Reaching and Teaching ALL Kids
at Linfield, 2017-18

Chris Shore

The Math Projects Journal
Temecula Valley USD

shore@mathprojects.com
@MathProjects
#ThoseKids

What is Your Million-Dollar Talent?

The Needed Mindset for Reaching & Teaching ALL Kids

Fixed Mindset

Growth Mindset ….

They are that smart
&
We are that good!

… of the teachers!

When You Reach ‘em …

Geometry: from 1st Progress to Semester Report Card (over 3 years)

F’s: 12-15% » 0-9%

District Final improved over 3 years from 74% to 85% avg.

Algebra 1 At-Risk: from 8th Grade Math to Algebra thru Geometry

F’s: 100% » 3%

Exceeded the district average on Final Exam.

Algebra 2 At-Risk + Positive Peers

F’s: 40% » 3%

Met the district average on Final Exam.

Single Digit Failure Rates are Possible!

MPJ

How Do We Reach Them?

We need…

Brain Surgery (a Paradigm Shift)

They need…

No-Options Engagement

Boot Camp Numeracy

HOTS

The Paradigm Shift

"Students are solely responsible."

Coach's or Parent's Mindset

Emotional Investment

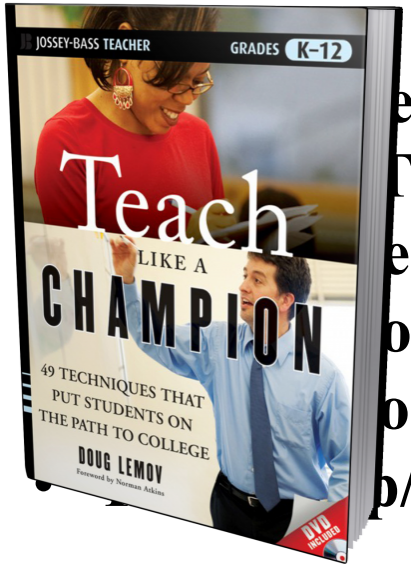
No-Options Engagement

The most loving thing you can do for your students is …

Demand Their Best Effort

No-Options

(Make failure more painful than success)



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Engage

(No Quiet Deals)

- Int ssons
- W
- Ca
- W
- Ex
- Pa

No-Options Engagement

❖**No-Options Strategies**

- Ticket out the door
- Non-stop harassment
- HW Detention
- Phone Calls/Email
- Supplemental Assignments

❖**Engagement Strategies**

- I do/we do/you do
- Chunking
- Stand & Point
- Use Student Response
- Wait for 100% involvement
- Thumb/Finger Votes
- Sticky Note Terror
- Participation Paraphernalia

(Beads, Raffle Tickets, Initials, Deck of Cards, Seating Chart Dots, Equity Sticks)

Problem Identified

Dan Meyer
@ddmeyer

"Kids don't flunk current content; they flunk past content." @MathProjects makes his case for numeracy and #clotheslinemath. #CMCMath

Students don't flunk current content; they flunk prior content!

Problem Expected

Standards are written as if all students have mastered 100% of the previous standards. No where in the world does that truly happen.

Boot Camp

Refresh, Refine & Accelerate …

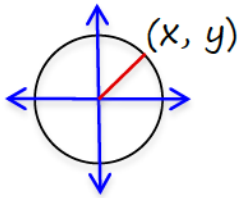
pre-requisite skills ...

before each lesson, week or unit.

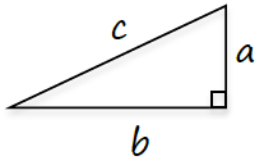
Fundamentals are Key …

… and need to be practiced regularly!

Refresh



$x^2 + y^2 = r^2$



$a^2 + b^2 = c^2$

So Warm-Up with them.

The 4-Digit Problem

$8 + 8 + 8 + 8 = 32$

$8^2/8 + 88 = 96$

1) Arrange four 8's to produce 19.

