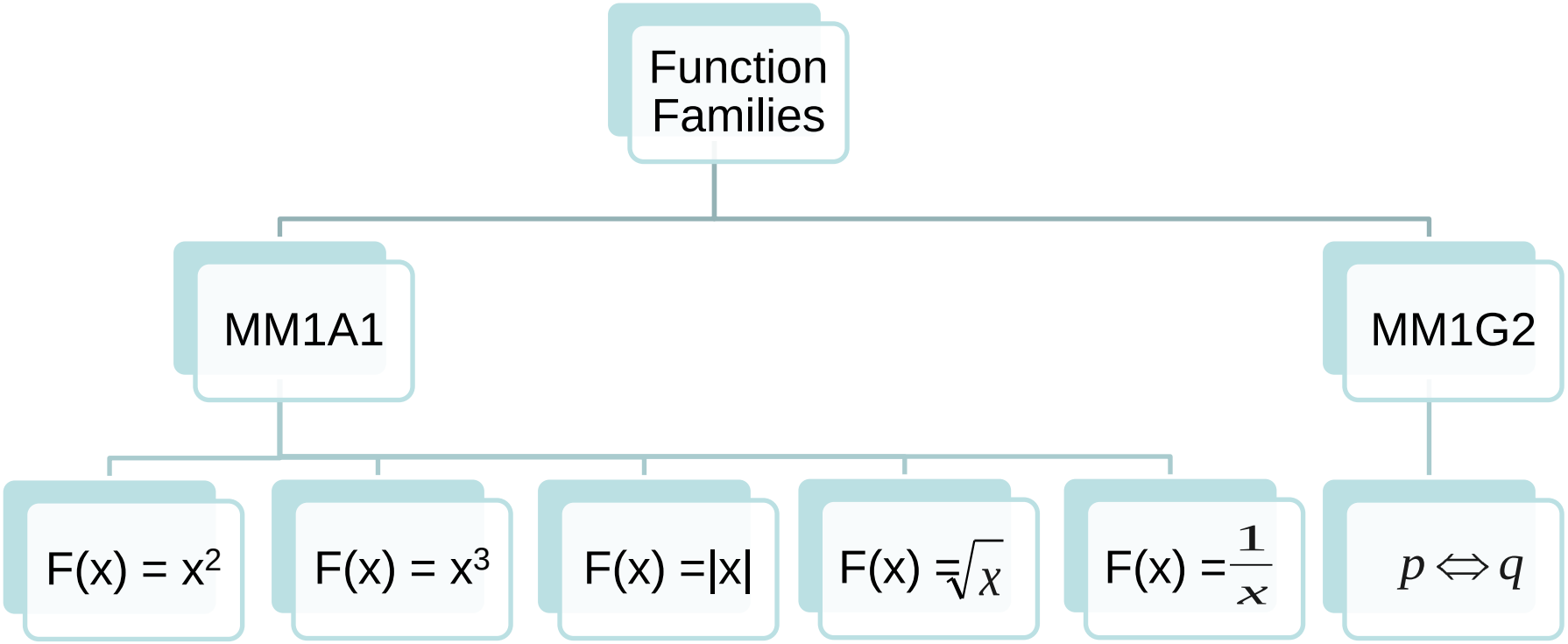
Content Map of the Unit



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Strategies

- Vocabulary
- Mnemonics
- Interleave
- Spaced Learning Over Time
- Graphic representation
- Flexible Groups

Vocabulary

Functions

Definition: For every input value there is exactly one output value

Characteristics:

Has an input and an output

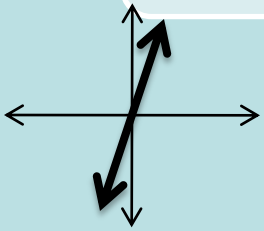
A defined relationship assigns every input with an output

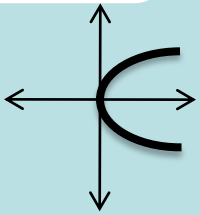
Examples:

{(2,4), (3,6), (4,8)}

F(x) = 2x

To get the output double every input.





Non-Examples:

{(2,4), (3,6),(2,8)}

$X = y^2$ 0r x = 4

One input produces multiple outputs

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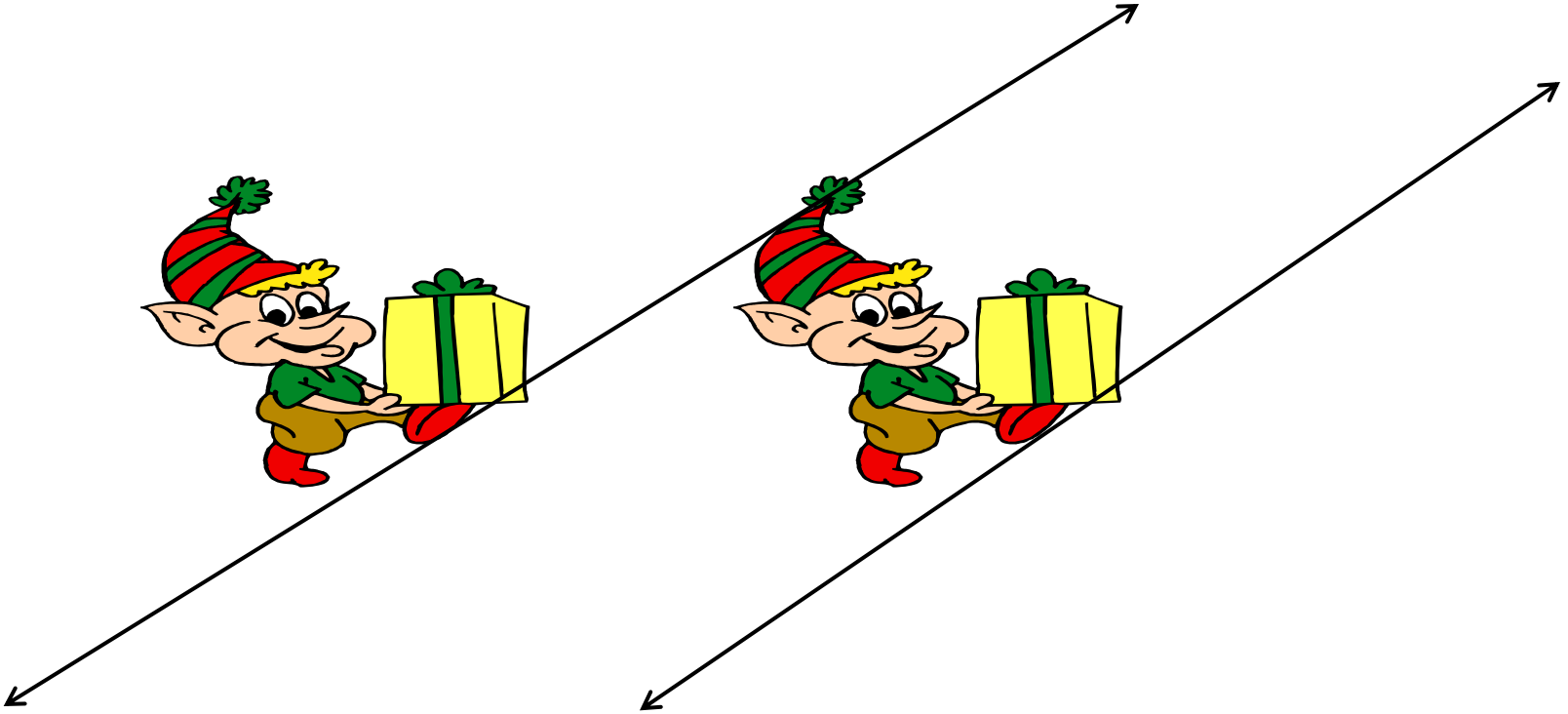
Parallel (Pair of Elves)

