Using Technology and Scaffolding for Students with Math Difficulties

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Assessment
Part 1

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What is a learning disability in math?

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1896

W. Pringle Morton publishes the first case article on Percy F a 14-year-old with LD

1963

- Dr Samuel Kirk's speech to National Teacher's Society
- Defines:
- Learning Disability
- FAPE
- LRE

1975

- IDEA becomes Federal Law
- LD defined as discrepancy between academics and achievement

1977

The National Center for LD is created using the first research supported remediation plans

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1990

- The National Joint Committee on Learning Disabilities states, “Learning disabilities is
- (1) **significant difficulties in the acquisition and use of academic skills**
- **(2.) presumed to be due to central nervous system dysfunction**,
- (3) Problems in self-regulatory behaviors, social perception, and social interaction **may exist with learning disabilities, but do not, by themselves, constitute a learning disability.”**

1996

- Dr Sally Shaywitz publishes Dyslexia
- Using neuro imaging dyslexia is defined as a language processing issue not a visual issue

1998

U.S. Department of Education's Office of Special Education Programs established the **National Center on response to intervention.**

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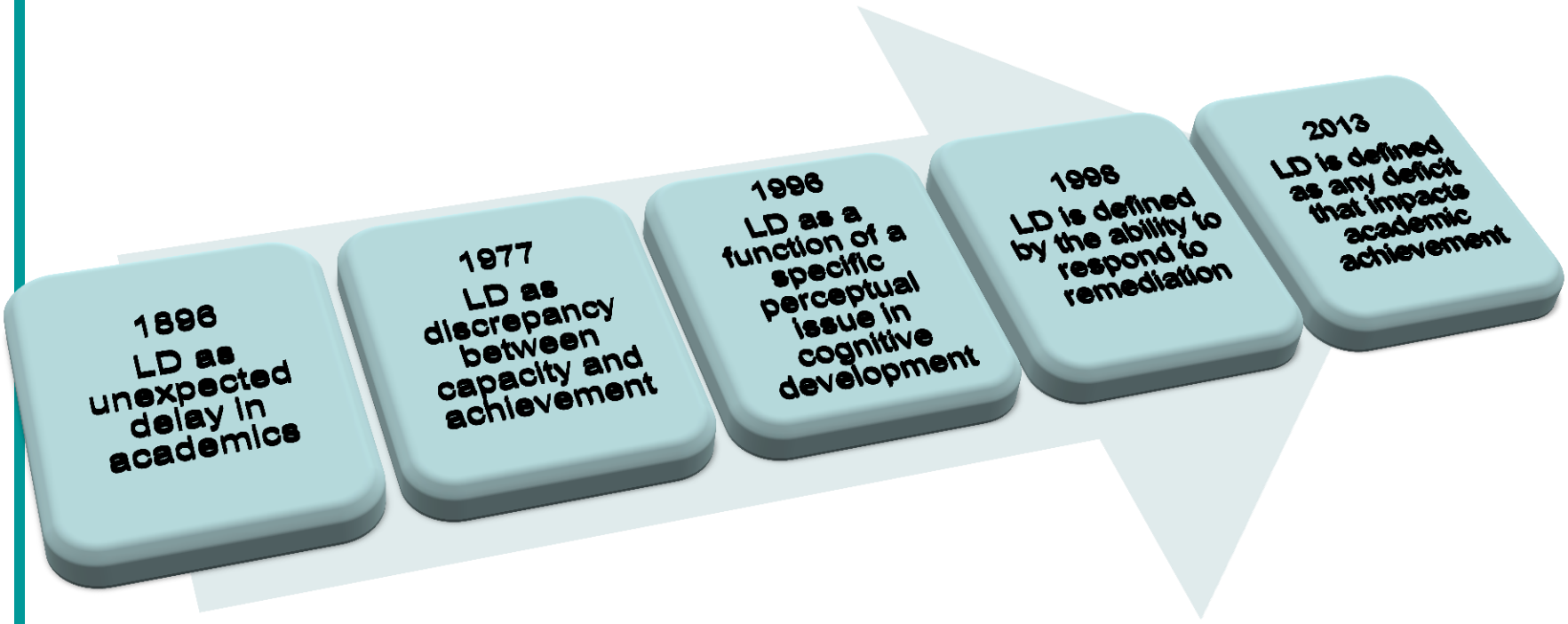

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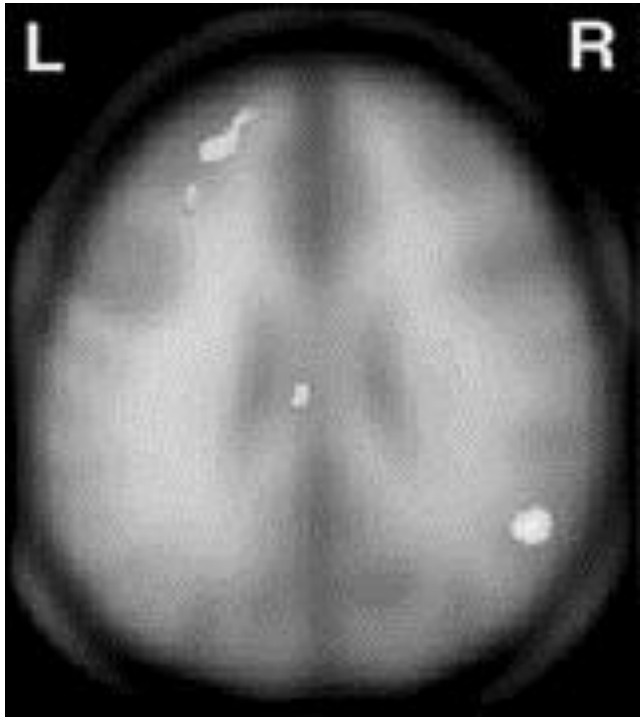
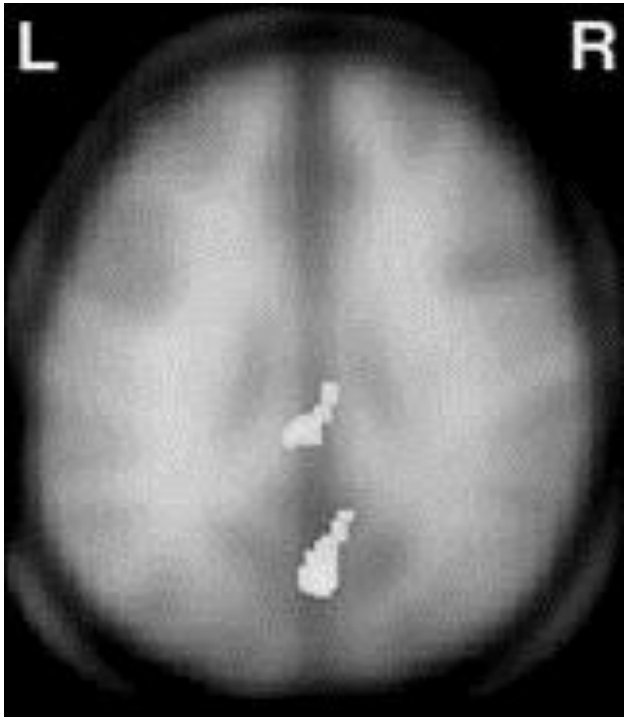
What is a Reading Delay?

Central Auditory Processing Delay - Katz, Stecker & Henderson (1992)

"What we do with what we hear."



Average Reader



Reading Delayed

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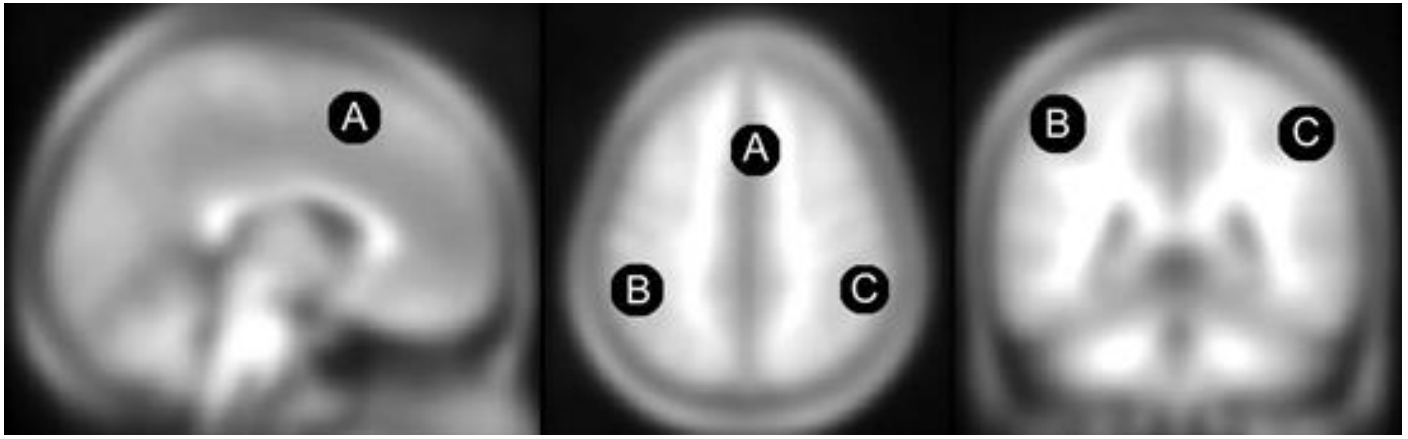
What is a Math Delay



Non-Symbolic Numerical Distance Effect in Children With and Without Developmental Dyscalculia: Kucian, Karin Loenneker, Thomas Martin, Ernst von Aster, Michael ; Developmental Neuropsychology, Vol 36(6), Aug, 2011.

Students with Math Disorder engage areas attributed to higher difficulty in response selection more than control children, possibly due to a deficient development of a spatial number representation in DD.

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What is a Math Delay?

Poor Processors

- Input Issues
- Poor Number Sense
- Difficulty understanding the exponential nature of multiplication
- Difficulties with estimation of distance

Poor Planners

- Output Issue
- Poor estimation of the sum
- Difficulties with retrieval of math rubrics
- Difficulties with lining up a problem

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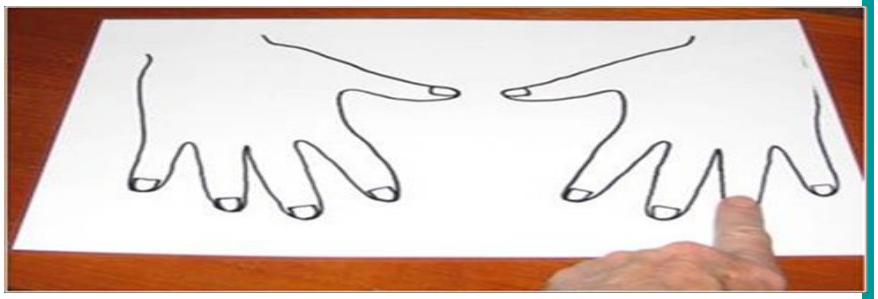
What is a Math Delay?

Poor Processors

- Number Sense
  - Fingertip Agnosia
- Poor Visual Processing
  - Spacing in handwriting
- Better at applied problems than calculation
  - Rationalize through an answer

Assessment



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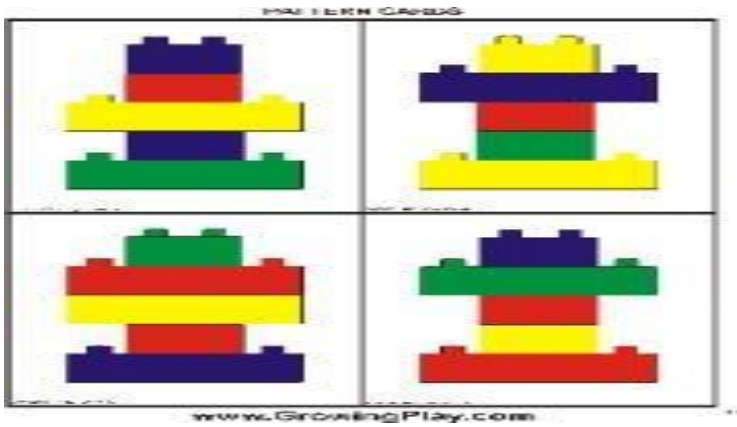
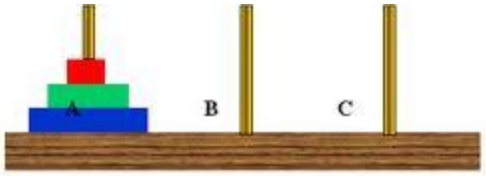
What is a Math Delay?

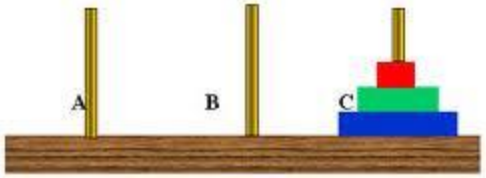
Poor Planners

- Retrieval - Sequential Memory Tasks
- Poor Arithmetic on WISC in relationship to WJ Calculation performance
- Executive Functioning Tasks

Assessment







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Summary of Part 1

- Learning Disabilities are defined as any deficit that impacts learning
- Math is not a solitary concept
- Thus delays in math are not solitary
- At least 2 types
  - Poor Planners
  - Poor Processors

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Intervention
Part 2

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Specific Learning Disorders – Math Domain Specific

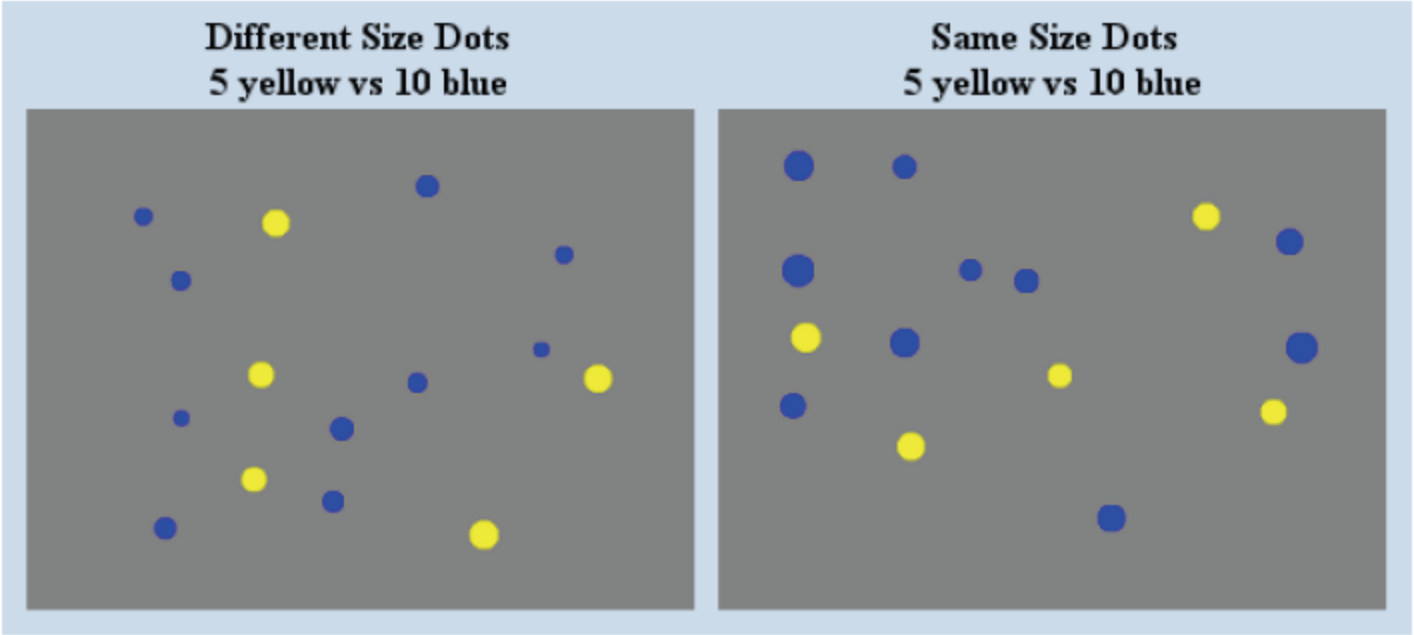
- attention
- working memory
- language,
- sensorimotor function (e.g., finger counting)
- visuospatial ideation;
- experience (e.g., practice and stimulation in everyday life) and
- type of teaching methods used).

Number Sense

- Refers to a child's fluidity and flexibility with numbers, the sense of what numbers mean and an ability to perform mental mathematics and to look at the world and make comparisons.

  (Berch, 1998)

Panamath



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Number Sense

- **magnitude**: how one thing (or amount) compares to another of the same kind in terms of size or rank
- **ranking**: think “higher than”, “lower than”, “equal to”
- **comparison**: evaluating features of things to make a judgment of some sort
- **measurement**: associating a physical quantity (i.e., length, weight) with a unit that describes it (i.e., inch, pound)
- **rounding**: replacing one quantity with another that is simpler but still meaningful
- **percents**: expressing something as a value of some amount compared to 100
- **estimation**: finding a result even though it may be imprecise or incomplete

Red Flags

- High frequency of procedural errors.
- Difficulty in representation and retrieval of arithmetic facts.
- Inability to symbolically or visually represent or code numerical information (Geary. 1990; Geary & Brown, 1991).

Math Skills

- Ability with basic math skills like counting, and basic operations
- Ability to predict appropriate procedures based on understanding patterns —
- Ability to organize objects in a logical way
- Ability to measure-telling time, using money
- Ability to estimate number quantities
- Ability to self-check work and find alternate ways to solve problems.

Numerical Processing

- Quantity and number
- Number-words
- Numeral system-symbolizing numbers
- Place value
- Numerospatial conceptual ability – mental number line
  - Fundamental for arithmetical thinking and calculating in one's head

    e.g 3+8 or 8+3

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Young Children

- Difficulty learning to count
- Trouble recognizing printed numbers
- Difficulty tying together the idea of a number (4) and how it exists in the world (4 horses, 4 cars, 4 children)
- Poor memory for numbers
- Trouble organizing things in a logical way - putting round objects in one place and square ones in another

School Age Children

- Learning math facts (addition, subtraction, multiplication, division)
- Difficulty developing math problem-solving skills
- Poor long term memory for math functions
- Not familiar with math vocabulary
- Difficulty measuring things
- Avoiding games that require strategy

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Teenagers and Adults

- Difficulty estimating costs like groceries bills
- Difficulty learning math concepts beyond the basic math facts
- Poor ability to budget or balance a checkbook
- Trouble with concepts of time, such as sticking to a schedule or approximating time
- Trouble with mental math
- Difficulty finding different approaches to one problem

Scaffolding Instruction

- Provides students who have learning problems the crucial learning support they need to move from initial acquisition of a math concept/skill toward independent performance of the math concept/skill.
- Also referred to as "guided practice."

Critical Elements

- Occurs after teacher initially describes & models concept/skill at least three times.
- Teacher begins by modeling succeeding skill and providing a high level of direction: Teacher asks questions and answers questions.
- Teacher gradually fades his/her direction as students demonstrate increasing levels of competency in performing the skill: Teacher asks questions and students answer questions.

Critical Elements

- temporary and adjustable support
- reduce task to fewest steps
- initial explicit demonstration
- promote student elaboration
- promote cueing and fading of cues
- explicit instruction

Steps

- **Lay the foundation.**
- **Pull back gradually.**
- **Support and re-engage.**

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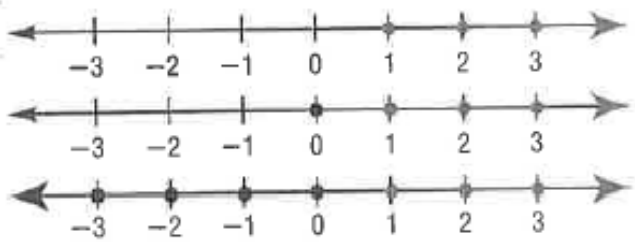
Mrs. Shrode's Algebra 1 Class

Classify and Graph Real Numbers A number line can be used to show the sets of natural numbers, whole numbers, and integers. Values greater than 0, or **positive numbers**, are listed to the right of 0, and values less than 0, or **negative numbers**, are listed to the left of 0.