$88 \div 8 + 8$

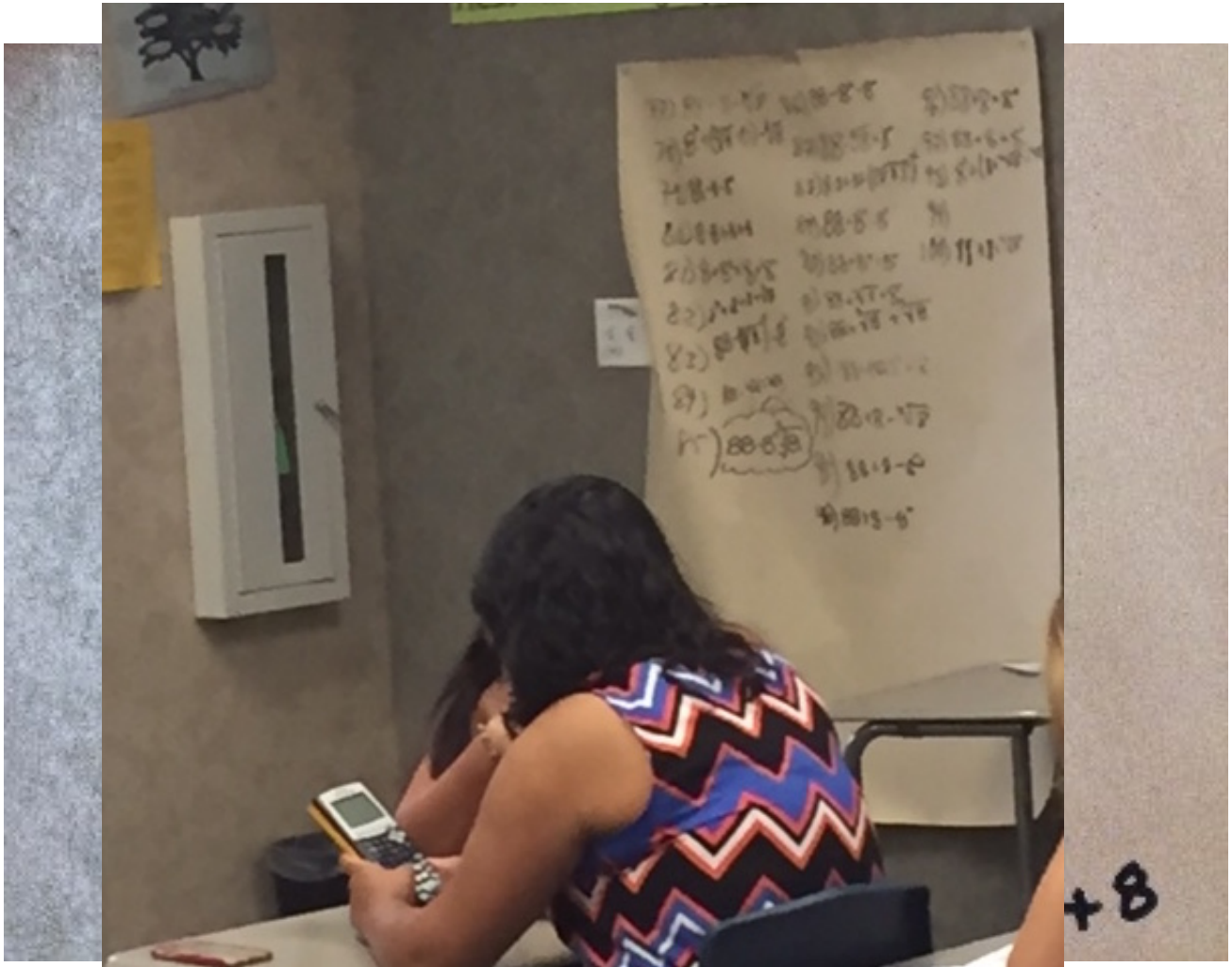
$8 + 8 + \sqrt[3]{8} + 8^0$

2) What is the value of the expression below?

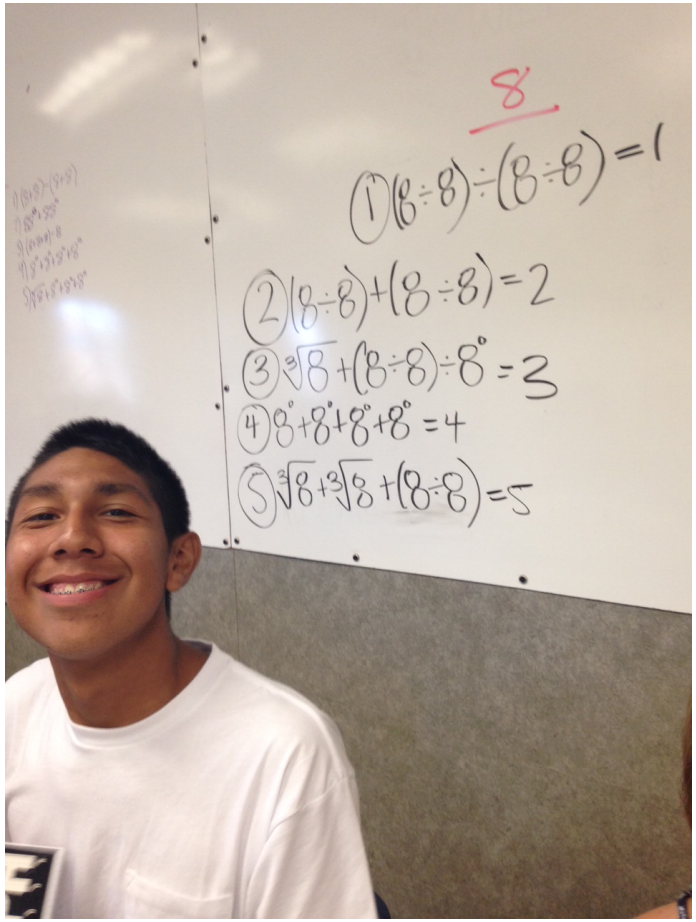
$8 + 6 \div (2 + 1)$

3) Place parenthesis within the expression above to yield 10.

The 4-Digit Problem

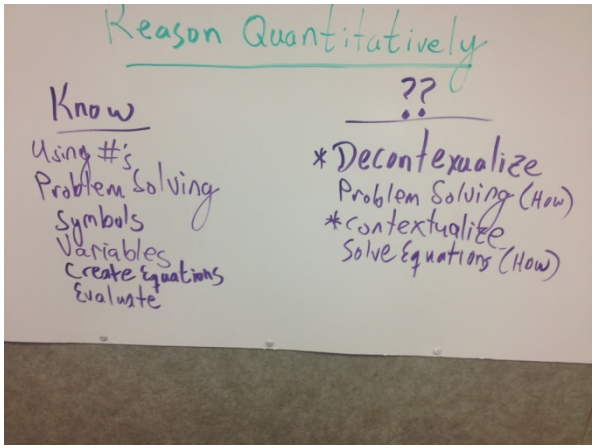


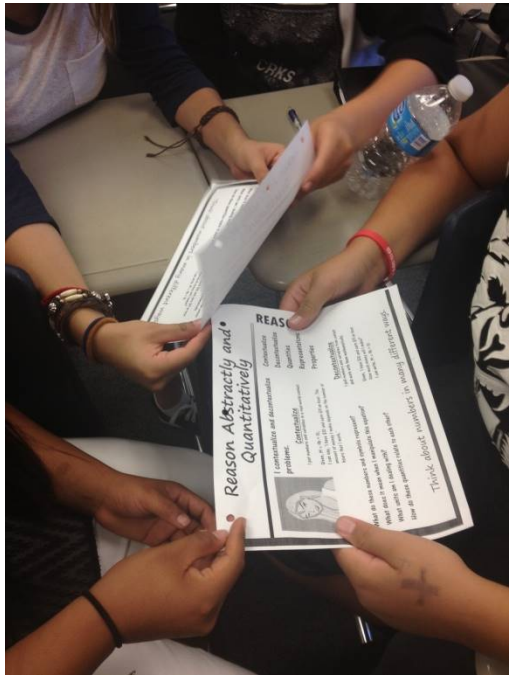
The 4-Digit Problem

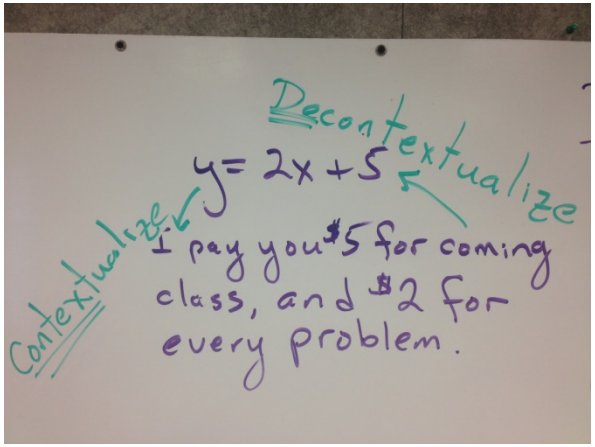


Explicit Instruction through Tasks in Algebra

Target: We will use order of operations and quantitative reasoning to write expressions for a given value.