Lines that are the same distance apart and will never intersect



The **pair of elves** are the same distance apart and will never intersect.

Paul Riccomini, Ph. D.

Interleave
Seatwork or Homework Assignment

1. Solve $12 + 2x = 15$ for x

$$12 + 2x = 15$$

$$\underline{-12} + 2x = \underline{-12}$$

$$\frac{2x}{2} = \frac{3}{2}$$

$$x = 3/2$$

$$x = 1.5$$

2. Solve $5 + 3x = 20$ for x

Spaced Learning Over Time

- **Make sure important and essential curriculum content is reviewed at least 3-4 weeks after it was initially taught.**
- **Benefits of a delayed review is much greater than the same amount of time spent reviewing shortly after initial instruction (Rohrer & Taylor, 2006)**

IES Practice Guide, (2007, September)

Spaced Learning Over Time

- **The delayed instructional review to the material can occur through:**
  - In-class reviews
  - Homework assignments
  - Cumulative midterm and final examinations

IES Practice Guide, (2007, September)

Spaced Learning Over Time

- **Use class time to review (reteaching) important curriculum content**
  - For example, every other week a 9th grade teacher spends half the class reviewing (providing instruction) an important math concept/skill taught in the previous 3-4 weeks (i.e., solving equations and arithmetic of sign numbers)

IES Practice Guide, (2007, September)

Advance Organizers

- **Mind Maps**
- **T-Chart**
- **Fish Bone**
- **Compare and Contrast**
- **Web Diagram**
- **Sequence Chart**

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Best Practices

- **Scaffolded Instruction**
  - Content
  - Task
  - Material
- **Explicit Instruction**
- **Progress Monitoring**
- **Grading**

Assessment Instruction Cycle

Initial Assessment

- Collect historical data
- Formal standardized assessment
- Diagnostic assessment

Instructional Design

- Analyze content for sameness
- Select range of examples
- Select language of instruction
- Sequence language and examples
- Organize into daily lessons
- Schedule practice of examples
- Provide for cumulative review

Instructional Delivery

- Secure attention
- Pace briskly
  - frequent responses
  - adequate think time
- Monitor student performance
- Provide feedback
  - systematic corrective
  - specific reinforcement

Progress Monitoring

- Determine appropriate starting level
- Monitor progress frequently
- Graph student scores
- Evaluate progress
- Determine need for instructional modifications

Medger, Hall, Glang (1997)

Grading Mathematics I and Mathematics I Support Classes

- **Grading for courses**
  - Credit may be given if one course is passed and the other is failed
  - However, if a student passes the Mathematics I course and fails the Mathematics Support
    - WHY?
    - WHAT were the issues with instruction and support?

Math and Math Support Classes

Mathematics I	Math Support	Action Needed
Failed	Failed	Retake Math AND Math Support; No credit for either course
Passed	Failed	Re-visit cause for failure and remedy if at all possible;
Failed	Passed	Retake Mathematics I - Consider credit recovery, “trailer course” or summer school; math support not required to be retaken, but may be if needed

RESOURCES

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- **Workshops**
  - Building Strategies to Help Students with Disabilities Graduate: Improving Academic Success in Math (SPDG)
  - Strategies for Making AYP for Math (SPDG)
- **Elluminates**
  - Error Analysis Procedures
- **Video**

Elluminates

- **Teacher Talk (Talking about Learning and Kids)**
  - Grade level
  - Math Support I bi-monthly talks
- **Special Education with General Education**
  - 10-15-08 Improving Academic Performance of SWD's for Elementary Mathematics
  - 11-12-08 Improving Academic Performance of SWD's for Secondary Mathematics
  - 01-14-09 SIA Mathematics Vocabulary & Interleave Strategies
  - 02-11-09 SIA Mathematics 1 and Mathematics Support, Space Learning
  - 03-18-09 SIA Mathematics: Graphic representation & Flexible groups (PAL)

Web Resources Available to Teachers

- **Georgiamath.org**
  - Parent information
  - Administrator information
  - Teacher information
- **Georgia Standards.org**
  - Frameworks
  - Videos
  - Webcasts
  - Learning Village for Mathematics 1
    - Mathematics Support suggestions
    - Destination Math
    - Vocabulary
- **Elluminate Sessions**
  - Ability to talk directly with Mathematics Curriculum experts
  - Recorded and Archived for future reference

What is georgiamath.org?

From
http://www.gadoe.org

Look for the calculator!

Or go directly to:
georgiamath.org

What Can You Find at the georgiamath.org Page?