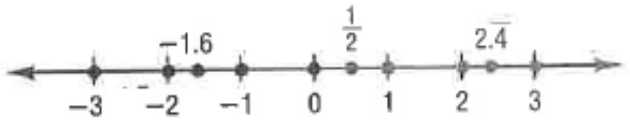
natural numbers: 1, 2, 3, . . .

whole numbers: 0, 1, 2, 3, . . .

integers:
. . ., −3, −2, −1, 0, 1, 2, 3, . . .



rational numbers: numbers that can be expressed in the form $\frac{a}{b}$, where a and b are integers and $b \neq 0$.



A rational number can also be expressed as a decimal that terminates, or as a decimal that repeats indefinitely.

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Algebra 1AB
Notes Section 1-8 Number Systems

Objective: To classify and graph real numbers (Standard 1.0). To find square roots and order real numbers (Standard 2.0).

Things to know:

Follow along in your textbook pg. 46 as the teacher defines and gives examples of the following terms.

TERM	DEFINITION	EXAMPLES
natural numbers	The counting numbers	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, …
whole numbers	The natural numbers plus zero	0, 1, 2, 3, 4, 5, 6, 7, 8, 9, …
integers	The positive and negative numbers plus zero	…-4, -3, -2, -1, 0, 1, 2, 3, …
rational numbers	Numbers that can be expressed in fraction form $\frac{a}{b}$ but b cannot be 0 *fractions, repeating & ending decimals	-1.6 = ending decimal 2.444… = repeating decimal $\frac{1}{2}$ or $-4\frac{3}{4}$ – fractions
Irrational numbers	Decimals that do not end or repeat. They have no pattern and come mainly from square roots.	$\sqrt{3}$ = 1.73205080…
Real numbers	Both rational and irrational numbers	Includes all examples above
Square root	If $a^2 = b$, then a is the square root a must be 2 exact same factors	8 • 8 = 64 -8 • -8 = 64 1.25 • 1.25 = 1.5625

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Instructional Scaffolding

- **3 Levels**
  - Content
  - Task
  - Material

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Content Scaffolding

- the teacher selects content that is not distracting (i.e., too difficult or unfamiliar) for students when learning a new skill.
- allows students to focus on the skill being taught, without getting stuck or bogged down in the content
- 3 Techniques for Content Scaffolding
  - Use Familiar or Highly Interesting Content
  - Use Easy Content
  - Start With the Easy Steps

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Mr. Silverman's Summer Math Class

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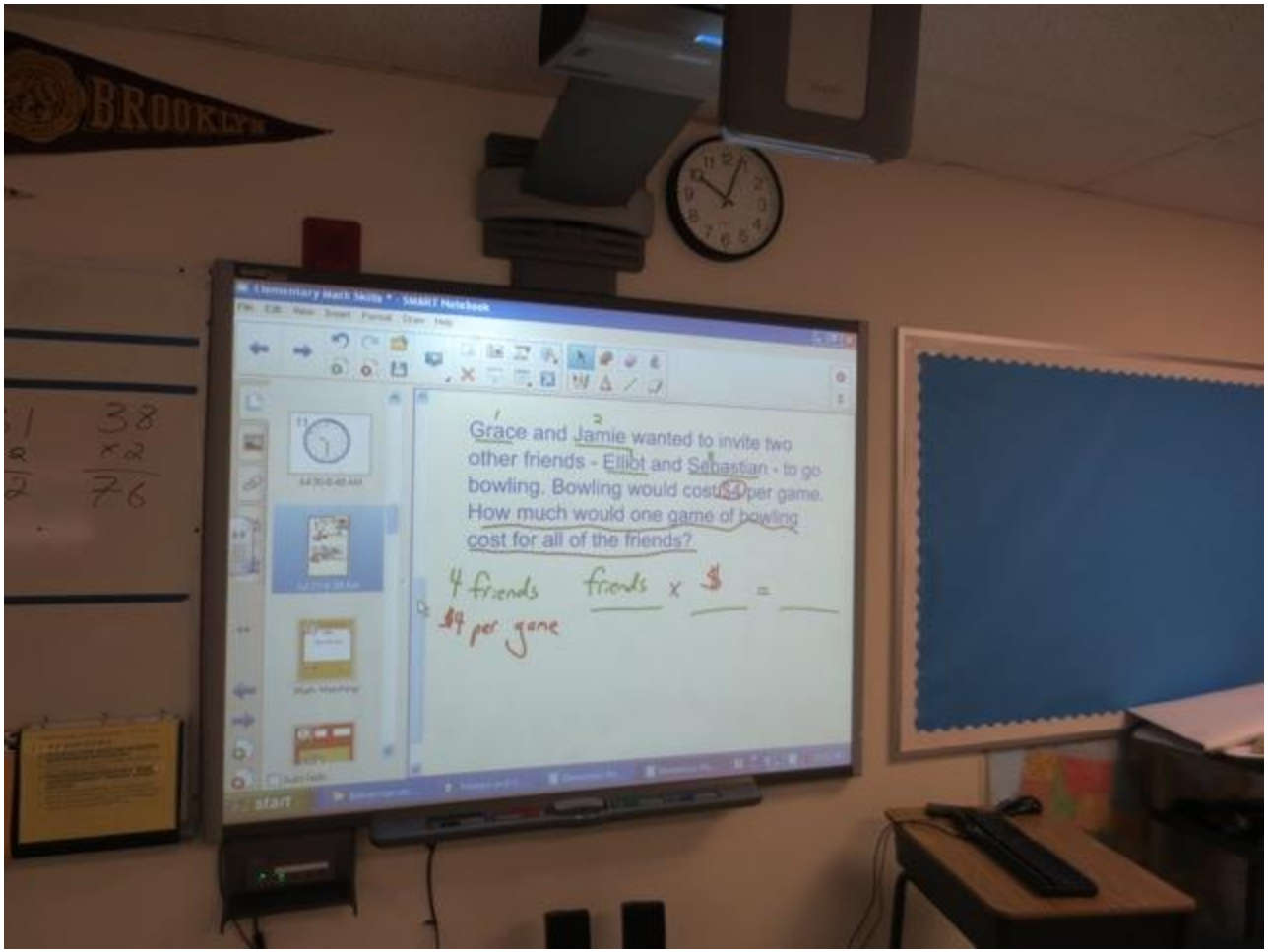
Mr. Silverman's Summer Math Class



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Example of Content Scaffolding

- **Math Word Problems Strategy Instruction**
  - Remove irrelevant information
  - Include answer in the problem (i.e., no question)
  - Allows students to focus on process of strategy
- For example:
  - Robert planted an oak seedling. It grew 10 inches the first year. Every year after it grew 1 ¼ inches. How tall was the oak tree after 9 years?
  - An oak seedling grew 10 inches in the first year. Every year after it grew 1 inch. After 9 years the oak tree was 18 inches

Task Scaffolding

- **Specify the steps** in a task or instructional strategy
- **Teacher models the steps** in the task, verbalizing his or her thought processes for the students.
- Teacher **thinks aloud and talks** through each of the steps he or she is completing
- Even though students have watched teacher demonstrate a task, it does not mean that they actually understand how to perform it independently

Mrs. Shrode's Algebra 1 Class

EXAMPLE **Solve Using Substitution**

1 Use substitution to solve each system of equations.

a. $y = 3x$

$x + 2y = -21$

Since $y = 3x$, substitute $3x$ for y in the second equation.

$x + 2y = -21$	Second equation
$x + 2(3x) = -21$	$y = 3x$
$x + 6x = -21$	Simplify.
$7x = -21$	Combine like terms.
$x = -3$	Divide each side by 7 and simplify.

Use $y = 3x$ to find the value of y.

$y = 3x$	First equation
$y = 3(-3)$ or -9	$x = -3$

The solution is $(-3, -9)$. Check the solution by graphing.

Study Tip

Looking Back

To review **solving linear equations,** see Lesson 2-5.

Example:
Use substitution to solve the system of equations: $y = 3x$
$x - 2y = -21$

PROBLEM	STEPS TO REACH A SOLUTION
$y = 3x$ $x + 2y = -21$	Since $y = 3x$, substitute $3x$ for y in the second equation.
$x + 2y = -21$ $x + 2(3x) = -21$ $x + 6x = -21$ $\frac{7x}{7} = \frac{-21}{7}$ $x = -3$	Replace the y with $3x$ in the second equation. Simplify to find the value of x Combine like terms Divide each side by 7.
$y = 3x$ $y = 3(-3)$ $y = -9$	Now we know the value of x: $x = -3$. Now go back to the first equation to substitute x with -3. Simplify. Now we know the value of y
$x = -3$ and $y = -9$ $(-3, -9)$	Your solution.

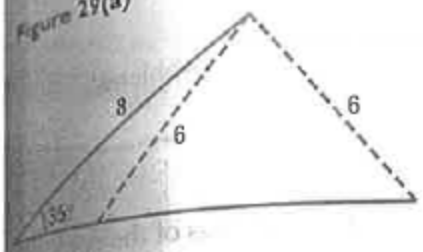
Ms. Cao's Pre-Calc Class

EXAMPLE 4 **Using the Law of Sines to Solve a SSA Triangle (Two Solutions)**

Solve the triangle: $a = 6, b = 8, \alpha = 35°$

Solution See Figure 29(a). Because $a = 6$, $b = 8$, and $\alpha = 35°$ are known, we use the Law of Sines to find the angle β.

Figure 29(a)



$$\frac{\sin\alpha}{a} = \frac{\sin\beta}{b}$$

Then

$$\frac{\sin 35°}{6} = \frac{\sin\beta}{8}$$

$$\sin\beta = \frac{8\sin 35°}{6} \approx 0.76$$

$$\beta_1 \approx 49.9° \quad \text{or} \quad \beta_2 \approx 180° - 49.9° = 130.1°$$

For both choices of β, we have $\alpha + \beta < 180°$. There are two triangles, one containing the angle $\beta_1 \approx 49.9°$ and the other containing the angle $\beta_2 \approx 130.1°$. The third angle γ is either

$$\gamma_1 = 180° - \alpha - \beta_1 \approx 95.1° \quad \text{or} \quad \gamma_2 = 180° - \alpha - \beta_2 \approx 14.9°$$

$\alpha = 35°$, $\beta_1 = 49.9°$ $\qquad$ $\alpha = 35°$, $\beta_2 = 130.1°$

The third side c obeys the Law of Sines, so we have

up

Solve the Δ.

$a=6 \quad b=8 \quad \alpha=35^\circ$

$\beta=? \quad y=? \quad c=?$

① Solve for β

$$\frac{\sin\alpha}{a}=\frac{\sin\beta}{b}$$

$$\frac{b\sin\alpha}{a}=\frac{a\sin\beta}{a} \rightarrow \sin\beta=\frac{b\sin\alpha}{a}$$

$$\beta=\sin^{-1}\left(\frac{b\sin\alpha}{a}\right)$$

$$\beta=\sin^{-1}\left(\frac{8\sin 35^\circ}{6}\right)=49.9^\circ$$

Option 1

$\beta=49.9^\circ$

$\alpha=35^\circ$

$\therefore y=180-49.9^\circ-35^\circ$

$y=95.1^\circ$

Option 2

$\beta=180^\circ-49.9^\circ=130.1^\circ$

$\alpha=35^\circ$

$y=180-130.1^\circ-35^\circ$

$y=14.9^\circ$

Solve for c

$$\frac{\sin\alpha}{a}=\frac{\sin y}{c}$$

$$c=\frac{a\sin y}{\sin\alpha}$$

$$c=\frac{6\sin 95.1^\circ}{\sin 35^\circ}$$

$c=10.4$

$$\frac{\sin\alpha}{a}=\frac{\sin y}{c}$$

$$c=\frac{a\sin y}{\sin\alpha}$$

$$c=\frac{6\sin 14.9^\circ}{\sin 35^\circ}$$

$c=2.7$

Extend Page

Instructional Scaffolding

- **Material Scaffolding**
  - involves the use of written prompts and cues to help the students perform a task or use a strategy.
  - cue sheets or guided examples that list the steps necessary to perform a task.
  - Students use these as a reference, to reduce confusion and frustration.
  - Prompts and cues phased out over time as students master the steps of the task or strategy.

Mrs. Shrode's Algebra 1 Class

polynomials. These techniques include finding a common factor for all terms in a polynomial, recognizing the difference of two squares, and **recognizing perfect squares of binomials.**

Standard 14.0 Students solve a quadratic equation by factoring or completing the square. (Key)

New Vocabulary

perfect square trinomials

To solve this problem, you need to solve the equation $(8 + 2x)^2 = 144$.

Factor Perfect Square Trinomials Numbers like 16, 49, and 144 are perfect squares, since each can be expressed as the square of an integer.

$16 = 4 \cdot 4$ or 4^2 $\qquad$ $49 = 7 \cdot 7$ or 7^2 $\qquad$ $144 = 12 \cdot 12$ or 12^2

Products of the form $(a + b)^2$ and $(a - b)^2$, such as $(8 + 2x)^2$, are also perfect squares. Recall that these are special products that follow specific patterns.

$$(a + b)^2 = (a + b)(a + b) = a^2 + ab + ab + b^2 = a^2 + 2ab + b^2$$

$$(a - b)^2 = (a - b)(a - b) = a^2 - ab - ab + b^2 = a^2 - 2ab + b^2$$

These patterns can help you factor **perfect square trinomials**, which are trinomials that are the squares of binomials.

Squaring a Binomial	Factoring a Perfect Square
$(x + 7)^2 = x^2 + 2(x)(7) + 7^2 = x^2 + 14x + 49$	$x^2 + 14x + 49 = x^2 + 2(x)(7) + 7^2 = (x + 7)^2$
$(3x - 4)^2 = (3x)^2 - 2(3x)(4) + 4^2 = 9x^2 - 24x + 16$	$9x^2 - 24x + 16 = (3x)^2 - 2(3x)(4) + 4^2 = (3x - 4)^2$

Name: ___

Algebra 1AB
Notes Section: 8-6 Trinomial Squares

Recognizing Trinomial Squares

Objective: *To recognize a trinomial square.* $(x+3)(x+3)=x^2+6x+9$

Remember what a trinomial square looks like? $(x-3)(x-3)=x^2-6x+9$

For the square of a binomial to be a **trinomial square**, three things must be true.

1. 2 terms, usually the first and the last one perfect squares. $(x^2 \text{ \& } 9)$ A^2 & B^2
2. The A^2 & B^2 must both be positive. (no) minus sign before them)
3. If you multiply A and B then double it (x^2) you get the third term $2AB$ or $-2AB$

Does $x^2 - 6x - 9$ meet all of these rules?

$x^2 = (\underset{A}{x})^2$ $9 = (\underset{B}{3})^2$ Is there a minus sign before the x^2 or 9? no

Is $2AB$ to $6x$ or $-6x$? yes $2(3x)=6x$ Is $x^2 + 6x - 9$ a trinomial square? yes

Example:

Is $x^2 + 6x + 11$ a trinomial square?

POLYNOMIAL	HOW YOU SHOULD DETERMINE YES OR NO
$x^2 + 6x + 11$	First check to see if the first and last terms are squares
$(\underset{A}{x})^2 + (\underset{B}{\sqrt{11}})^2$	If yes then multiply $2AB$ and see if it gives you your middle term. It can be positive or negative.
$2(\underset{A}{\quad})(\underset{B}{\quad})$	Is it a trinomial square? NO

Is $16a^2 - 56a + 49$ a trinomial square?

POLYNOMIAL	HOW YOU SHOULD DETERMINE YES OR NO
$16a^2 + 56a + 49$	First check to see if the first and last terms are squares
$(\underset{A}{4a})^2 + (\underset{B}{7})^2$	If yes then multiply $2AB$ and see if it gives you your middle term. It can be positive or negative.
$2(\underset{A}{4a})(\underset{B}{7})$	Is it a trinomial square? yes

$2(28a)$
$56a$

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Name: Jordan

Algebra 1AB
Notes Section: 8-6 Trinomial Squares

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Example:

Is $x^2 + 6x + 11$ a trinomial square?

POLYNOMIAL	HOW YOU SHOULD DETRMINE YES OR NO
$x^2 + 6x + 11$	First check to see if the first and last terms are squares
$(\underset{A}{X})^2 + \_\_\_\_ + (\underset{B}{\text{nope}})^2$	If yes then multiply $2AB$ and see if it gives you your middle term. It can be positive or negative.
$2(\underset{A}{\_\_\_\_})(\underset{B}{\_\_\_\_})$	Is it a trinomial square? NO

Is $16a^2 + 56a + 49$ a trinomial square?

POLYNOMIAL	HOW YOU SHOULD DETRMINE YES OR NO
$16a^2 + 56a + 49$	First check to see if the first and last terms are squares
$(\underset{A}{4a})^2 + \sqrt{} + (\underset{B}{7})^2$	If yes then multiply $2AB$ and see if it gives you your middle term. It can be positive or negative.
$2(\underset{A}{4a})(\underset{B}{7})$	Is it a trinomial square? yes

$2(28a)$
$56a$

Mrs. Shrode's Algebra 1 Class

add, subtract, multiply, and **divide monomials** and polynomials. **Students solve multistep problems, including word problems, by using these techniques.** (Key, CAHSEE)

New Vocabulary

zero exponent

negative exponent

Quotients of Monomials Look for a pattern in the examples below.

$$\frac{4^5}{4^3} = \frac{\overbrace{4 \cdot 4 \cdot 4 \cdot 4 \cdot 4}^{5 \text{ factors}}}{\underbrace{4 \cdot 4 \cdot 4}_{3 \text{ factors}}} = 4 \cdot 4 \text{ or } 4^2 \qquad 5 - 3 \text{ or 2 factors}$$

$$\frac{3^6}{3^2} = \frac{\overbrace{3 \cdot 3 \cdot 3 \cdot 3 \cdot 3 \cdot 3}^{6 \text{ factors}}}{\underbrace{3 \cdot 3}_{2 \text{ factors}}} = \underbrace{3 \cdot 3 \cdot 3 \cdot 3}_{6 - 2 \text{ or 4 factors}} \text{ or } 3^4$$

KEY CONCEPT — *Quotient of Powers*

Words To divide two powers with the same base, subtract the exponents.

Symbols For all integers m and n and any nonzero number a, $\frac{a^m}{a^n} = a^{m-n}$.

Example $\frac{b^{15}}{b^7} = b^{15-7}$ or b^8

EXAMPLE **Quotient of Powers**

1 Simplify $\frac{a^5b^8}{ab^3}$. Assume that no denominator is equal to zero.

$$\frac{a^5b^8}{ab^3} = \left(\frac{a^5}{a}\right)\left(\frac{b^8}{b^3}\right)$$ Group powers that have the same base.

$$= (a^{5-1}), (b^{8-3}) \text{ or } a^4b^5$$ Quotient of Powers

CHECK Your Progress

Things to know:

DIVIDING POWERS WITH LIKE BASES!

PROBLEM	WHAT IT MEANS	SHORTCUT
$\frac{3^5}{3^2}$	$\frac{3\cdot3\cdot3\cdot3\cdot3}{3\cdot3} = 3^3$	$3^{5-2} = 3^3$
$\frac{x^6}{x^2}$	$\frac{x\cdot x\cdot x\cdot x\cdot x\cdot x}{x\cdot x} = x^4$	$x^{6-2} = x^4$
$\frac{p^5q^7}{p^2q^2}$	$\frac{p\cdot p\cdot p\cdot p\cdot p\cdot q\cdot q\cdot q\cdot q\cdot q\cdot q\cdot q}{p\cdot p\cdot q\cdot q} = p^3q^5$	$p^{5-2} = p^3$ $q^{7-2} = q^5$ p^3q^5

This brings us to the rule:

For any rational number a, and for all whole numbers m and n

$$\frac{a^m}{a^n} = a^{m-n}$$

Practice.

1) $\frac{7^6}{7^2} = 7^{6-2} = 7^4$

2) $\frac{a^7}{a^2} = a^{7-2} = a^5$

3) $\frac{m^4}{m^2} = m^{4-2} = m^2$

4) $\frac{x^4y^3}{x^2y^2} = x^{4-2}y^{3-2} = x^2y$

Notice in all these problems the top term has a larger exponent than the bottom. What happens if the top has a smaller exponent?