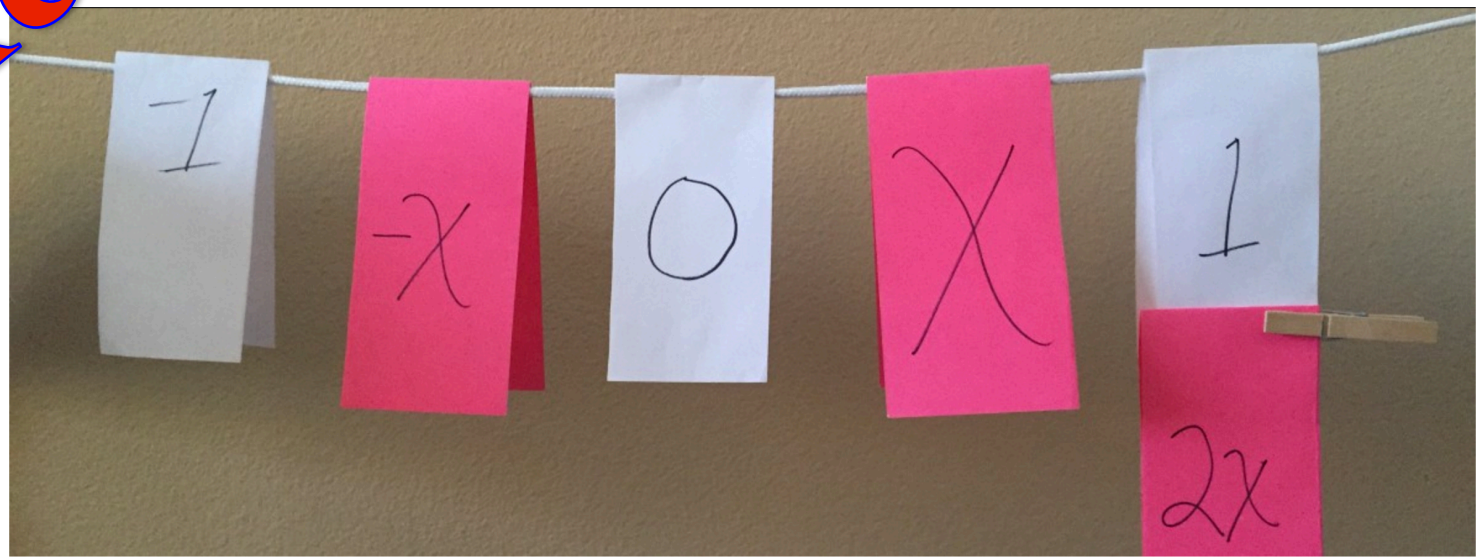




Clothesline Math

The Master Number Sense Maker

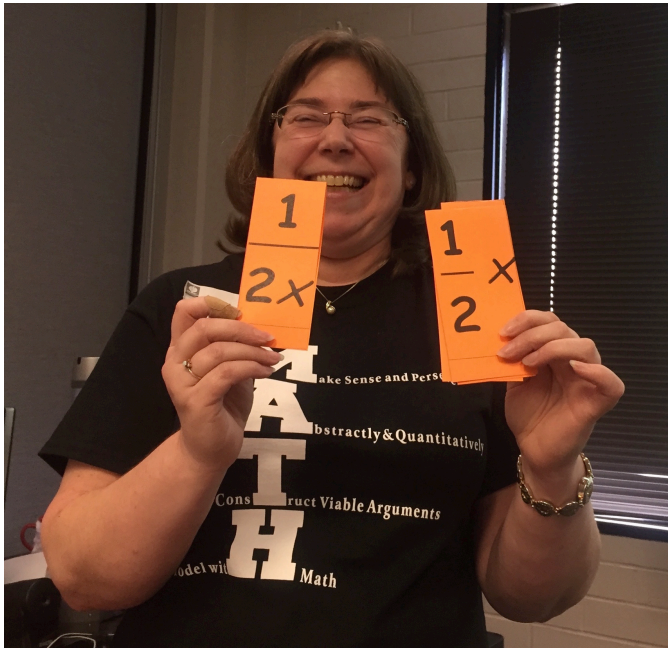
Refine



#clotheslinemath

Clothesline Math

A Brief History



Molly Daley
@mdaley15

I've just been Clotheslined or maybe kicked in the head. @MathProjects #55thNWMC

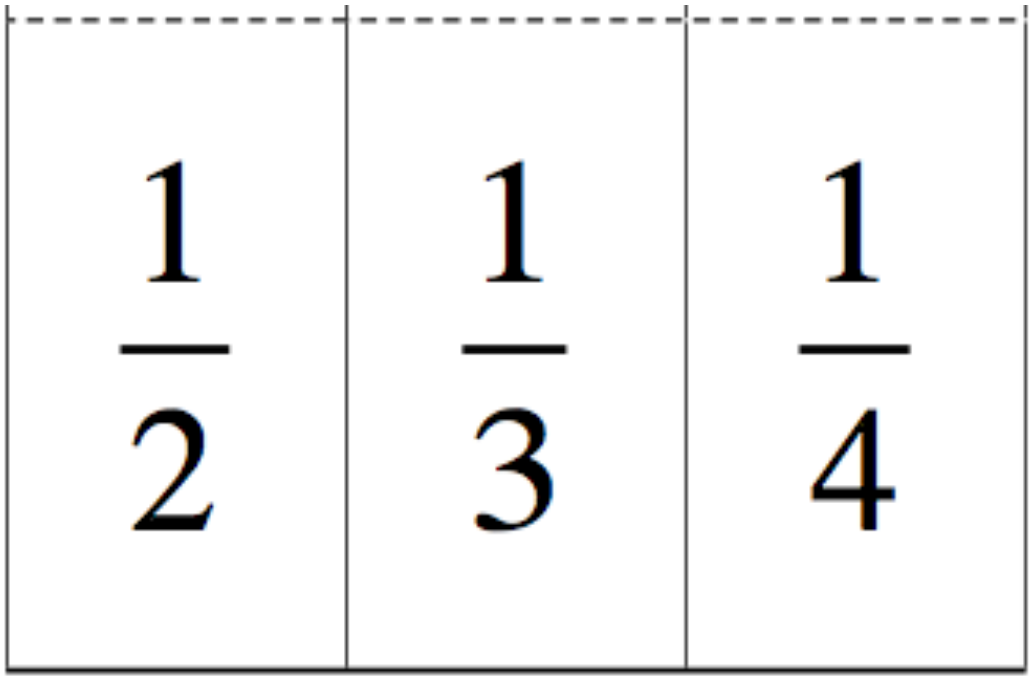
The Need for Number Sense

Build Number Sense…

…intentionally!

Clothesline Math

Warm-Up



Clothesline Math Handout