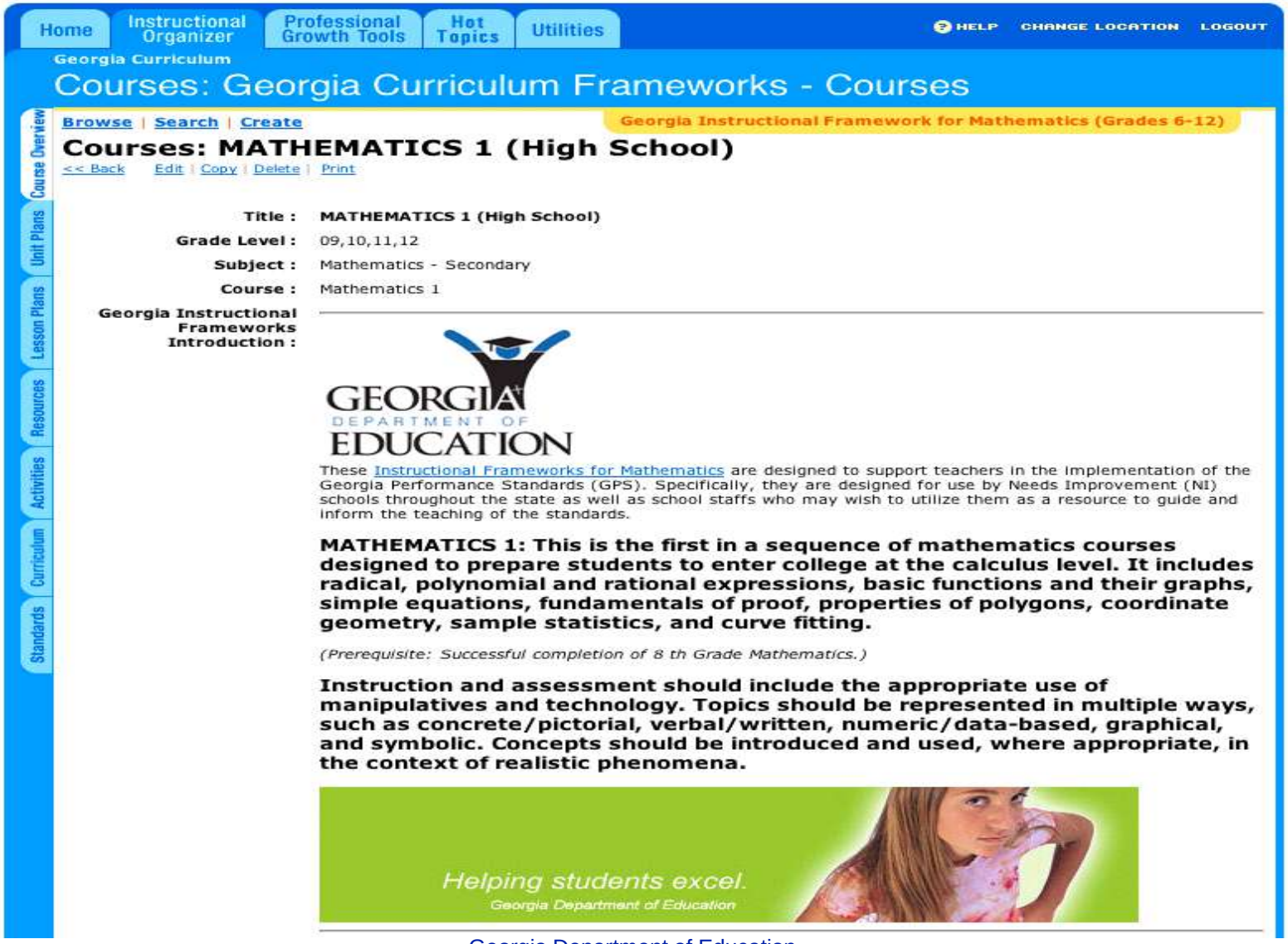
- Introductory Video by Kathy Cox
- Comparison of QCC and GPS Course Content
- Information about learners requiring acceleration and learner requiring support
- Resources for Parents, Teachers and Educators
- General Information
- Link to GeorgiaStandards.org

Learning Village for Mathematics 1

An easy-to-use instructional framework that aligns best practice plans of instruction with quality resources and learning activities.

This project will help to ensure that all students are receiving the same quality of instruction, and that the teacher, regardless of the district campus and level of expertise, is covering the same material with access to the same best practices for teaching and learning.

Single Point of Access, 24/7



Georgia Department of Education
Kathy Cox, State Superintendent of Schools

Resources via Single Instructional Desktop

List of Instructional Units :

Georgia Performance Standards: Curriculum Map MATHEMATICS I					
1st Semester			2nd Semester		
Unit 01	Unit 02	Unit 03	Unit 04	Unit 05	Unit 06
Function Families	Algebra Investigations	Geometry Gallery	The Chance of Winning	Algebra In Context	Coordinate Geometry
4 weeks	*5 weeks*	*7 weeks*	*6 weeks*	*6 weeks*	*4 weeks*

NOTE: Mathematical standards are interwoven and should be addressed throughout the year in as many different units and tasks as possible in order to stress the natural connections that exist among mathematical topics.

SAMPLE NAEP QUESTIONS FOR:		
Unit 01 Function Families	Unit 02 Algebra Investigations	Unit 03 Geometry Gallery
Unit 04 The Chance of Winning	Unit 05 Algebraic Investigations	Unit 06 Coordinate Geometry
NOTE: Answers to Sample Questions not provided		
Click NAEP image below to access website		

MATHEMATICS I

Parent Letters by Unit Plan

Unit 01	Unit 02	Unit 03	Unit 04	Unit 05	Unit 06
Function Families PARENT LETTER	Algebra Investigations PARENT LETTER	Geometry Gallery PARENT LETTER	The Chance of Winning PARENT LETTER	Algebra In Context PARENT LETTER	Coordinate Geometry PARENT LETTER

Brought to you by Georgia Tech

CSI: MATHEMATICS
Curriculum Support Information

A mathematics resource for parents, teachers, and students

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Further Investigations:
Show your student graphs in newspapers, journals, or on the Internet. Identify the domains and ranges and discuss whether they represent discrete or continuous data.