Algebra IAB Binder Check Chapter 7

Be sure your binders have all the following in each section.
Binder checks will be done during review week!

- Notes
  - Chapter 7

	Have a copy?	Completed & Filed?
Pre Section 7-1	✓	✓
Section 7-1	✓	✓
Pre Section 7-2	✓	✓
Section 7-2	✓	✓
Section 7-3	✓	✓
Section 7-4	✓	✓
Section 7-5	✓	✓
Section 7-6	✓	✓
Section 7-7	✓	✓

- Classwork
  - Warm-ups/Review Sheets/Book work

	Have a copy?	Completed & Filed?
Warm-up Pre 7-1	✓	✓
Pg. 361 #'s 1-6, 12	✓	✓
Skills Practice 7-1 WS	✓	✓
Warm-up Pre 7-2		
Pg. 370 #'s 1-11 odd	✓	✓
Quiz 7-1Warm-up	✓	✓
Warm-up Pre 7-4	✓	✓
Quiz 7-2 Warm-up	✓	✓
Warm-up Pre 7-5	✓	✓
Pg. 392 #'s 16 - 30	✓	✓
Pg. 392 #'s 1-7	✓	✓
Quiz 7-3 Warm-up	✓	✓
Warm-up Pre 7-7	✓	✓
Pg. 407 #'s 12-30 skip 18	✓	✓
Study Guide WS 7-7	✓	✓

- Homework
  - All homework from chapter 7 graded and returned
- Tests/Quizzes
  - Returned tests/quizzes

Reminders:

- Make sure all work is filed into the correct section
- Make sure all notes are completely filled out
- Try not to have any loose papers
- Don't forget to file away papers in the pockets of your binder
- Ask for any quizzes that have not been returned to you
- Homework has a score on top out of 10 points, it should be dated with the page number and problems on top

Instructional Practices

- ***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***

The Help Group

Mr. Ramirez's Geometry Class

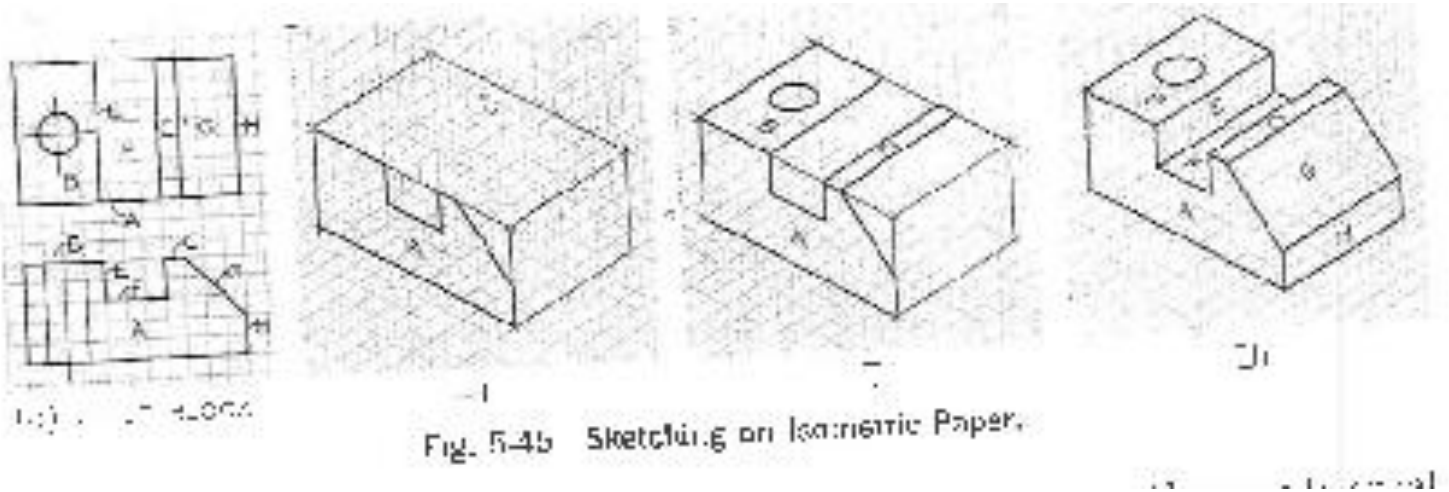
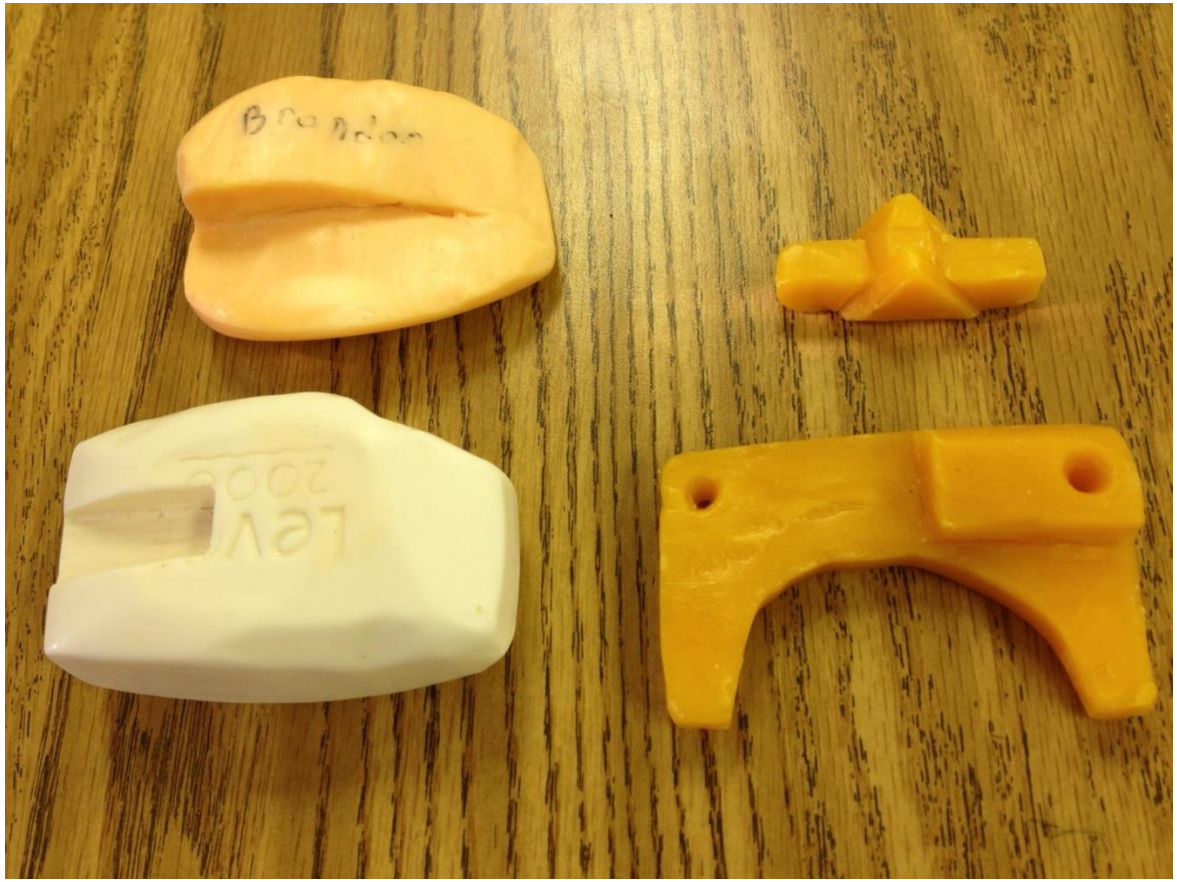


Fig. 5.45 Sketching on Isometric Paper.

Mr. Ramirez's Geometry Class



The Help Group

Instructional Practices

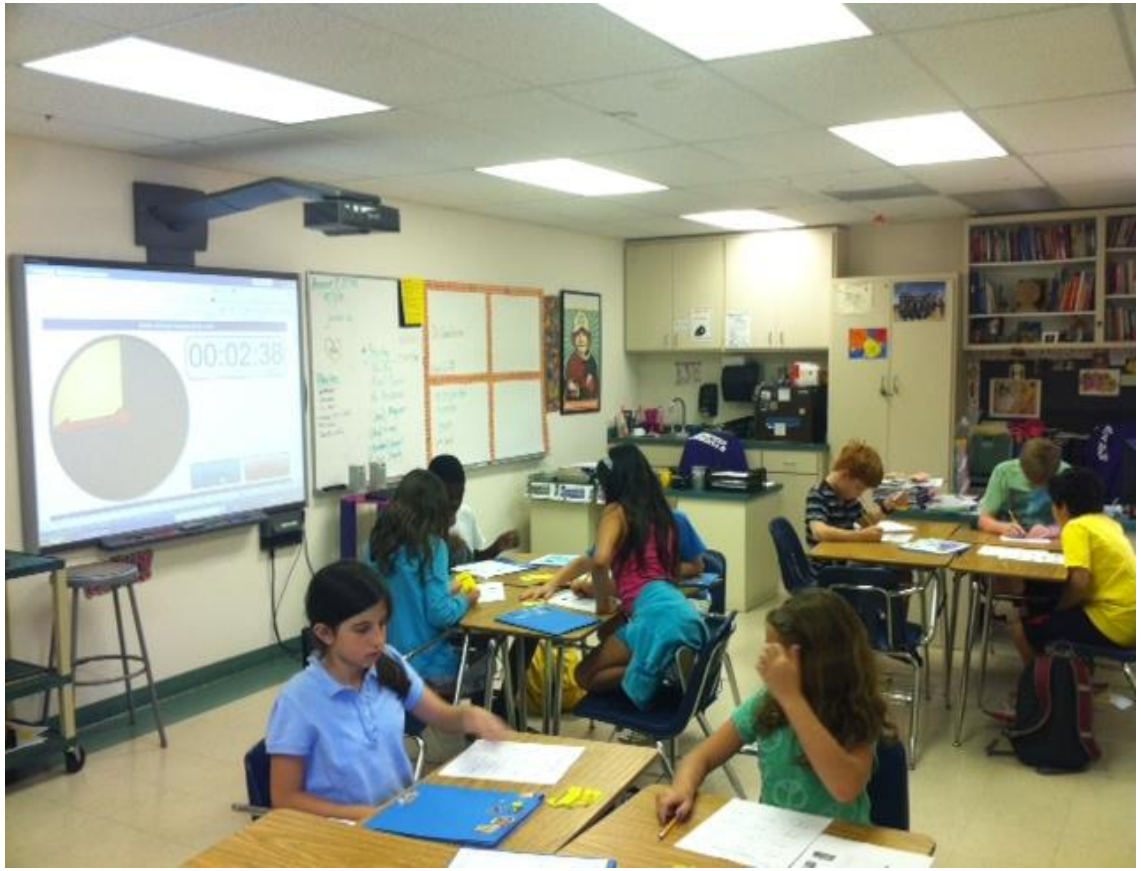
- repeated practice;
- segmentation of subject matter;
- small, interactive groups;
- the use of cues in strategy-learning

The Help Group

Mrs. Rios's Summer Math Class

The Help Group

Mrs. Rios's Summer Math Class



The Help Group

Strategies

- Use graph paper for students who have difficulty organizing ideas on paper.
- Work on finding different ways to approach math facts; i.e., instead of just memorizing the multiplication tables, explain that 8 x 2 = 16, so if 16 is doubled, 8 x 4 must = 32.
- Practice estimating as a way to begin solving math problems.
- Introduce new skills beginning with concrete examples and later moving to more abstract applications.

Strategies

- For language difficulties, explain ideas and problems clearly and encourage students to ask questions as they work.
- Provide a place to work with few distractions and have pencils, erasers and other tools on hand as needed.
- Help students become aware of their strengths and weaknesses. Understanding how a person learns best is a big step in achieving academic success and confidence.

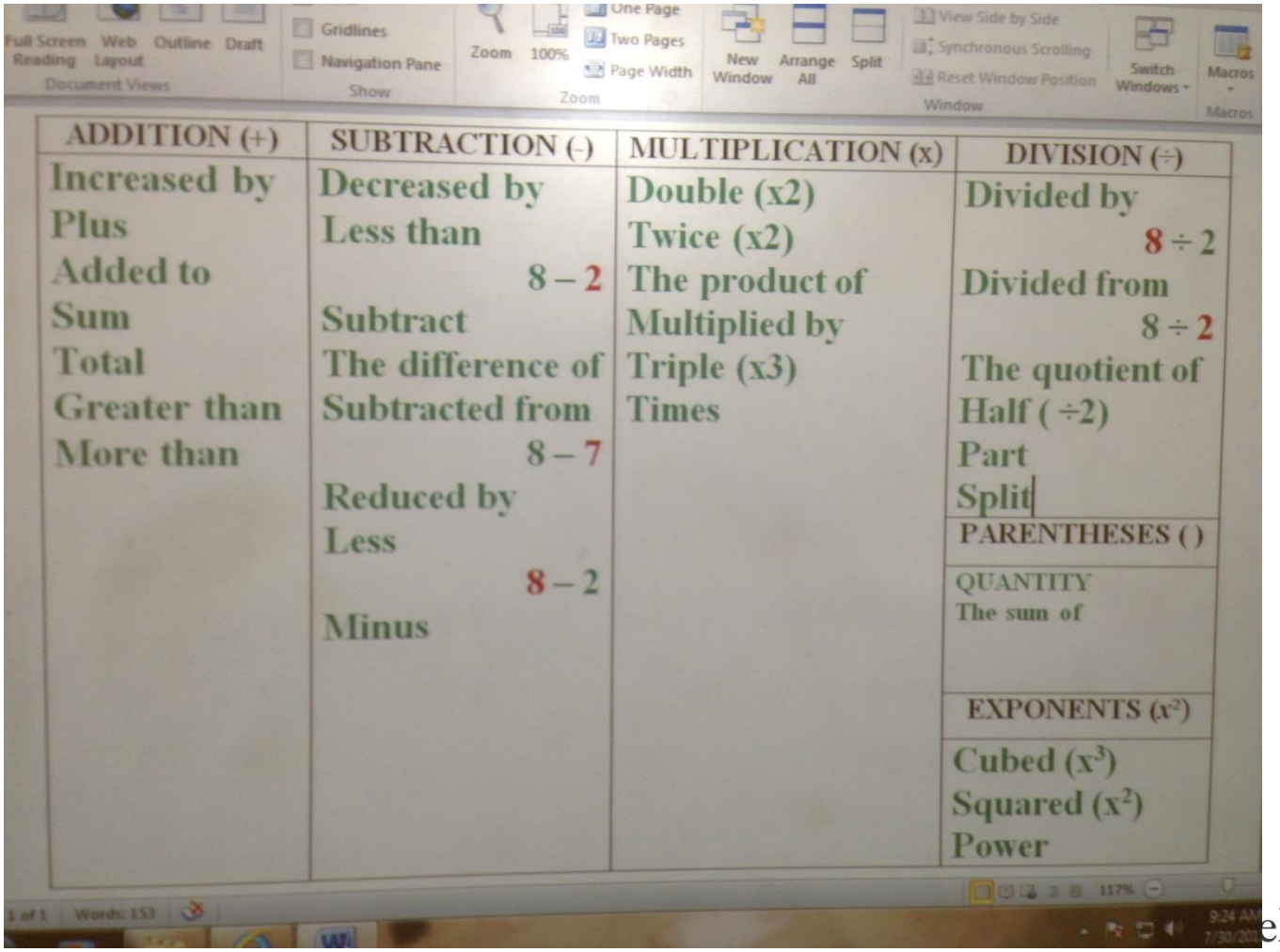
LDA Michigan

Explicit Instruction

- **Critical Features**
  - Daily Reviews
  - Presentation of New Content
  - Guided Practice
  - Explicit feedback and Correctives
  - Independent Practice
  - Weekly and Monthly Reviews

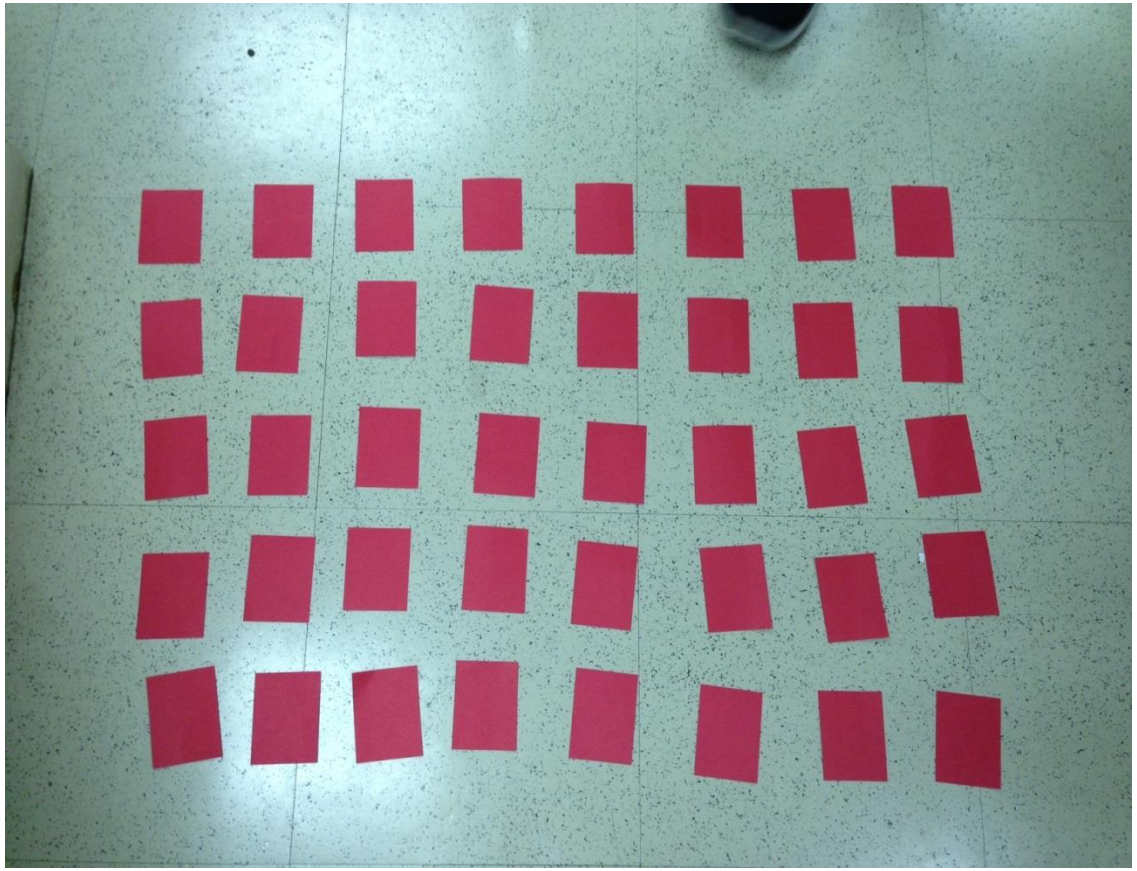
The Help Group

Mrs. Shrode's Algebra Class



ADDITION (+)	SUBTRACTION (-)	MULTIPLICATION (x)	DIVISION (÷)
Increased by Plus Added to Sum Total Greater than More than	Decreased by Less than 8 – 2 Subtract The difference of Subtracted from 8 – 7 Reduced by Less 8 – 2 Minus	Double (x2) Twice (x2) The product of Multiplied by Triple (x3) Times	Divided by 8 ÷ 2 Divided from 8 ÷ 2 The quotient of Half (÷2) Part Split
			PARENTHESES ( )
			QUANTITY The sum of
			EXPONENTS (x^2)
			Cubed (x^3) Squared (x^2) Power