The Clothesline

Name: _____

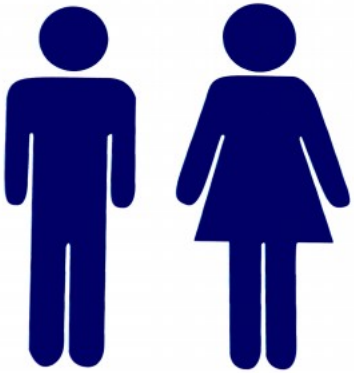
Date: _____

For each set, record the given values, expressions or drawings. After the discussion of their placement on the clothesline, record them on the number line.

1. _____, _____, _____

Discussions, Deductions & Decisions

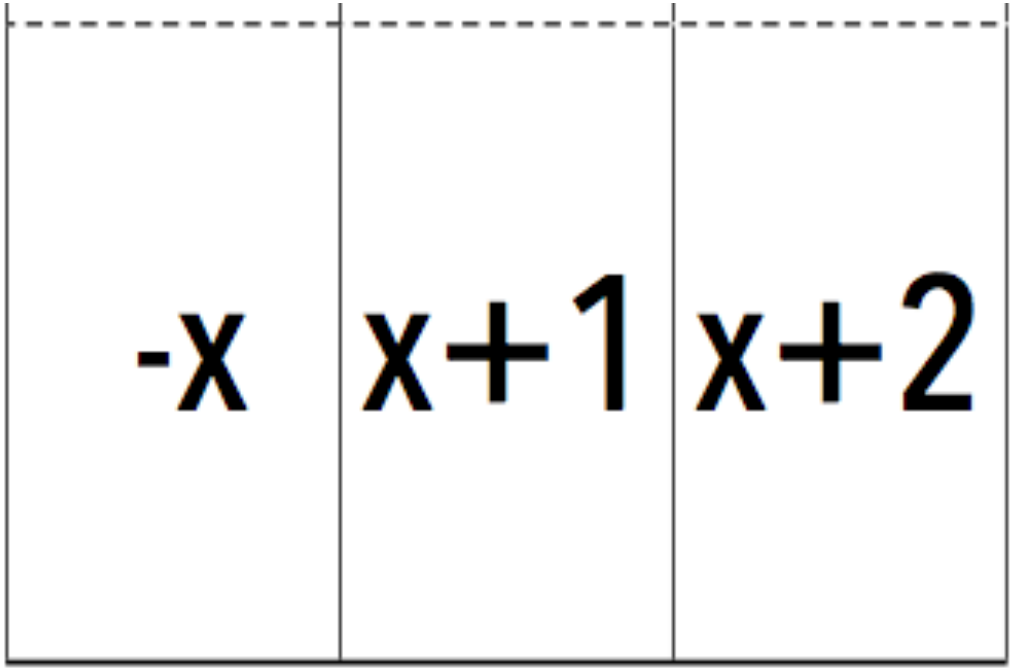
Break



10 minutes, until...

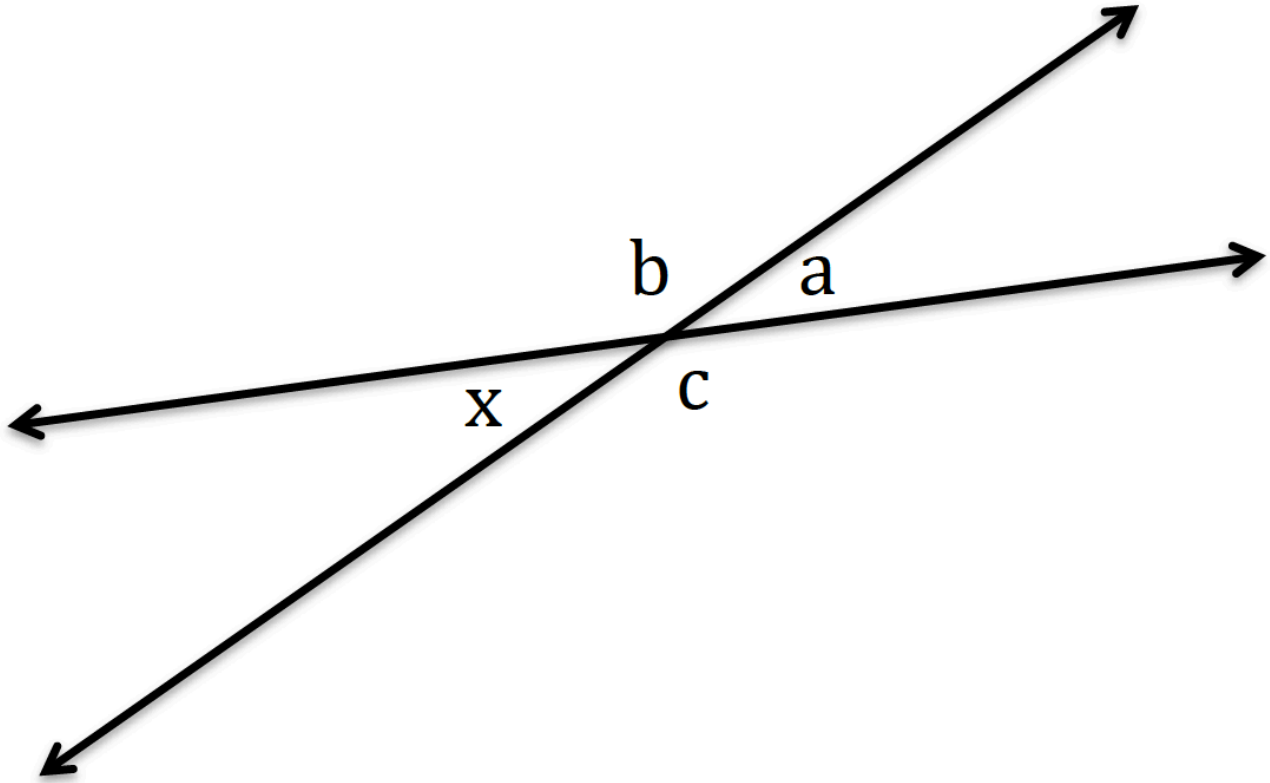
we return to REFINING with the Clothesline