When watching television with your student, pick statements from the commercials and restate them as conditional statements. Then state the converse, inverse, and contrapositive. Evaluate the truth value of each statement.

Look for sequences in your world such as hours worked or number of seats at a theatre. Ask your student to represent them recursively, in closed form, and in function notation.

Terminology:

Contrapositive: A conditional statement that negates and reverses the hypothesis and the conclusion.

Converse: A conditional statement that reverses the hypothesis and the conclusion.

Continuous: A set of data that can include any Real-numbered value in a given interval such temperature, time, and length.

Discrete: A set of data that represents a situation where the possibilities are distinct and separated from each other such as counts of people.

Domain: The set of all possible values for the independent or input variable in a function.

Hypothesis: In a conditional statement, the part that follows "if."

Inverse: A conditional statement that negates the hypothesis and the conclusion.

Range: The set of all possible values for the dependent or output variable in a function.

Clues:

To a large extent, applied mathematics consists of modeling various phenomena by functions, using mathematics to analyze these functions, and then using this mathematical analysis to obtain insight into the phenomena. We can model more and more things if we have a larger repertoire of functions.

Book'em:

Through the Looking Glass
by Lewis Carroll

Related Files:
www.ceismc.gatech.edu/csi

Function Families

Students will: Math I - 1 of 6

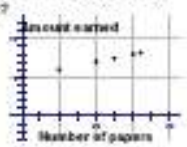
- Explore properties of basic quadratic, cubic, absolute value, square root, and rational functions
- Determine the range given the domain and rule of correspondence for a function
- Represent functions with function notation and use the notation to ask and answer questions about relationships
- Read and draw graphs of functional relationships
- Recognize and evaluate logical relationships between a statement and its converse, its inverse, and its contrapositive.

Classroom Cases:

1. He has a job after school delivering papers. She is paid $5 per week plus $.10 for each paper delivered. Make a table and a graph to show the relationship between the number of papers delivered and amount earned each week. Write a formula in function notation to represent the relationship. What is the domain? What is the range?

Case Closed - Evidence:

Number of papers delivered, n	10	20	25	30	32
Weekly earnings, $E(n)$	6	7	7.50	8	8.20



$E(n) = 5 + 0.10n$

The domain is the number of papers delivered, n. It can be represented $\{n \in W \mid n \geq 0\}$. The range includes all the amounts he could earn in a week. It can be represented $\{E(n) \in Q \mid E(n) \geq 0\}$. Since the number of papers must be whole numbers, the points on the graph should not be connected.

2. Write the sentences below in "if-then" form. Give the converse of each statement and tell whether its truth value is true or false.
   - I cry at weddings.
   - A rectangle is a quadrilateral with 4 right angles.
   - $f(9) = 3$ when $f(x) = \sqrt{x}$

Case Closed - Evidence:

Statement	Converse	Truth value
If I am at a wedding, then I cry.	If I cry, then I am at a wedding.	False. I also cry at the movies.
If a quadrilateral is a rectangle, then it has 4 right angles.	If a quadrilateral has 4 right angles, then it is a rectangle.	True
If $f(x) = \sqrt{x}$, then $f(9) = 3$	If $f(9) = 3$, then $f(x) = \sqrt{x}$	False. $f(x)$ could be $27\sqrt{x}$.

3. Uncle Hank is building a shop. He needs a floor space of 1200 square feet. Make a table to show some of the possible lengths and widths for the shop. Draw a graph to show the relationship between width and length and represent the relationship in function notation. Write a function rule to calculate the length of the floor for any given width. Use your rule to determine the length of the floor when the width is 28 feet.

Case Closed - Evidence:

Width	Length
10	120
20	60
30	40
40	30
50	24
60	20
80	15
100	12

Let w = width and $L(w)$ = length. Then $L(w) = 1200/w$.
If $w = 28$, then $L(28) = 1200/28$ or 42 6/7 feet

An Instructional Organizer of Best Practice

A powerful curriculum management tool that enhances the teaching and learning experience by connecting educators to the best practices, strategies, instruction, resources, and professional development that enable and support consistent and measurable student achievement.

Technology

Research-based Strategies

- **Technology**
  - Both assistive technology and accessible instructional technology have increased the availability of instructional materials in digital formats and have proven to address more learning needs of students with reading disabilities.
  - Technology has been beneficial in building computation fluency, converting symbols, notations and text, building conceptual understanding, etc. (National Center for Technology Innovations, October 2004)

Definition of Assistive Technology

Assistive technology device

- Any item, piece of equipment or product system, whether acquired commercially off the shelf, modified, or customized, that is used to increase, maintain, or improve the functional capabilities of children with disabilities.
- EXCEPTION. The term does not include a medical device that is surgically implanted, or the replacement of such device.

Individuals with Disabilities Education Improvement Act of 2004

Definition of Assistive Technology

- **Assistive technology devices for math include a range of tools ranging from simple to complex that are used to support calculation, visual-spatial, organizational, and problem solving skills.**

Access Tools for Math

- **In order to produce quality work, the student must have an appropriate environment and access to the proper tools to compensate for difficulties that they are experiencing.**
  - While these tools may not specifically address math skills, they are considered necessary for some students to provide them with access to the curriculum.
  - In some cases, these tools may be the only assistive technology students will need to complete their math tasks.