Practice



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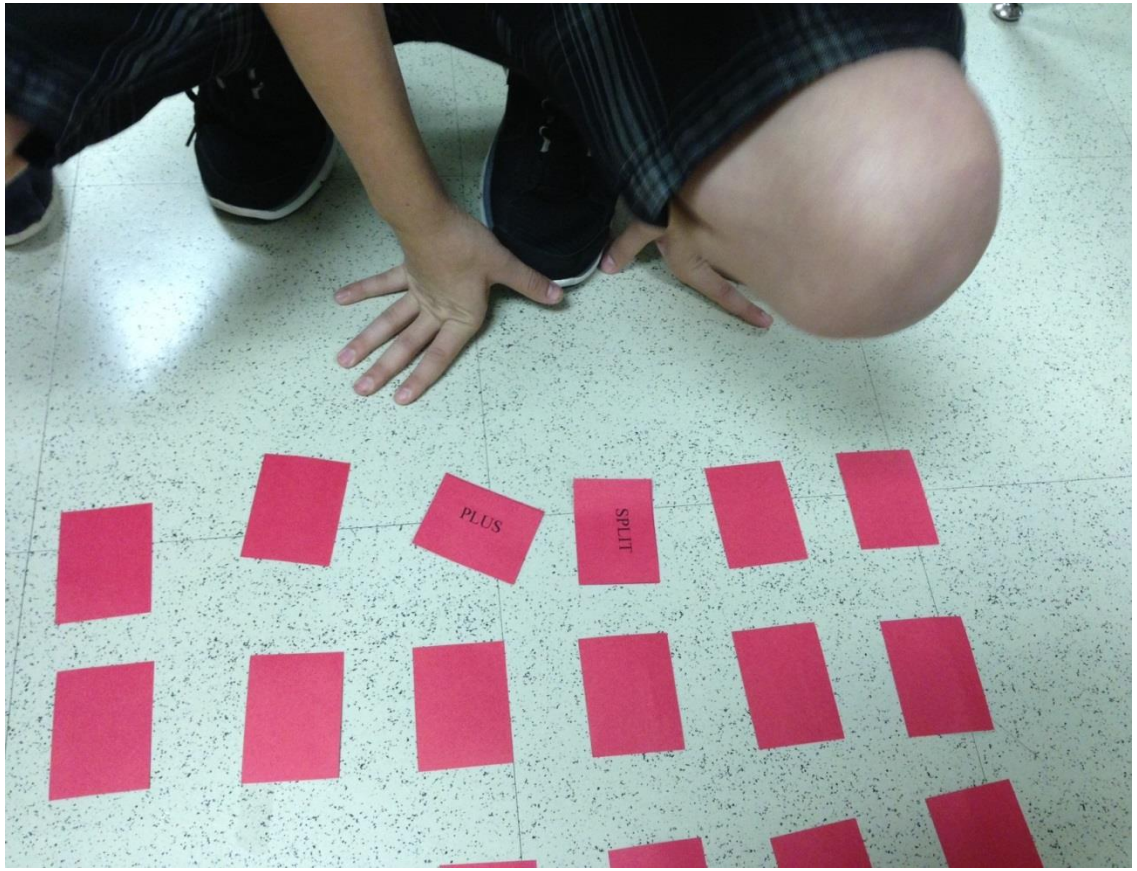
Practice



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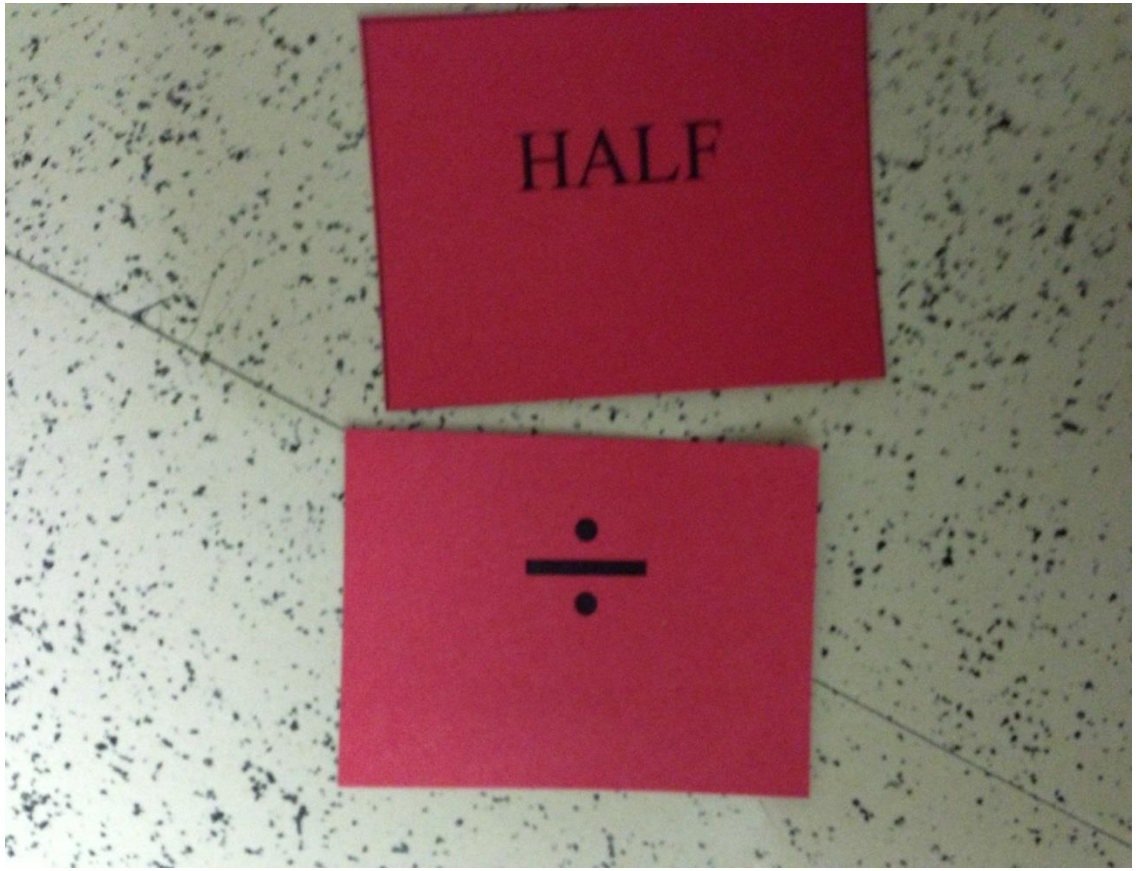
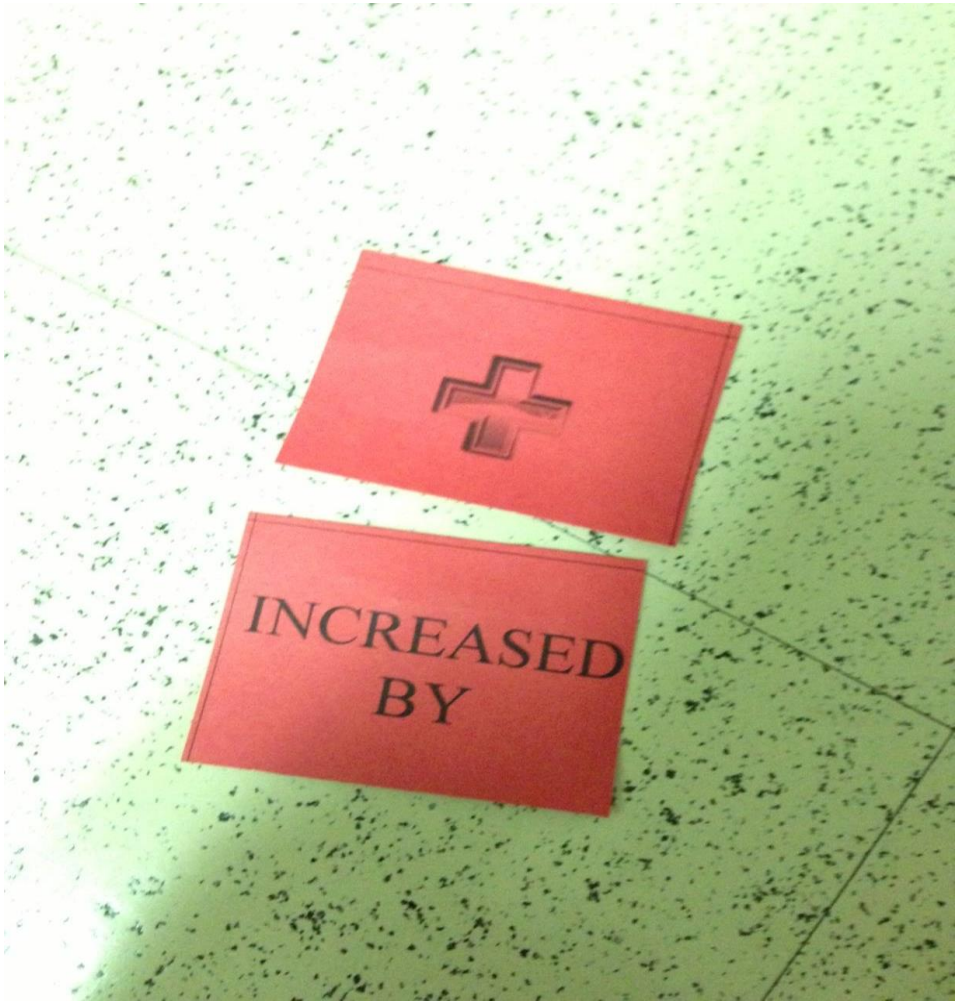
Practice



The Help Group

Practice



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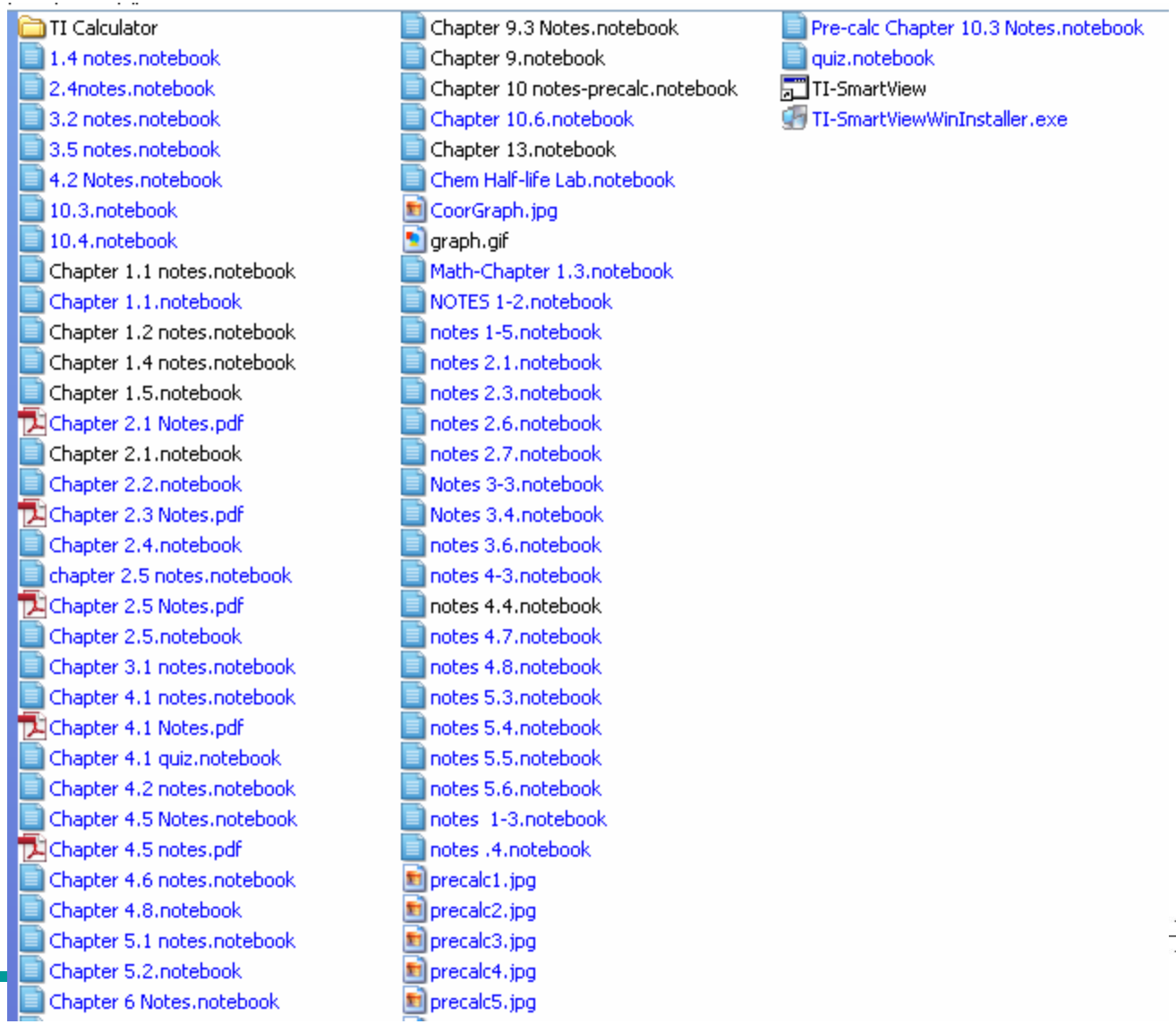
Ms. Cao's Pre-Calculus Class



Help Group

Using Technology in Math Instruction

- Educational software
  - best used to augment classroom instruction
  - should not be the only instructional method for learning
  - not a replacement for teachers
  - tool that helps teachers
  - makes learning more fun,
  - motives students,
  - helps with long-term memory of the material

Characteristics

- Drills
- Tutorials
- Games
- Problem Solving

IXL

Second-grade skills

- Skip-counting puzzles
- Greatest and least - word problems - up to 1,000
- Add and subtract numbers up to 100
- Guess the number
- Compare fractions

See all 214 second-grade skills >>

Third-grade skills

- Division facts to 12
- Estimate sums
- Triangles: acute, right, and obtuse
- Equivalent fractions: type the missing numerator or denominator
- Add and subtract decimals

See all 230 third-grade skills >>

Fourth-grade skills

- Rounding
- Add and subtract mixed cust units
- Parallel, perpendicular, inters
- Patterns of equivalent fracti
- Calculate probability

See all 214 fourth-grade skills >

Fifth-grade skills

- Parts of a circle
- Least common multiple
- Create line graphs
- Stem-and-leaf plots
- Unit prices

See all 268 fifth-grade skills >>

Sixth-grade skills

- Evaluate exponents
- Which is the better coupon?
- Add and subtract like terms
- Circle graphs with fractions
- Divide fractions and mixed numbers

See all 284 sixth-grade skills >>

Seventh-grade skills

- Scientific notation
- Do the ratios form a proporti
- Find the percent: tax, discou more
- Arithmetic sequences
- Make predictions

See all 254 seventh-grade skills

Eighth-grade skills

- Evaluate negative exponents
- Convert rates and measurements: customary units
- Volume and surface area of spheres
- Volume and surface area of similar solids
- Quartiles

Algebra 1 skills

- Solve compound inequalities
- Solve absolute value inequalities
- Identify independent and dependent variables
- Match exponential functions and graphs
- Rational functions: asymptotes and excluded values

Geometry skills

- Triangle Angle-Sum Theorem
- Hypotenuse-Leg Theorem
- Proving a quadrilateral is a parallelogram
- Properties of trapezoids
- Similarity rules for triangles

See all 180 Geometry skills >>

p

IXL – Skills by Grade

Sixth grade

Here is a list of all of the skills students learn in sixth grade! These skills are organized into categories, and you can move you over any skill name to view a sample question. To start practicing, just click on any link. IXL will track your score, and the qu will automatically increase in difficulty as you improve!

Whole numbers

- **A.1** Place values in whole numbers
- **A.2** Word names for numbers
- **A.3** Roman numerals

Decimal numbers

- **B.1** What decimal number is illustrated?
- **B.2** Decimal place values
- **B.3** Word names for decimal numbers
- **B.4** Convert decimals to mixed numbers
- **B.5** Put decimal numbers in order
- **B.6** Inequalities with decimals
- **B.7** Round decimals

Multiply and divide decimals

- **O.1** Multiply decimals
- **O.2** Estimate products of decimal numbers
- **O.3** Inequalities with decimal multiplication
- **O.4** Divide decimals by whole numbers
- **O.5** Divide decimals by whole numbers: word problems
- **O.6** Multiply and divide decimals by powers of ten
- **O.7** Division with decimal quotients
- **O.8** Inequalities with decimal division
- **O.9** Evaluate expressions involving decimals

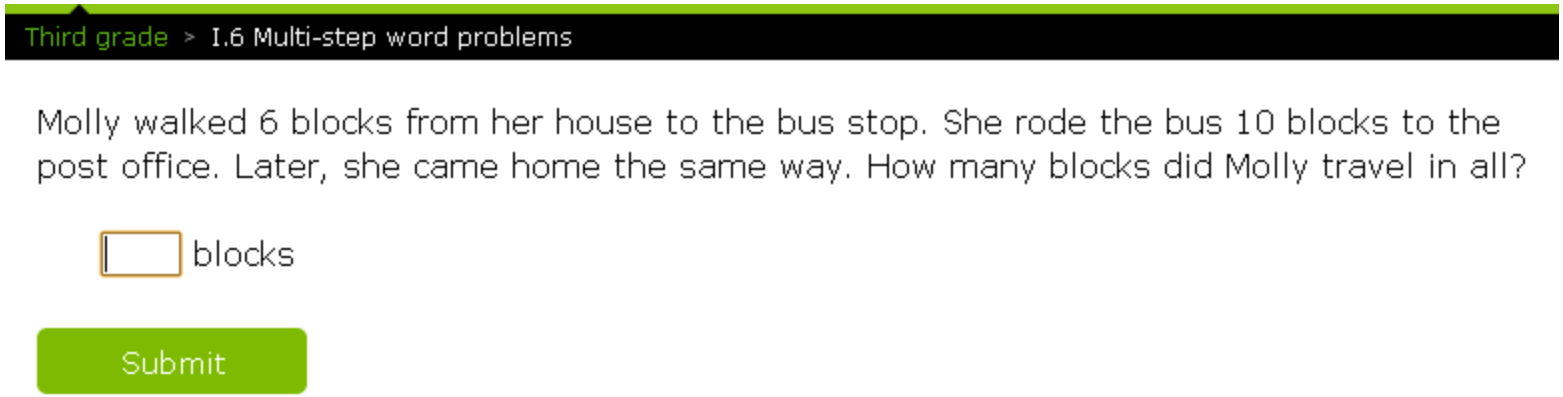
Divide fractions

- **W.1** Divide by fractions - with m
- **W.2** Reciprocals
- **W.3** Divide fractions
- **W.4** Estimate quotients when di mixed numbers
- **W.5** Divide fractions and mixed numbers
- **W.6** Divide fractions and mixed numbers: word problems
- **W.7** Simplify expressions involvir fractions
- **W.8** Recipes with fractions and numbers

Mixed operations

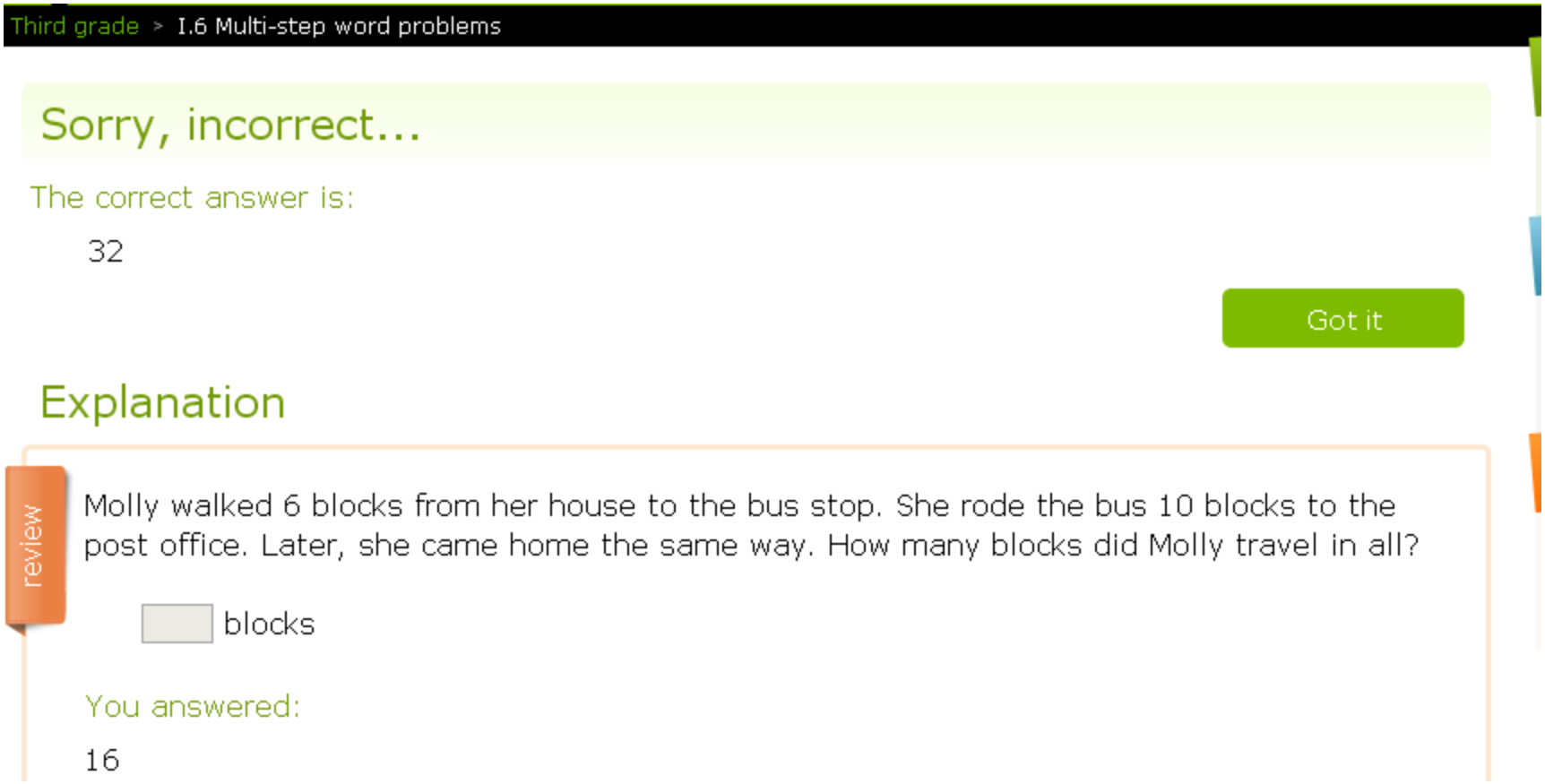
The Help Group

IXL – Third Grade Sample



The Help Group

IXL – Third Grade Sample



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IXL – Third Grade Sample

solve

Step 1: Find the number of blocks traveled on the way to the post office.