Clothesline Math
Algebra



Clothesline Math

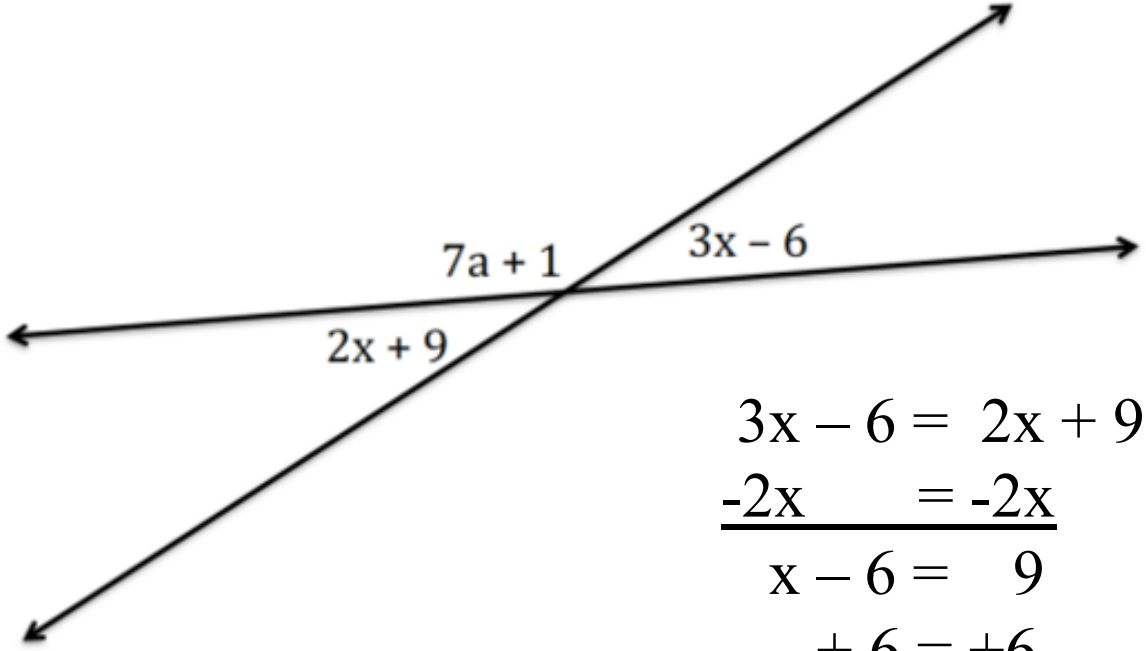
Geometry



Clothesline Math

Vertical Angles with Algebra

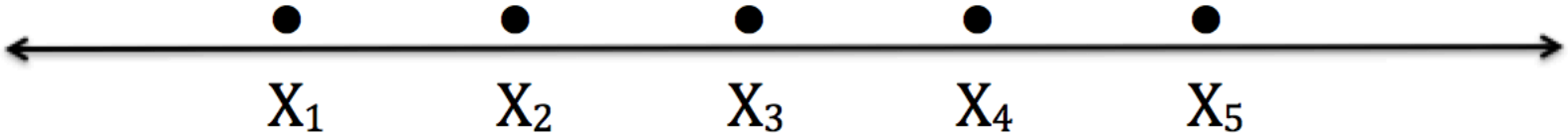
2x + 9, 3x - 6, 2x, 3x, x



$$3x - 6 = 2x + 9$$
$$-2x \quad = -2x$$
$$x - 6 = 9$$
$$+6 = +6$$
$$x = 15$$

Clothesline Math

Statistics



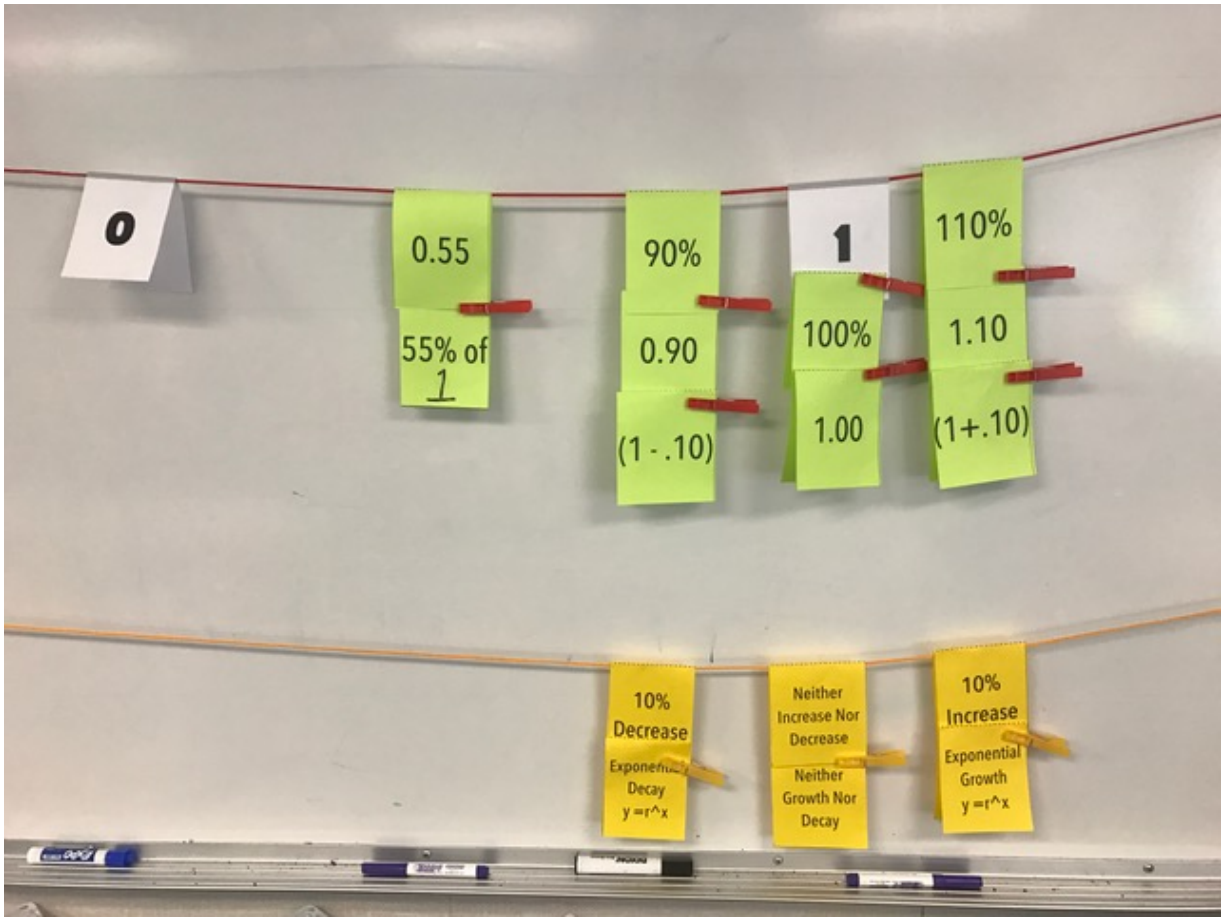
Smaller *Range*

Smaller *Standard Deviation*

Smaller *Average*

Clothesline Math

on warm-ups