Positioning Aids

- **Helps maintain posture and stabilizes student's books and paper**
  - Teacher made slant boards (3" binders)
  - Book stands, Dycem or non-slip shelf liner (Sammons Preston Rolyan)
  - Slant boards (Pocket Full of Therapy)
  - Page and copy holders (office supply store)
  - Clip boards (office supply store)

Adapted Writing Utensils

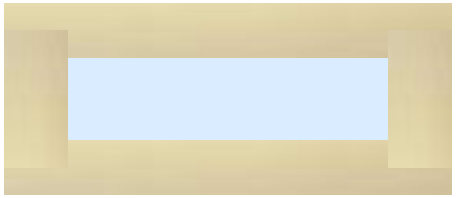
- **Assists with maintaining grip for writing**
- **Improves legibility**
- **Delays fatigue and increases comfort**
  - Adapted pens/pencils (Sammons Preston Rolyan, Onion Mountain Technology)
  - Pencil grips (Sammons Preston Rolyan, Onion Mountain Technology)

Adapted Paper

- **Improves spacing and alignment of student work**
  - Raised line paper (Sammons Preston Rolyan, Onion Mountain Technology)
  - Bold line paper (Sammons Preston Rolyan, Onion Mountain Technology)
  - Highlighted Paper (Onion Mountain)
  - Graph Paper (Office Supply)

Tracking Aids

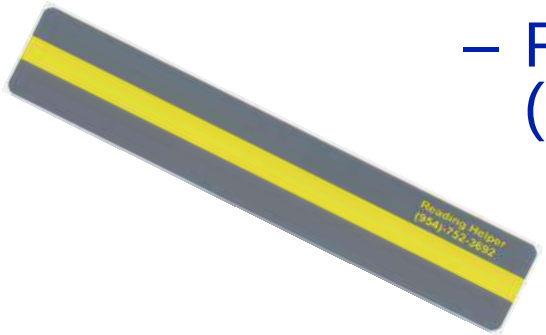
- **Enables students with visual tracking difficulties to maintain their place in the text or on a worksheet**
  - Reading Window (Teacher Made)
  - Bar Magnifier (Independent Living Aids)
  - EZC Reader/ Reading Helper (Really Good Stuff)



Click for Demo

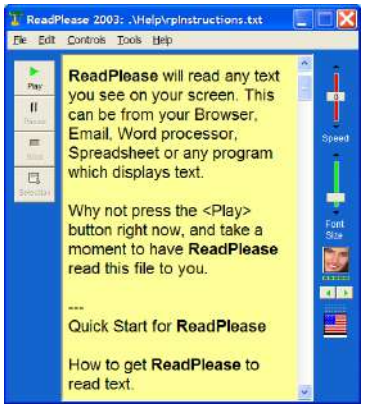
Contrast Aids

- **Alters the foreground-background contrast to promote visual access to text**
  - Highlighters
  - Highlighting Tape (Crystal Springs)
  - Acetate Report Covers
  - Color Overlays (National Reading Styles Institute, Onion Mountain Technology)
  - Reading Helper, E.Z. Reader (Really Good Stuff)



Text Readers

- **Text-reading computer applications that provide a bimodal presentation of the document being read aloud**
  - ReadPlease Free (ReadPlease)
  - Natural Reader (NaturalSoft)
  - Etext Reader (Premier Programming)
  - TextAloud (NextUp)



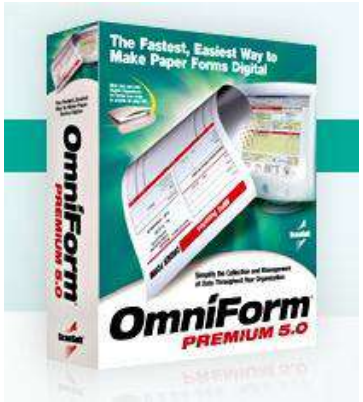
Text ALOUD

Numpads

- **Assists with math processing input**
  - Standard keyboard numpad (Windows or Macintosh)
  - Standalone Numpad (InfoGrip)

Electronic Worksheets and Tests

- **Provides a way for worksheets and tests to be scanned into electronic format**
  - Paper Port (Nuance)
  - OmniForm (Nuance)



he midpoint of each line segment.

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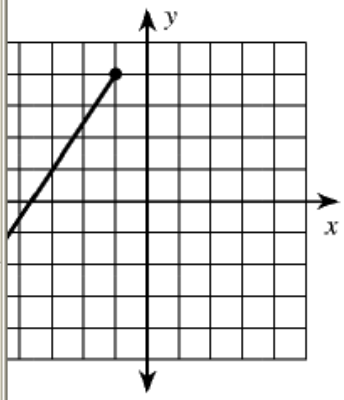

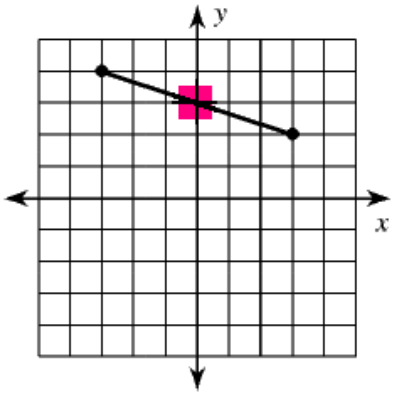

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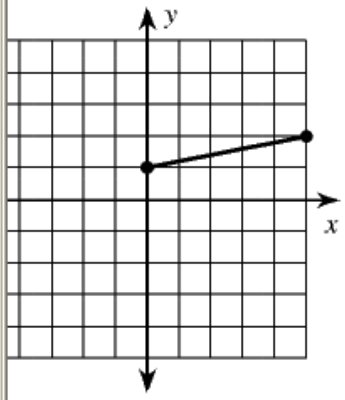
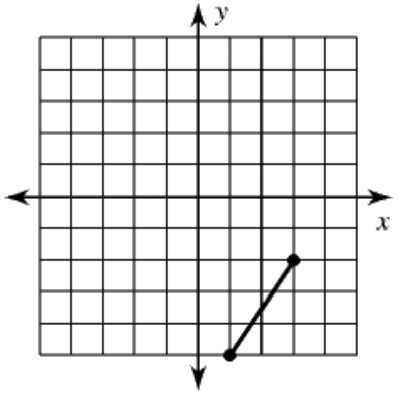


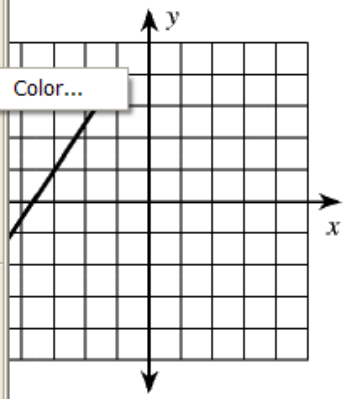


he midpoint of the line segment with the given endpoints.

1), (−2, 5)

6) (4, 3), (−1, 6)

he midpoint of each line segment.