6 + 10 = 16

Step 2: Find the total number of blocks traveled.

16 + 16 = 32

Molly traveled 32 blocks.

Got it

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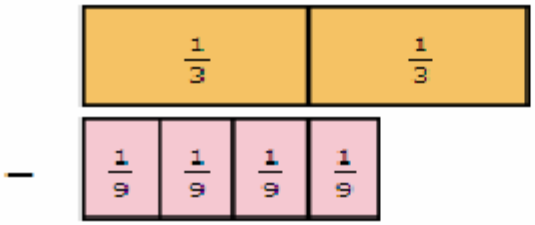
IXL – 5th Grade Sample

Fifth grade › M.5 Subtract fractions with unlike denominators

Subtract:

$\frac{2}{3} - \frac{4}{9} = ?$

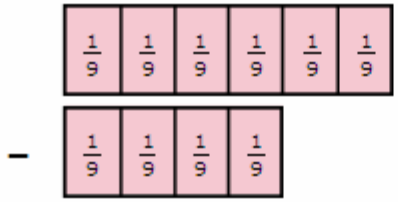


The Help Group

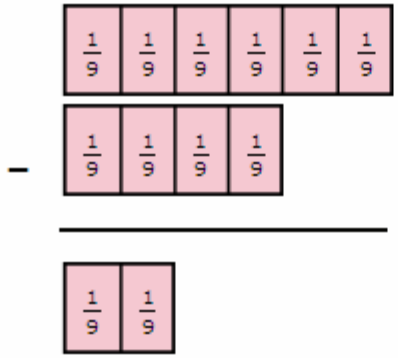
IXL – 5th Grade Sample

Rename the fractions using a common denominator.

You can break each $\frac{1}{3}$ piece into three $\frac{1}{9}$ pieces.



Now subtract:

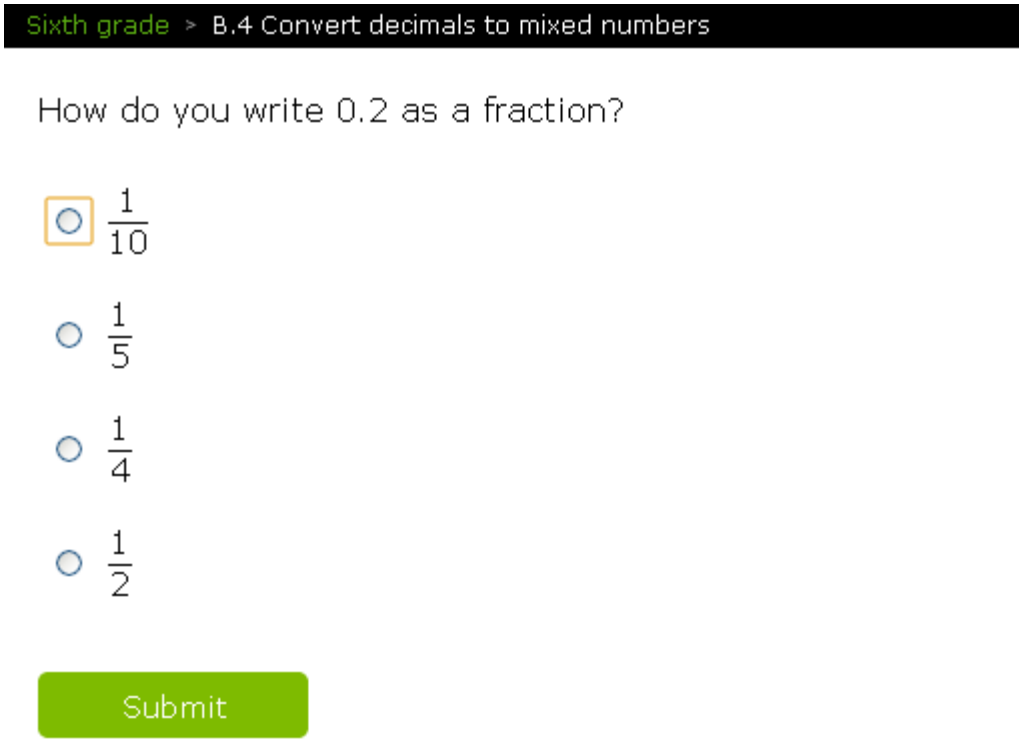


$\frac{2}{3} - \frac{4}{9} = \frac{2}{9}$

Got it ✓

The Help Group

IXL – 6th Grade Sample



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IXL – 6th Grade Sample

Explanation

review

How do you write 0.2 as a fraction?

- $\frac{1}{10}$
- $\frac{1}{5}$
- $\frac{1}{4}$
- $\frac{1}{2}$

You answered:

$\frac{1}{4}$

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IXL – 6th Grade Sample

solve

Write the decimal as a fraction with 10 as the denominator. Reduce the fraction to simplest form.

$$0.2 = \frac{2}{10}$$

$$= \frac{2 \div 2}{10 \div 2}$$

$$= \frac{1}{5}$$

Got it

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MobyMax

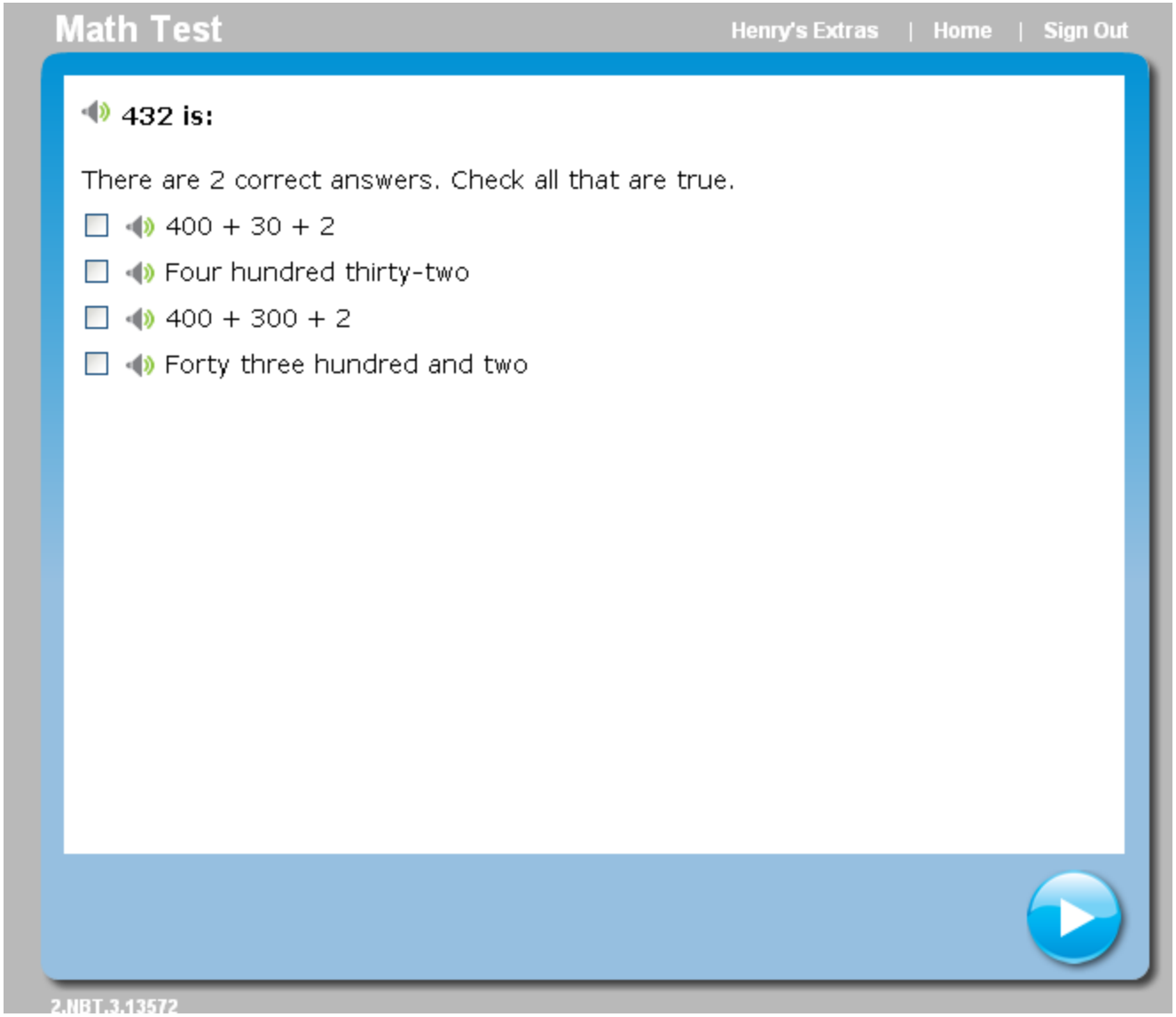
The Help Group

MobyMax

- Has placement test
- Charts progress
- Generates goals
- Generates worksheets
- Facts Master
- Can earn badges
- Reads the problem to you