Clothesline Math

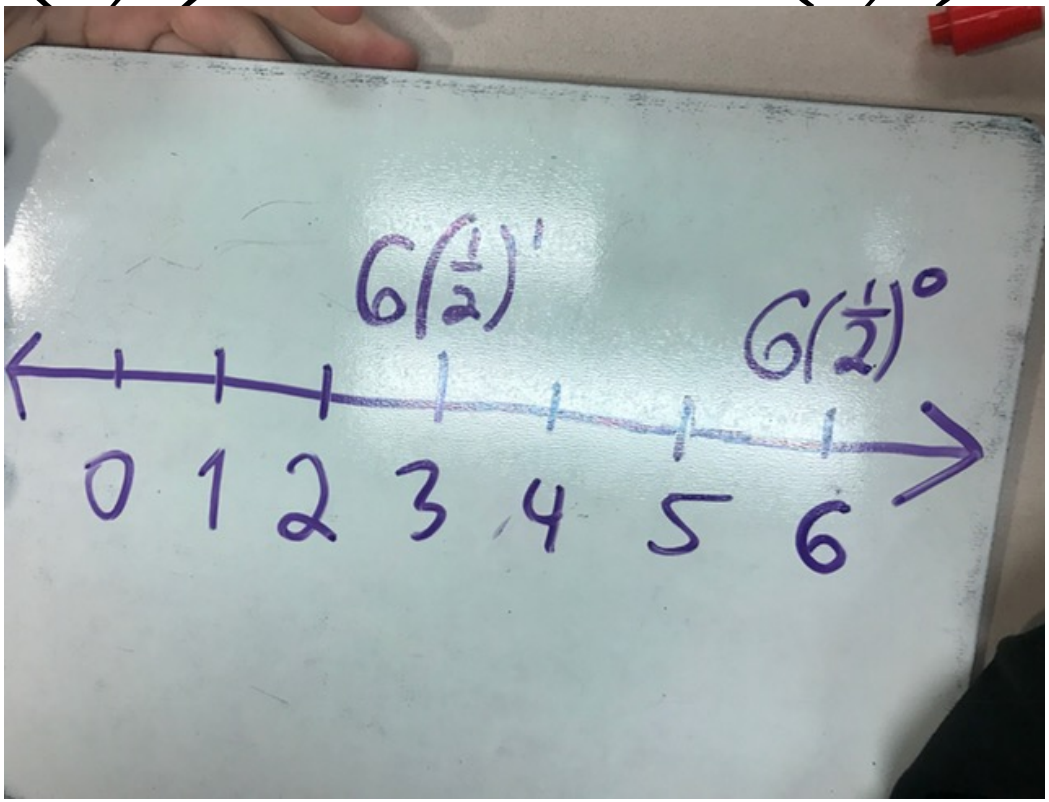
on warm-ups that turn into lessons

$$y = 6\left(\frac{1}{2}\right)^{x}$$

Clothesline Math

on warm-ups that turn into lessons

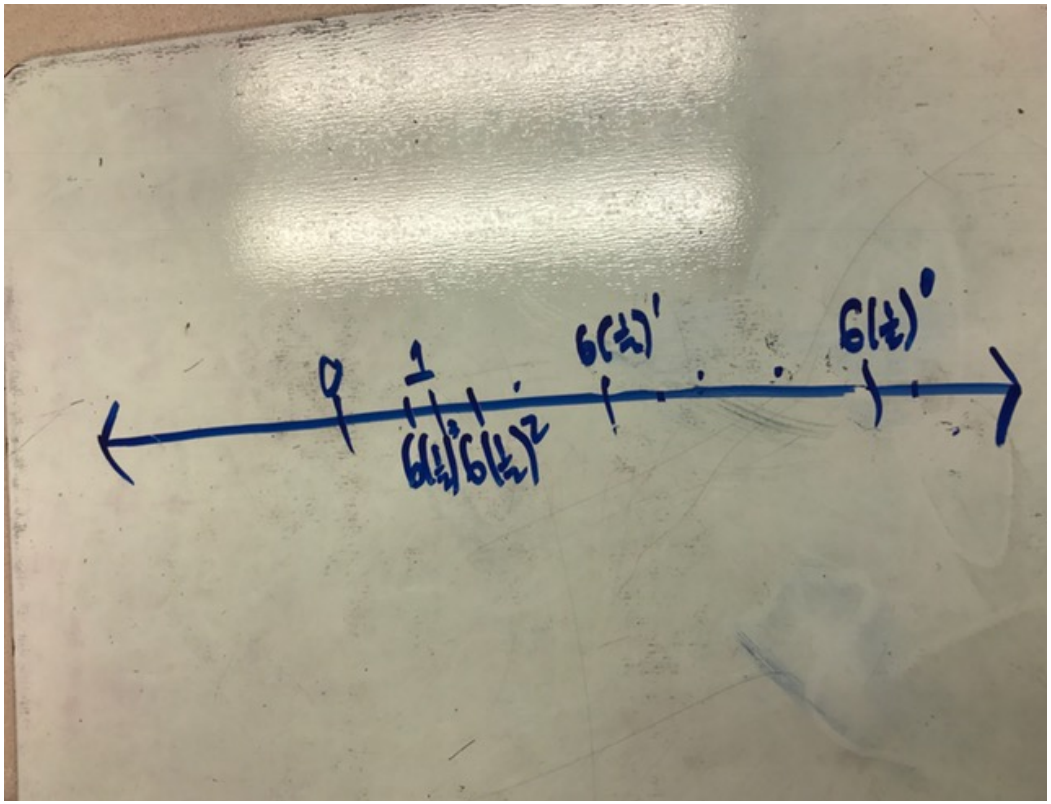
$6\left(\frac{1}{2}\right)^0$ $6\left(\frac{1}{2}\right)^1$



Clothesline Math

on warm-ups that turn into lessons

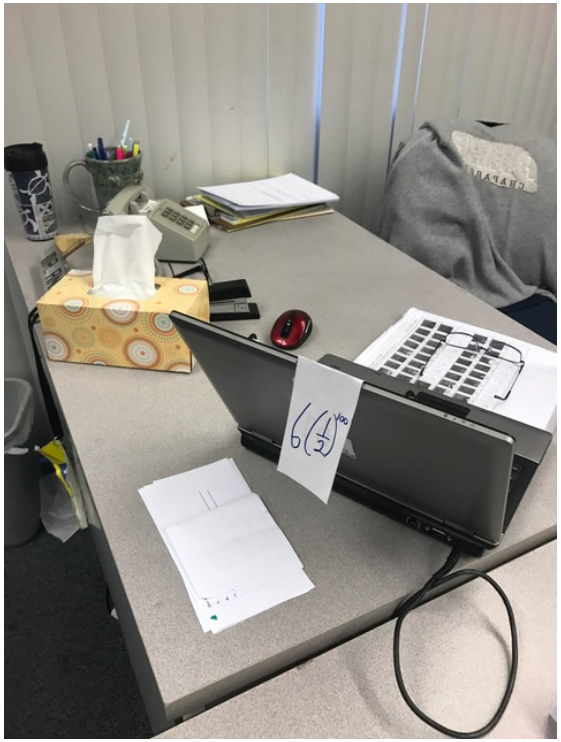
$$6\left(\frac{1}{2}\right)^2 \qquad 6\left(\frac{1}{2}\right)^3$$