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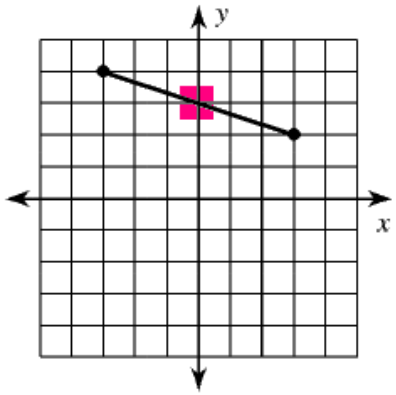

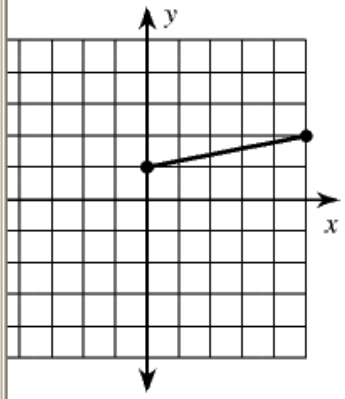

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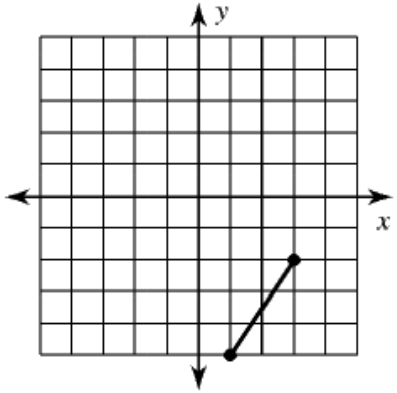


he midpoint of the line segment with the given endpoints.

1), (−2, 5)

6) (4, 3), (−1, 6)

Voice Input

- **Allows the student to complete math tasks on the computer through voice dictation**
  - MathTalk (MetroPlex Voice Computing)
    - Can be used with basic operations, using MathPad, up to graduate level math, using Scientific Notebook.

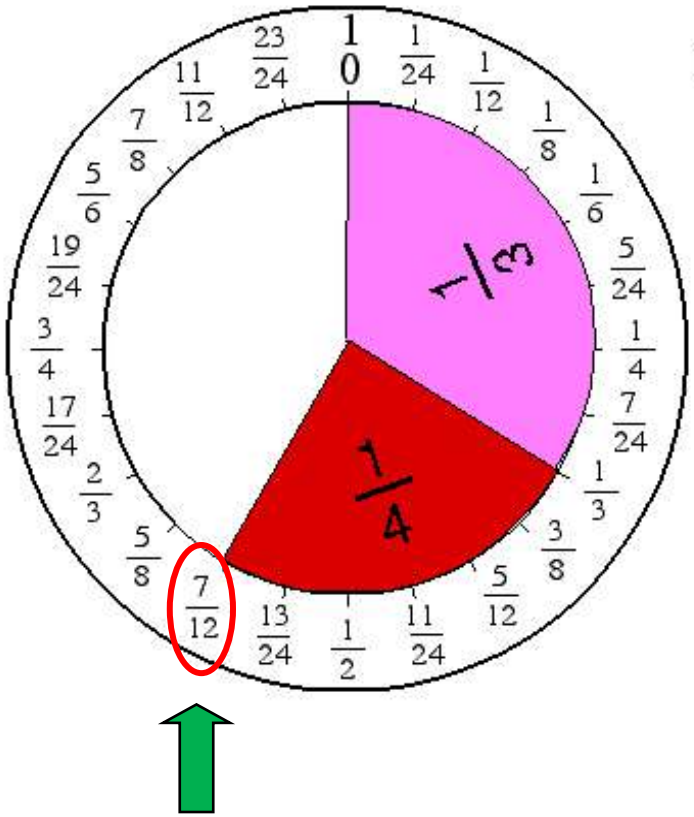
Calculation and Problem Solving Tools

Manipulatives

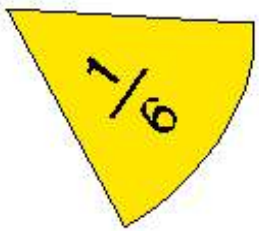
- **Provides concrete materials that can be used when performing math tasks**
  - BarCulator (mathfun.com)
  - PieCulator (mathfun.com)
  - Master Fraction (Onion Mountain Technology)

PieCulator

Click **here** for more information

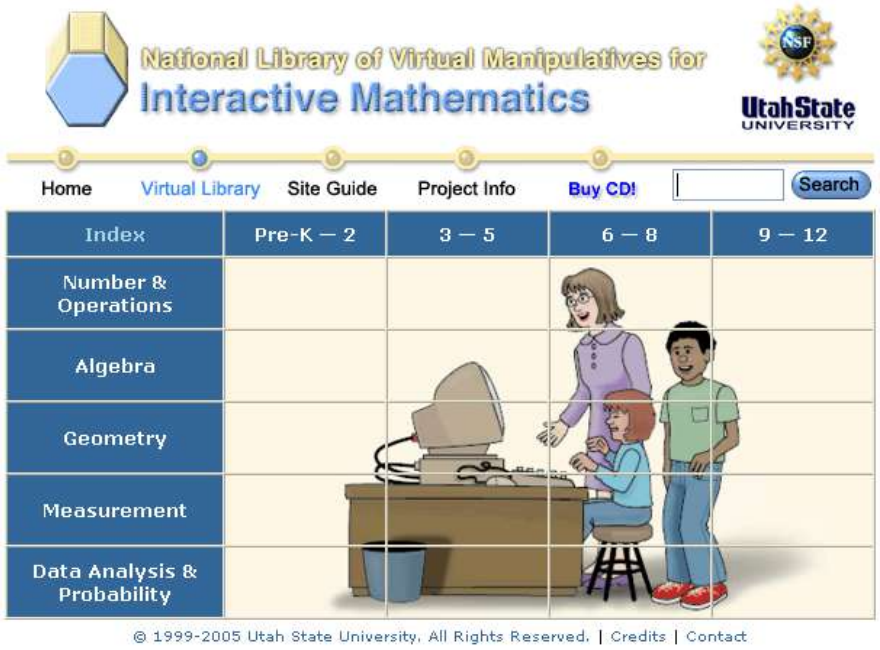


1/3 + 1/4 = 7/12



Virtual Manipulatives

- **Allows for access to electronic manipulatives**
  - National Library of Virtual Manipulatives (http://nlvm.usu.edu/en/nav/)