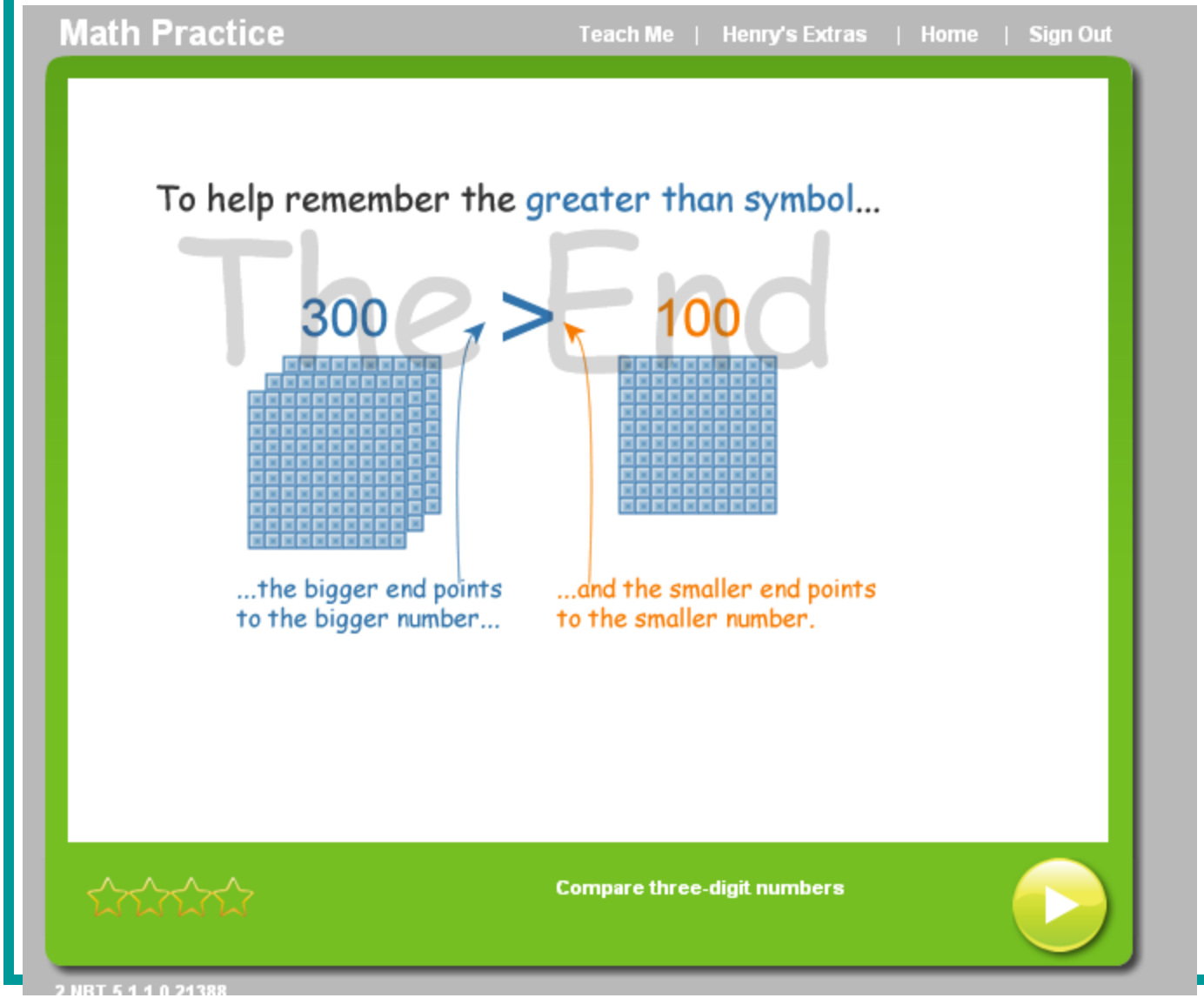
The Help Group

Moby Max



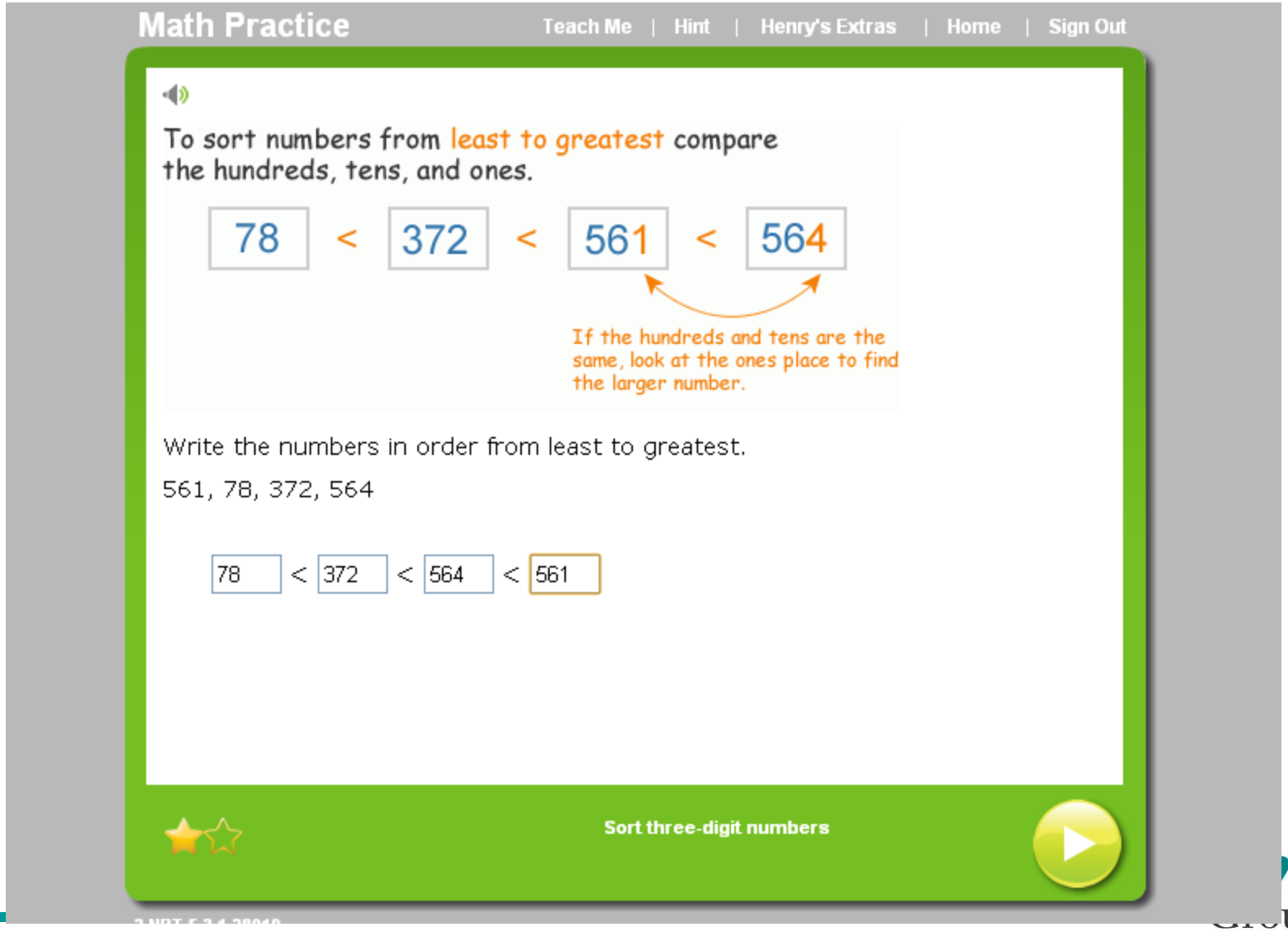
The Help Group

Moby Max

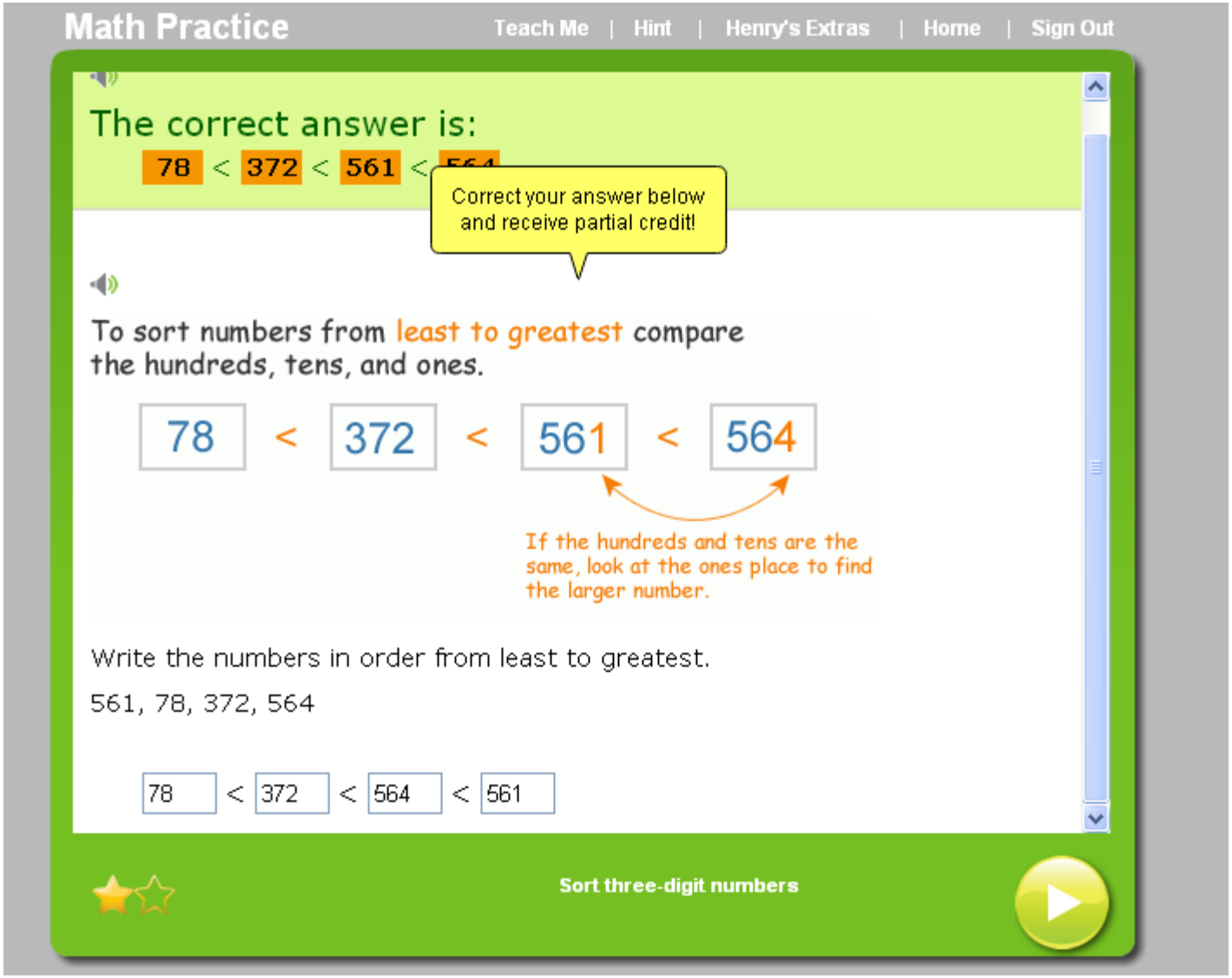


The Help Group

Moby Max

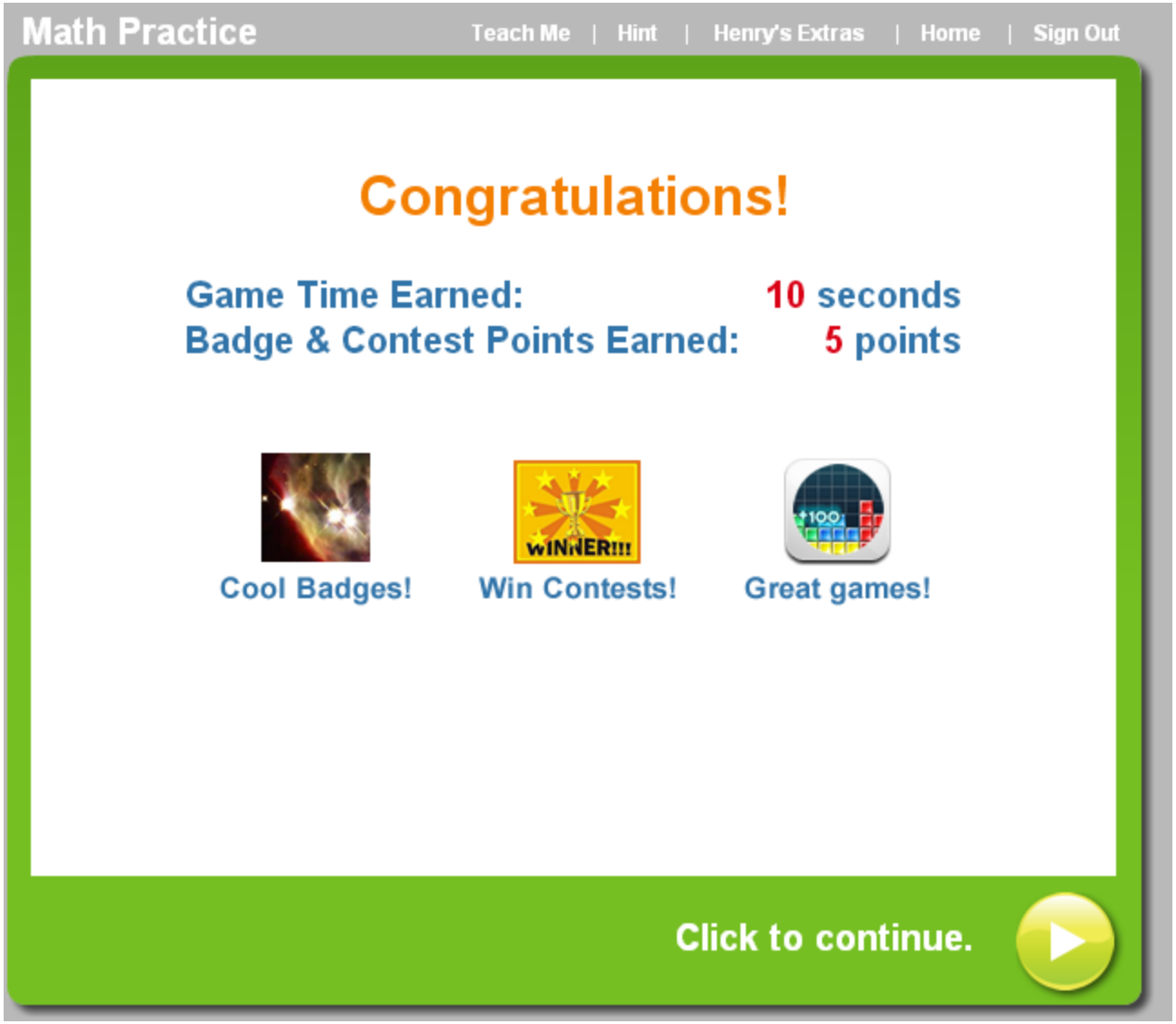

Math Practice
Teach Me | Hint | Henry's Extras | Home | Sign Out
To sort numbers from least to greatest compare the hundreds, tens, and ones.
78 < 372 < 561 < 564
If the hundreds and tens are the same, look at the ones place to find the larger number.
Write the numbers in order from least to greatest.
561, 78, 372, 564
78 < 372 < 564 < 561
Sort three-digit numbers

MobyMax



The Help Group

Moby Max



The Help Group

MobyMax Reports

Progress Monitoring

Students | Class

Student	Ending Grade Level	Beginning Grade Level	Increase <Decrease>	Standards Passed	Learning Velocity	Print
alan	3.1	2.5	0.6	19	3.6	☐
Andrew	4.3	4.0	0.3	7	1.0	☐
andy	4.1	3.9	0.2	6	3.6	☐
asher	2.6	2.2	0.4	14	3.9	☐
elliot	3.9	3.7	0.2	7	2.5	☐
Emma	3.0	2.4	0.6	14	1.0	☐
izzy l	3.3	3.0	0.3	12	0.0	☐
jeremy	4.5	4.2	0.3	7	3.1	☐
lana	4.2	3.3	0.9	27	3.5	☐
TJ H	3.8	3.0	0.8	20	2.8	☐
Will	4.3	3.8	0.5	12	3.9	☐

The Help Group

MobyMax Reports

Adding and Subtracting with Unknowns

Practice Sets	Final Score	Prior Scores
Add with an unknown fill-in-the-box	100%	
Add with an unknown fill-in-the-box word problems	85%	
Add with an unknown as a variable	100%	
Add with an unknown as a variable word problems	70%	
Add with an unknown in an equation	100%	
Add with an unknown in an equation word problems	In Progress	65%
Subtract with an unknown fill-in-the-box		

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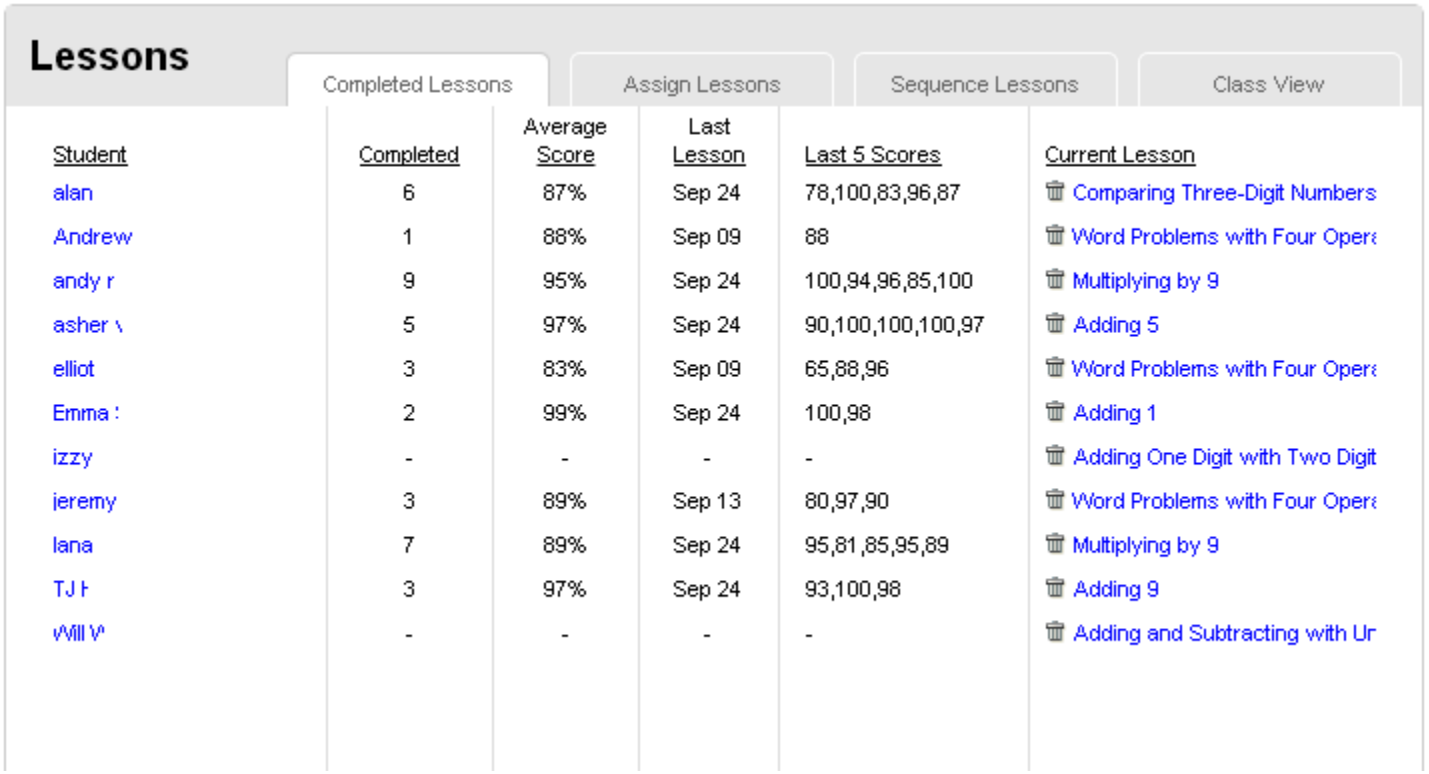
MobyMax Reports



Lessons

Completed Lessons | Assign Lessons | Sequence Lessons | Class View

Student	Completed	Average Score	Last Lesson	Last 5 Scores	Current Lesson
alan	6	87%	Sep 24	78,100,83,96,87	Comparing Three-Digit Numbers
Andrew	1	88%	Sep 09	88	Word Problems with Four Opera
andy r	9	95%	Sep 24	100,94,96,85,100	Multiplying by 9
asher \	5	97%	Sep 24	90,100,100,100,97	Adding 5
elliot	3	83%	Sep 09	65,88,96	Word Problems with Four Opera
Emma :	2	99%	Sep 24	100,98	Adding 1
izzy	-	-	-	-	Adding One Digit with Two Digit
jeremy	3	89%	Sep 13	80,97,90	Word Problems with Four Opera
lana	7	89%	Sep 24	95,81,85,95,89	Multiplying by 9
TJ h	3	97%	Sep 24	93,100,98	Adding 9
Will V	-	-	-	-	Adding and Subtracting with Ur

The Help Group

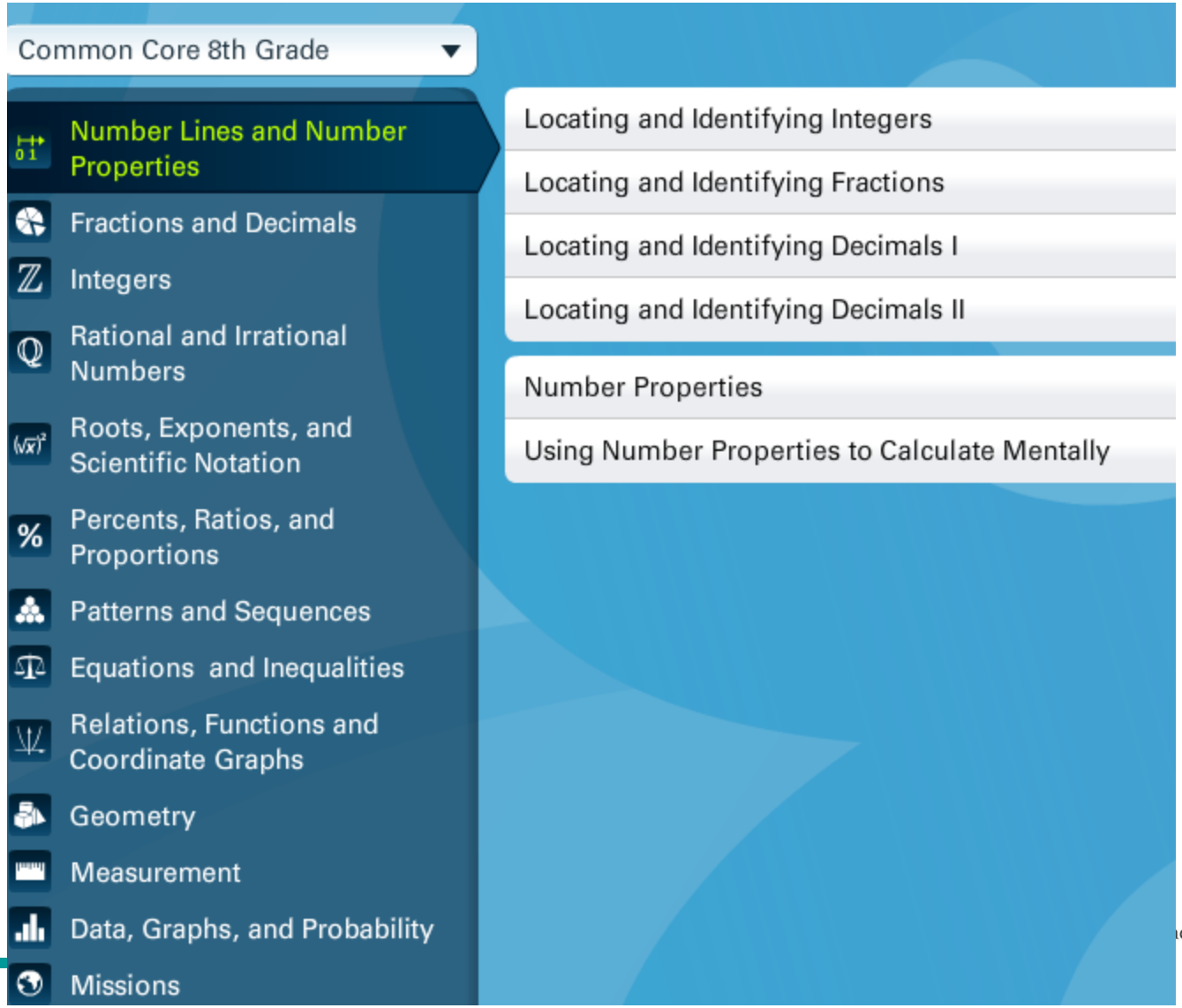
Buzz Math

Create your Classrooms

	Classroom	Premium Classroom
3,000+ problems aligned with the CCSS	✓	✓
Variety of answer inputs	✓	✓
Automated **corrections**, infinite retries	✓	✓
Administration tools to manage your school	✓	✓

The Group

BuzzMath Content



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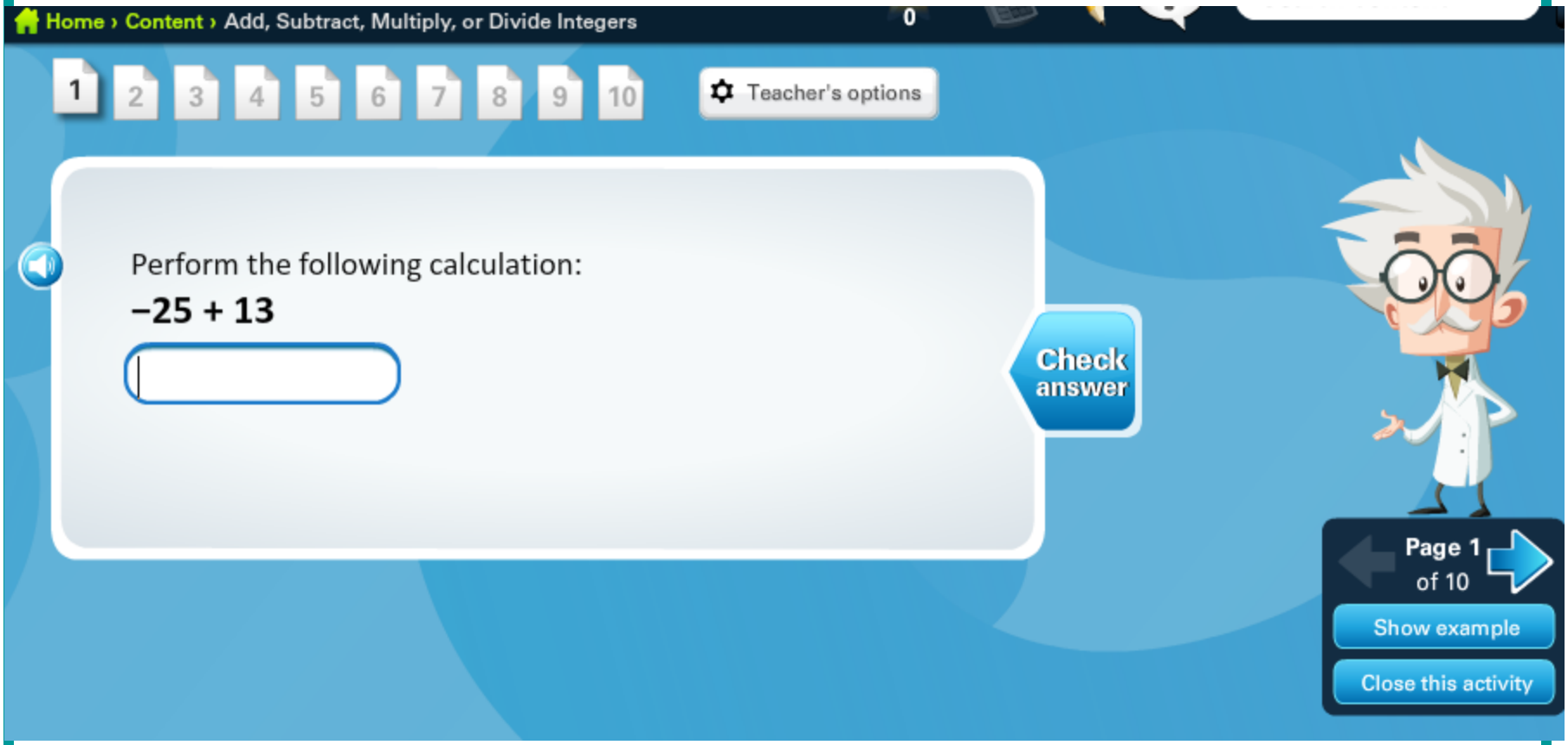
BuzzMath Sample