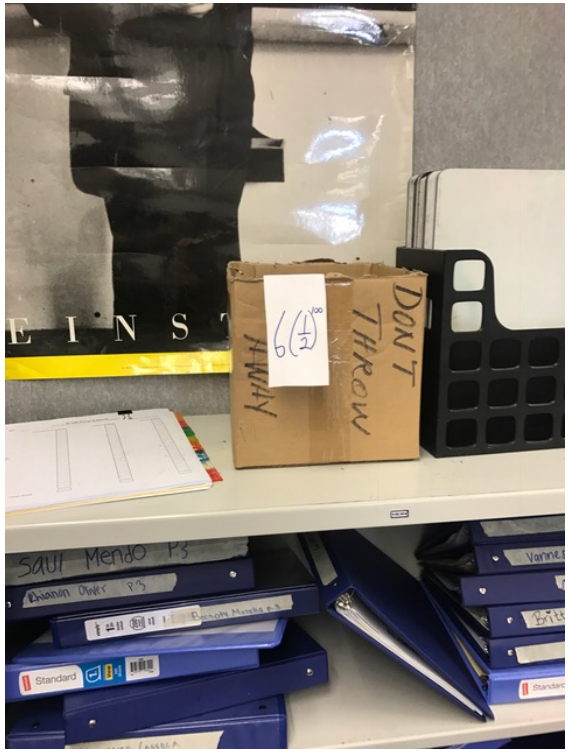


Clothesline Math

on warm-ups that turn into lessons

$$6\left(\frac{1}{2}\right)^{100}$$

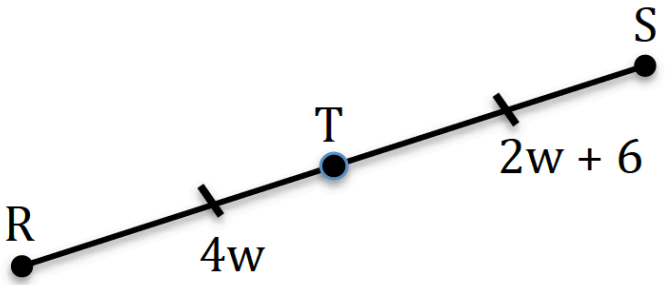




Clothesline Math

on assignments

31. a. w, RT, TS, RS

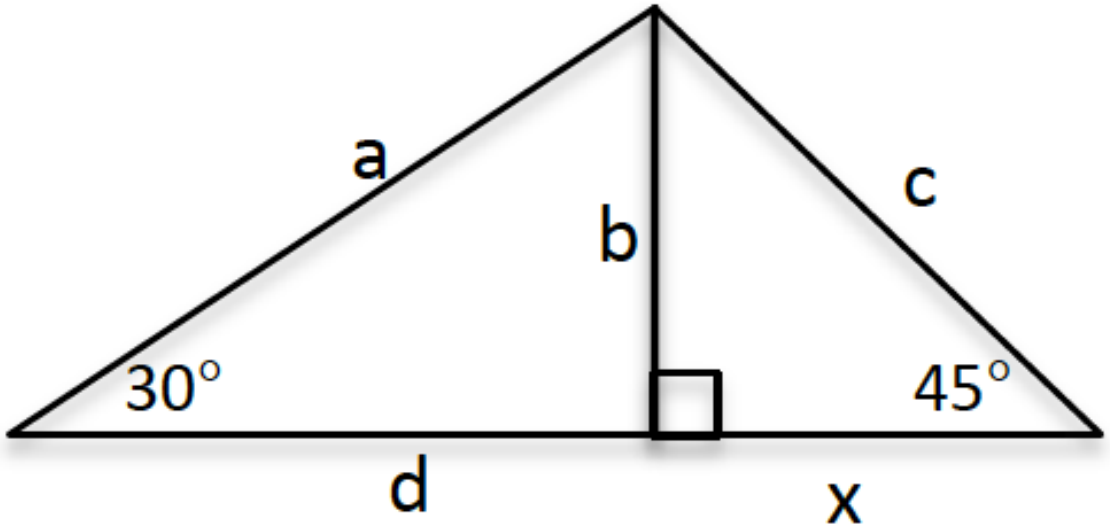


Clothesline Math
on assessments

9) Given that $\frac{a}{b} = \frac{c}{d}$, a ≠c, and the position of a & b on the number line below, show a possible placement of c & d.

Clothesline Math