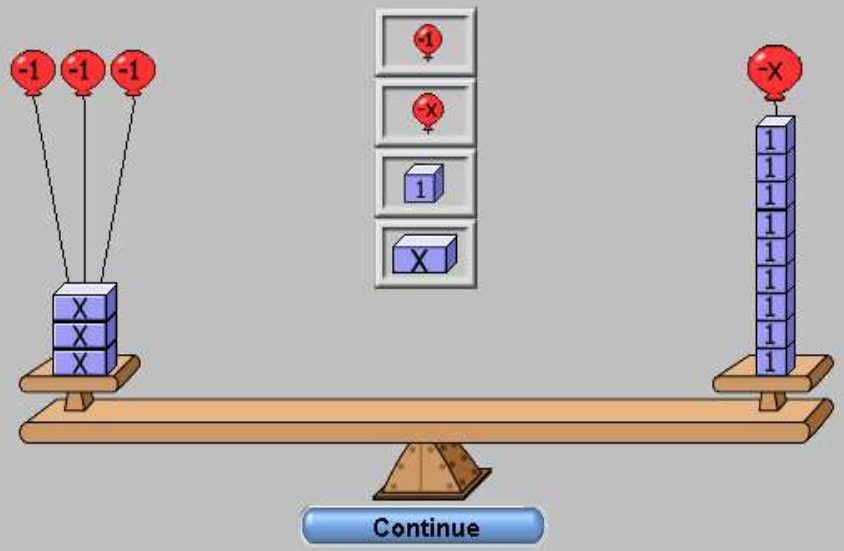
Algebra Balance Scales - Negatives - NLVM - Windows Internet Explorer

http://nlvm.usu.edu/en/nav/frames_asid_324_g_3_t_2.html?open=instructions&from=category_g_3_t_2.html

Back | Parent/Teacher | Standards | Instructions

Click and drag quantities from bins to balance beam pans to represent the equation.

$$3x - 3 = -x + 9$$



Continue

Clear | Create Problem | New Problem

Download Free Trial Desktop Version

Click here if you cannot see the virtual manipulative.

Credits | Contact | Feedback | **Language:** English

Internet 100%

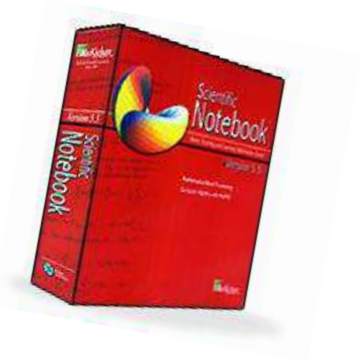
Charts and Study Guides

- **Booklets provide sample problems and references for solving common math problems**
  - Flip charts, Quick Study guides (Amazon, Google search ‘flipper study guides’)
  - Quick Math Books (Curriculum Associates)
  - CliffNotes (www.cliffnotes.com, bookstores)
  - Flow chart, cheat sheets (Teacher made)

Charts and Study Guides

- **Applications provide sample problems and references for solving common math problems**
  - Microsoft Math (Microsoft)

  - Scientific Notebook (MacKichen Software)



- **Online Resources provide sample problems and references for solving common math problems**
  - Ask Dr Math, Algebrahelp.com, Webmath.com

Calculators

- **Large Button - Provide large buttons and/or large display for physical access**
  - Jumbo Display Folding Calculator (Independent Living Aids)

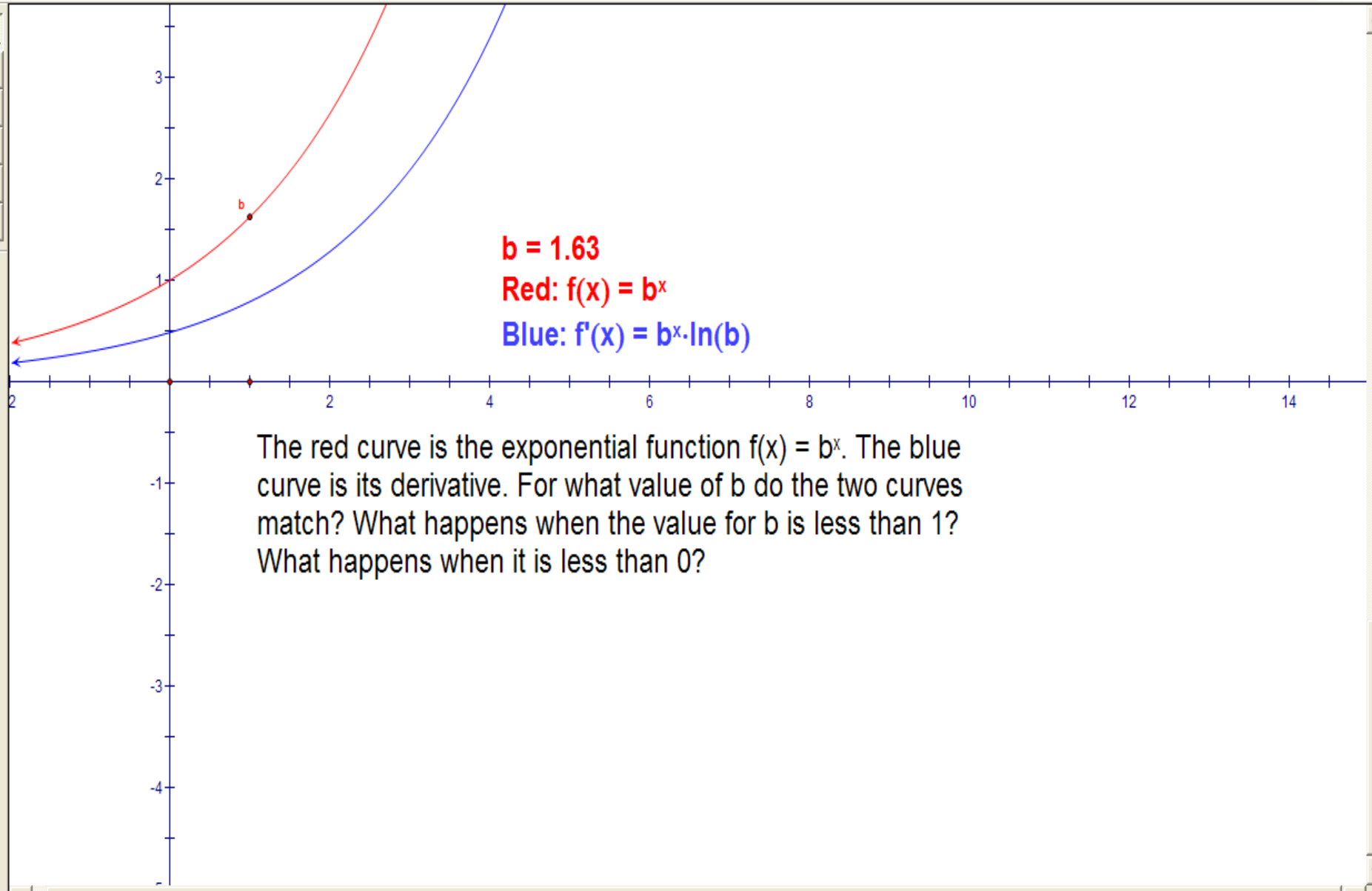
- **Talking Calculator – Provide speech feedback of numbers entered and numbers on display**
  - Desktop Talking Calculator (Maxi-Aids)