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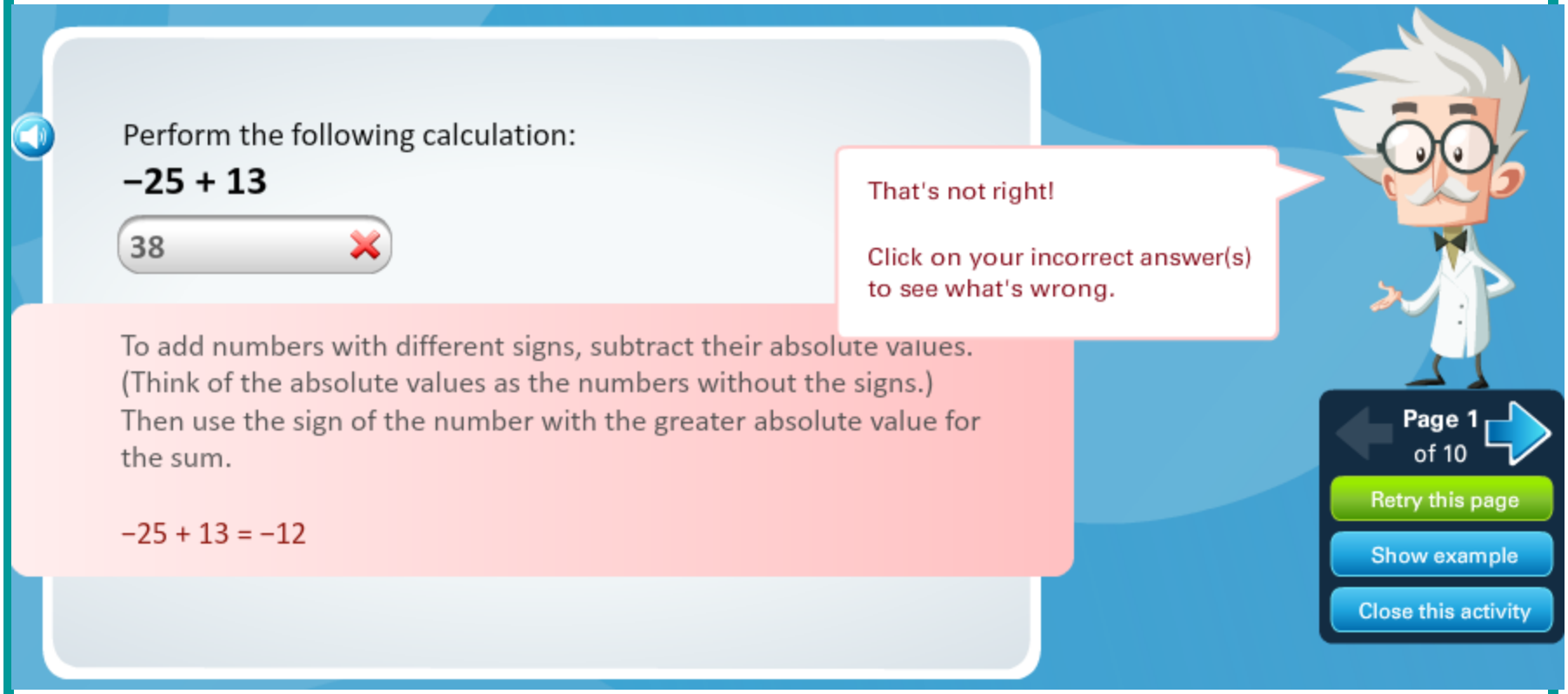
BuzzMath Sample



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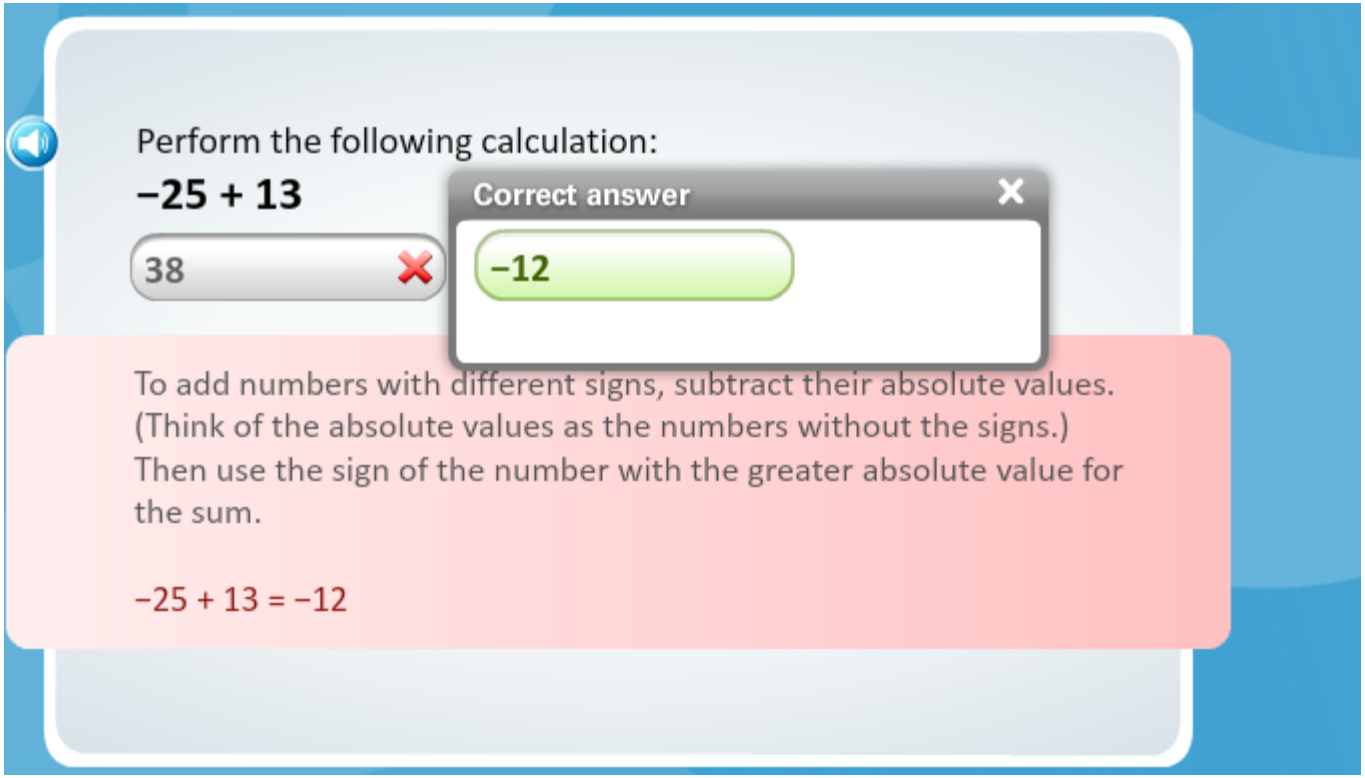
BuzzMath Sample



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Sample Word Problem

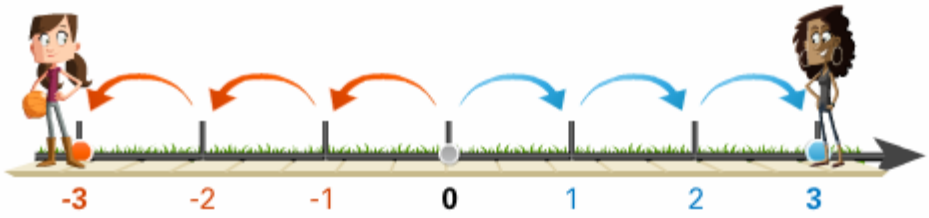
Home › Content › Absolute Value

2 3 4 5 6 7 8 9 10

Teacher's options

This page has been completed successfully

Chloe and Natalie start at zero on a number line and walk 3 steps in opposite directions. We can say the value of their new location has an absolute value of 3, because they are each a distance of 3 units from zero, the starting point.

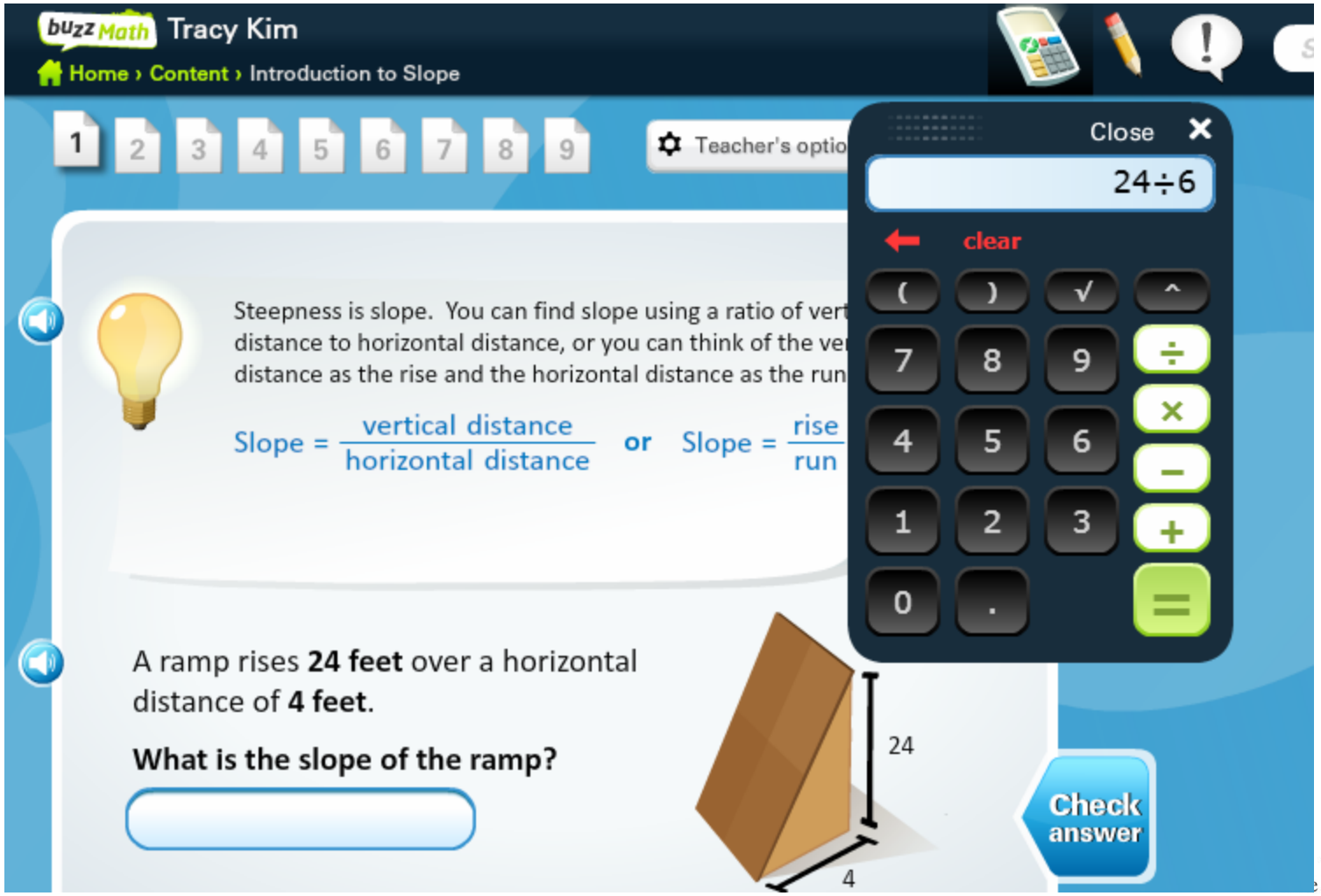


What would be the absolute value of each girl's location if they had **walked 10 steps from zero**?

Check answer

The Help Group

Buzz Math Example



Help Group

Examples

Example of page 1

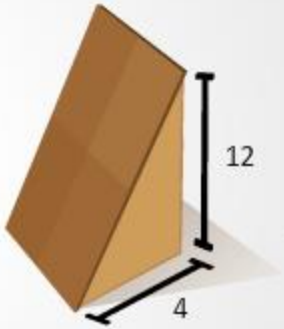
Steepness is slope. You can find slope using a ratio of vertical distance to horizontal distance, or you can think of the vertical distance as the rise and the horizontal distance as the run.

$$\text{Slope} = \frac{\text{vertical distance}}{\text{horizontal distance}} \quad \textbf{or} \quad \text{Slope} = \frac{\text{rise}}{\text{run}}$$

A ramp rises **12 feet** over a horizontal distance of **4 feet**.

What is the slope of the ramp?

3



Slope is a ratio of vertical distance to horizontal distance, or rise to run.

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BuzzMath Example

Steepness is slope. You can find slope using a ratio of vertical distance to horizontal distance, or you can think of the vertical distance as the rise and the horizontal distance as the run.

$$\text{Slope} = \frac{\text{vertical distance}}{\text{horizontal distance}} \quad \textbf{or} \quad \text{Slope} = \frac{\text{rise}}{\text{run}}$$

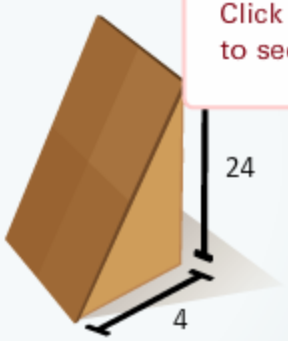
That's not right!

Click on your incorrect answer(s) to see what's wrong.

A ramp rises **24 feet** over a horizontal distance of **4 feet**.

What is the slope of the ramp?

8



Page 1 of 9

Retry this page

Show example

Close this activity

Slope is a ratio of vertical distance to horizontal distance, or rise to run.

$$\text{Slope} = \frac{\text{vertical distance}}{\text{horizontal distance}} \text{ or } \frac{\text{rise}}{\text{run}}$$

The vertical distance (rise) is 24 feet. The horizontal distance (run) is 4 feet.

$$\textbf{Slope} = \frac{\textbf{24 ft}}{\textbf{4 ft}} = \textbf{6.}$$

Lesson Details about Student Progress

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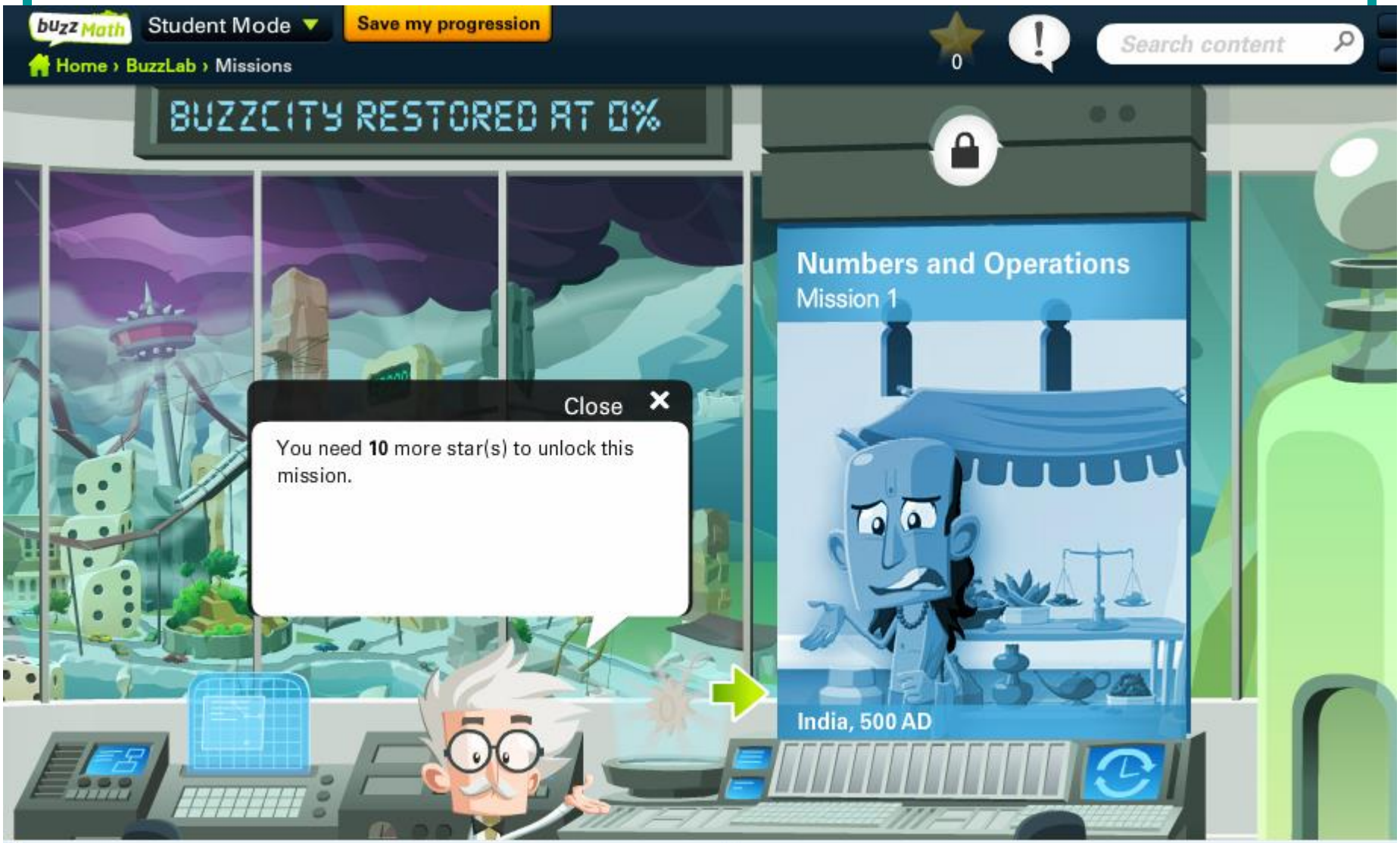
BuzzMath Missions



Missions

The Secret Rule

Algebra (Mission 2)

After your teleportation, you find yourself on a farm where rabbits graze under a radiant sky. The farmer sees you. This is Leonardo himself. He is retired, but in dire straits.

*Ah, my friend! You arrived just in time. We have just had a terrible disaster. All of my research has been wiped out. All of my notes and documents just blew away. Even my rabbit's hutch! If I cannot find the things that I've lost, the world of mathematics that I care so much about will have lost one of its greatest treasures. This is a treasure that people used to talk a lot about in the olden days--the **Golden Number.***

By helping me solve some problems as I go about my daily routine, I will regain the lost knowledge.