Graphing Software
Software for Graphs and Charts

- **Allows students to create graphs on the computer**
  - Microsoft Word (Microsoft)
  - Microsoft Excel (Microsoft)
  - Geometer Sketchpad (Key Curriculum Press)

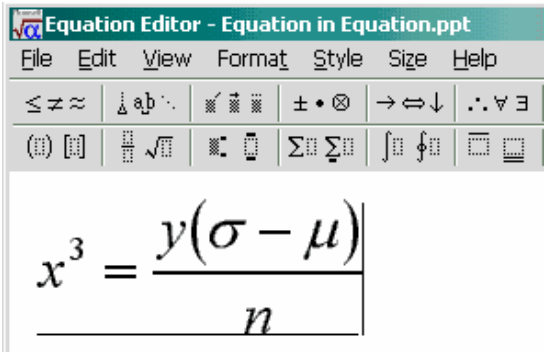
The Geometer's Sketchpad - [Exponential and Derivative.gsp - Exponential and Derivative]

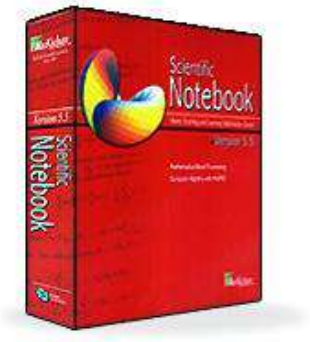
File Edit Display Construct Transform Measure Graph Window Help



Electronic Math Processing Software

- **Allows for completion of higher level math functions in an electronic format**
  - Equation Editor (free download from MS Office CD)
  - Scientific Notebook (MacKichen Software)
  - Geometer's Sketchpad (Key Curriculum Press)





$$\frac{3n-2}{5}=\frac{7}{10}$$

$$10(3n-2)=35$$

$$30n-20=35$$

$$+20=+20$$

$$30n=55$$

$$\frac{30n}{30}=\frac{55}{30}$$

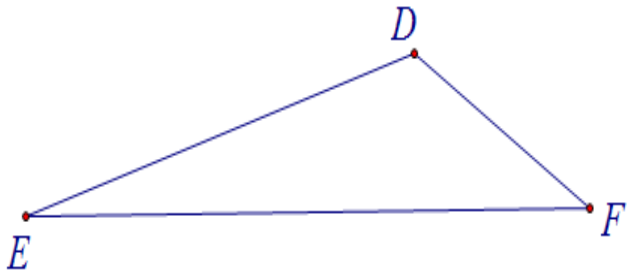
$$n=1.83$$

The Geometer's Sketchpad - GSP tutorial.gsp

File Edit Display Construct Transform Measure Graph Window Help

Measuring Angles (tabulating)

ΔDEF is constructed at right.
All of the angles have been measured as well as the sum of the angles.
Move point D to change the measures of the angles, then double-click on the tabulation table.



What do you notice?

m∠DFE = 33°

m∠DEF = 16°

m∠EDF = 130°

m∠DFE+m∠DEF+m∠EDF = 180°

Move point F then double-click on the tabulation table again. What happens?

m∠DFE	m∠DEF	m∠EDF	m∠DFE+m∠DEF+m∠EDF
15°	27°	138°	180°
33°	16°	130°	180°
33°	16°	130°	180°

On the next page you will learn how to make a tabulation table.

Scientific Notebook - [Untitled1]

File Edit Insert View Go Tag Tools Compute Window Help

400%

$$\frac{3x-2}{5} = \frac{7}{10}$$

$$10(3n-2) = 35$$

$$30n - 20 = 35$$

$$30n = 55$$

$$n = 1.83$$

Body Text

Determining the Right Tool(s)

Determining The Optimal Tool(s)

- **Student abilities and needs**
- **Required tasks**
- **Available supports**

Benefits of Assistive Technology

Benefits of Math Aids

- **Productivity**
- **Independence**
- **Achievement**

Things to Keep in Mind

- **Technology is no substitute for good instruction**
- **Technology should be used in conjunction with other available supports**
- **Technology use should be monitored and changes made as needed**

Assistive Technology Resource Charts

AT Devices for Math

Available on GPAT website

www.gpat.org

Thank You for Being Here Today!

Contact Information

Donna Ann Flaherty (dflaherty@doe.k12.ga.us)

Education Program Specialist (SLD)

Janet Davis (jdavis@doe.k12.ga.us)

Mathematics Program Manager

Sally Kemph (skemph@doe.k12.ga.us)

Education Program Specialist (AT)

Georgia Department of Education
Divisions for Special Education Services and Supports
1870 Twin Towers East
Atlanta, Georgia 30334
404-656-3963
Website: http://www.gadoe.org/ci_exceptional.aspx

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