Buzz Math

- Teacher can review accuracy.
- Time spent
- Problems skipped
- Incorrect Answers

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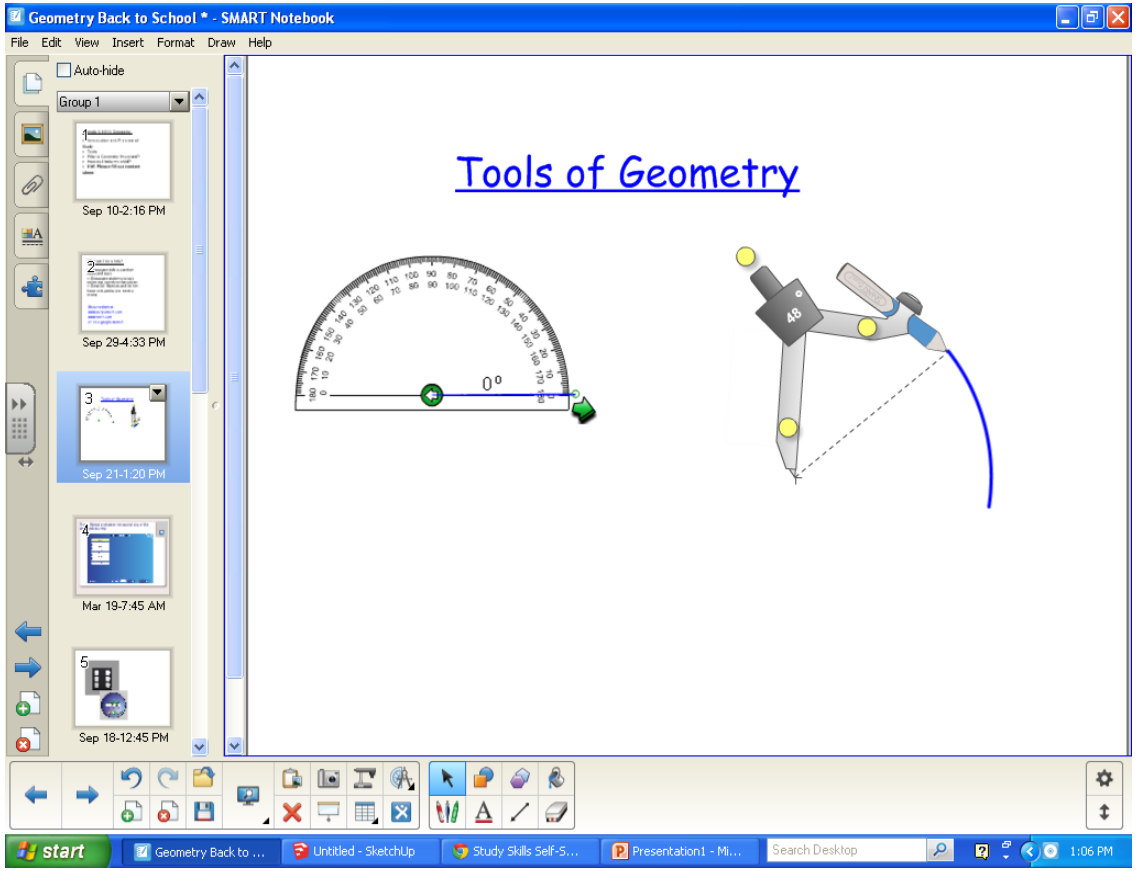
BuzzMath Class Content for Teachers

Topic	Activity name	Avg. % Completed	Avg. Accuracy	Participation	Avg. Time Spent
	Introduction to Slope	91%	45%	25	19 min
	Solving One-Step and Two-Step Equations with Rationals	96%	82%	24	9 min
	Solving One-Step and Two-Step Equations	98%	71%	24	25 min
	Solving One-Step and Two-Step Equations with Rationals: Variables on Both Sides	82%	64%	22	44 min
	Solving Challenging Equations I	82%	77%	21	30 min
	Solving More Equations with Rationals:Variables on Both Sides	85%	71%	19	38 min
	Solving Challenging Equations II	71%	67%	9	32 min
	Solving Challenging Equations III	70%	80%	4	25 min
%	Ratios	13%	16%	3	13 min
	Solving One-Step and Two-step Equations with Decimals	53%	55%	3	41 min

Mr. Ramirez's Geometry Class Smart Board



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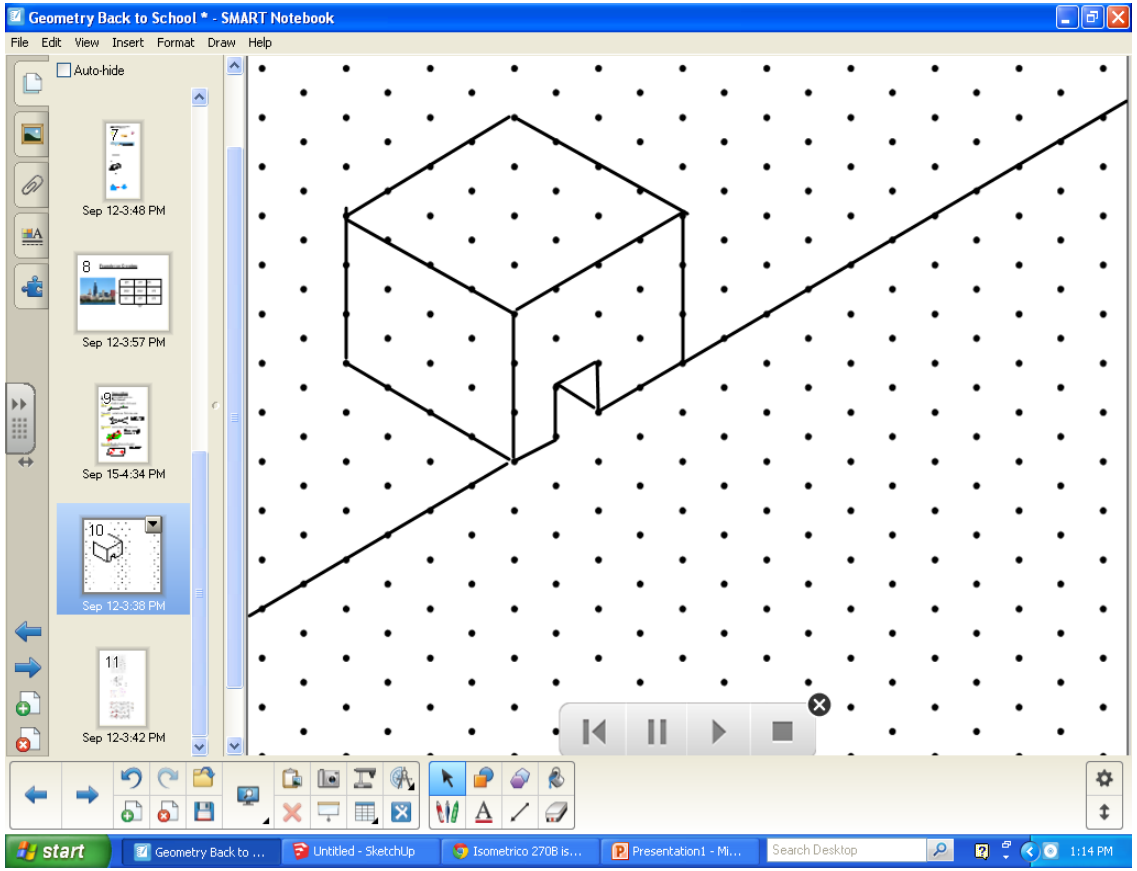
Mr. Ramirez's Geometry Class Smart Board



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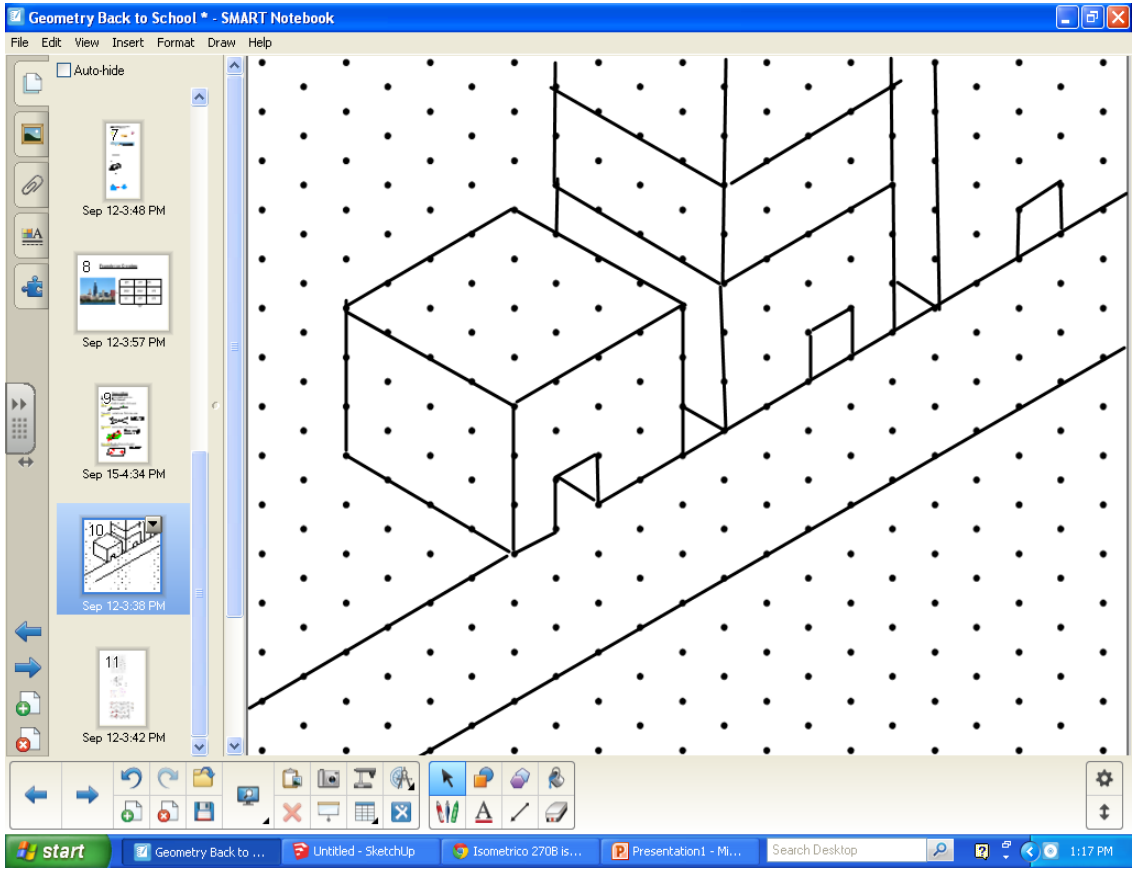
Mr. Ramirez's Geometry Class Smart Board



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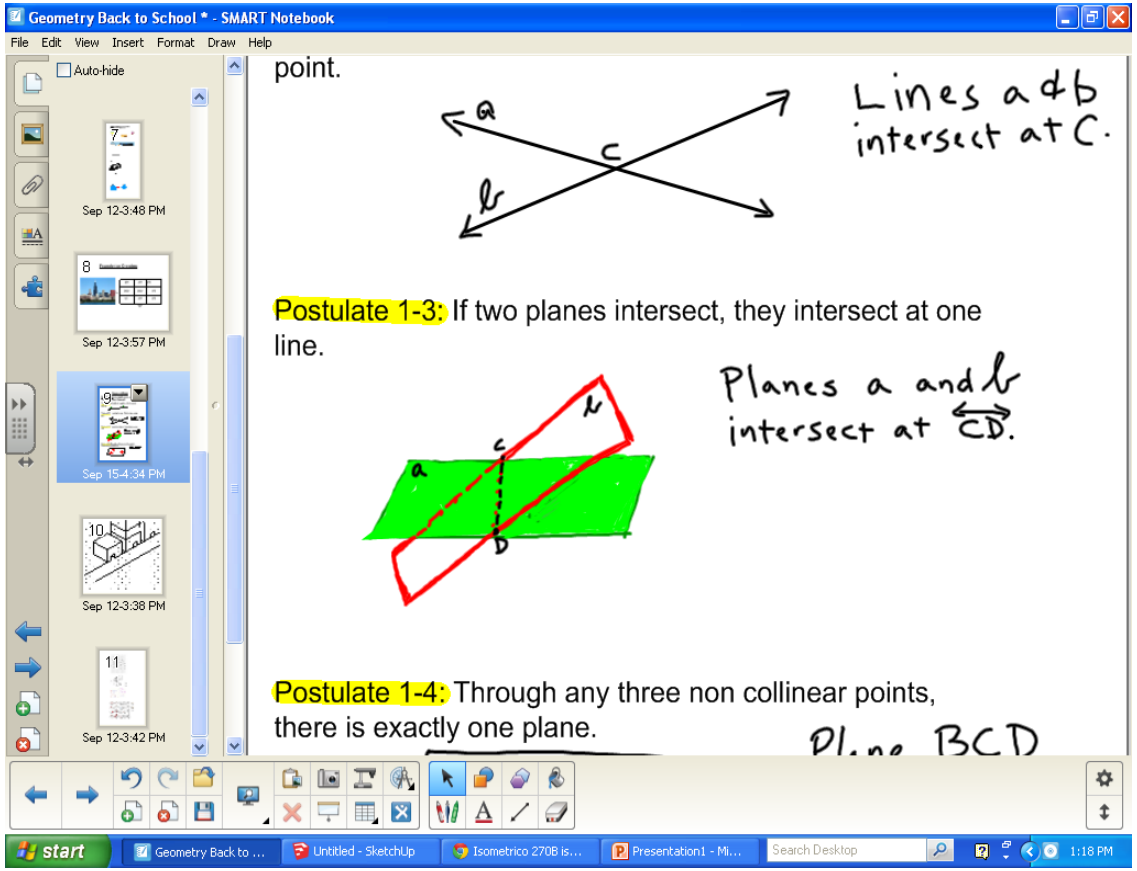
Mr. Ramirez's Geometry Class



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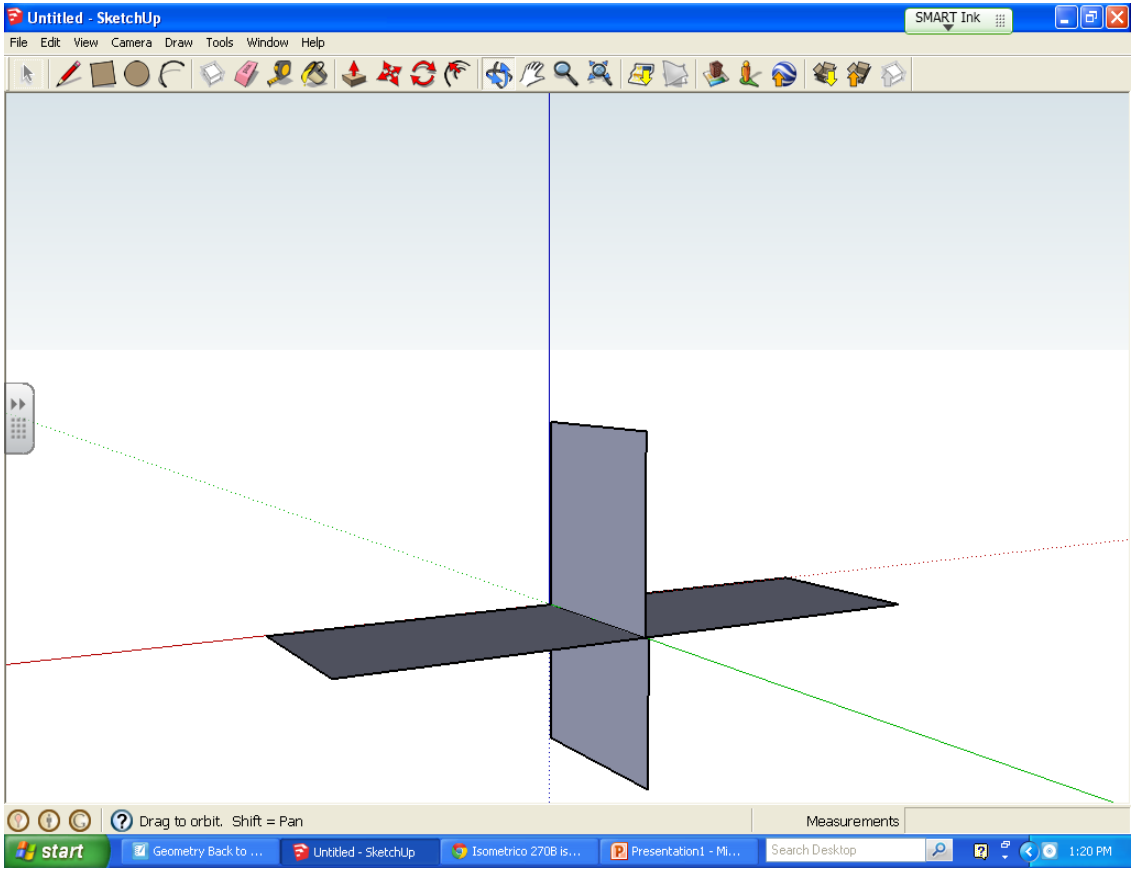
Google Sketch Up



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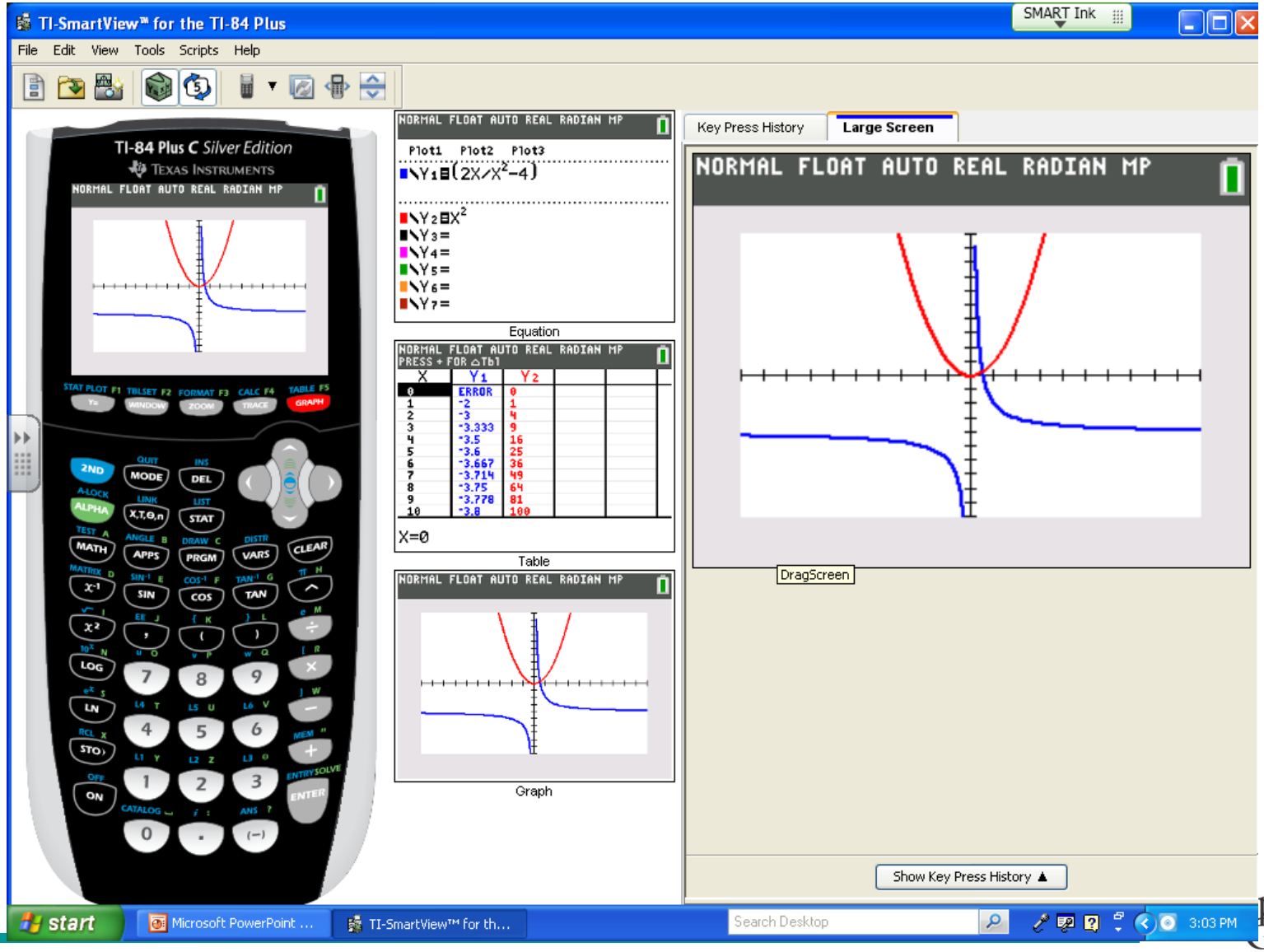
Software for Graphing Calculator



How much scaffolding is necessary?

- BOTTOM LINE:
  - As much as the students require to learn and be successful!

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Teachers are the Key!

- Teacher provides immediate and specific feedback to students, including corrective feedback and ample amounts of positive reinforcement.
- Teacher provides additional modeling as needed when students demonstrate non-understanding.
- Teacher increases number of and difficulty level of questions for successive examples of target math concept/skill requiring students to demonstrate increased levels of understanding.
- Gradual release, and how to intervene if a student requires assistance.

Websites

- www.ixl.com
- www.buzzmath.com
- www.mobymax.com
- www.sketchup.com
- www.smarttech.com/smartboard
- TI – Smart View for the TI-84 Plus
  www.ti.com

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