on assessments



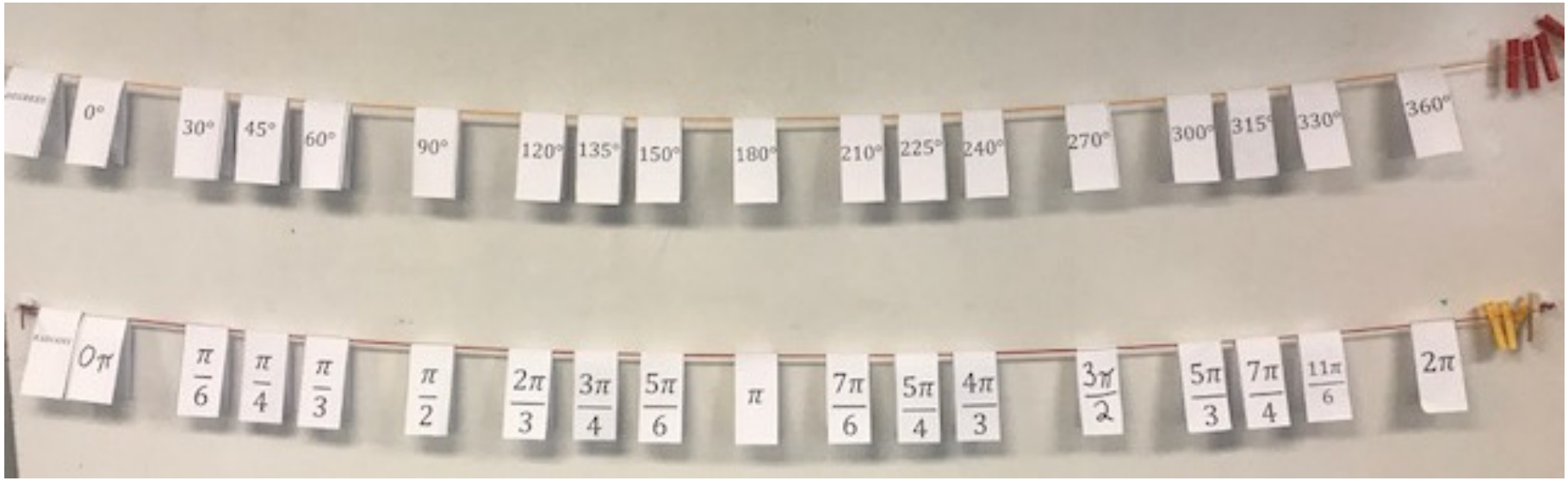
Clothesline Math
as Review

$\sqrt[3]{8}$ $25^{\frac{1}{2}}$ -2.5 5^{-2} $(-2)^0$ $\frac{3}{2}$ $\sqrt{2}$

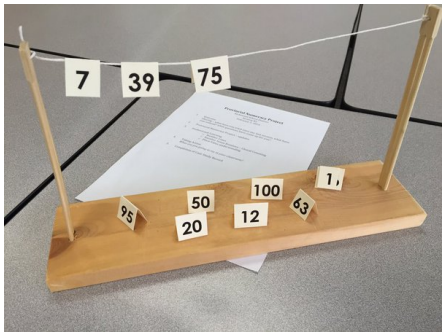
73% $16^{\frac{1}{4}} + 32^{\frac{1}{5}}$ $4^{\frac{3}{2}}$ -0.08 $-\sqrt{3}$ $8^{-\frac{1}{3}}$ $\sqrt{42}$

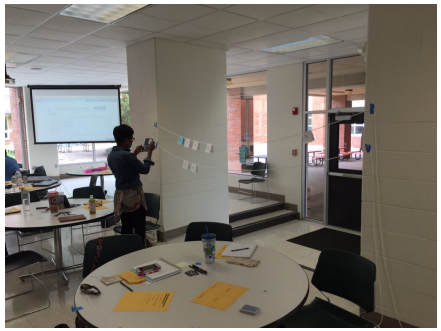
Clothesline Math

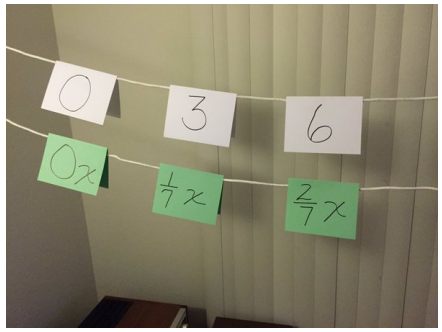
as Introduction

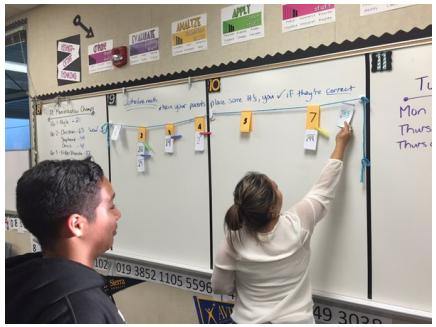


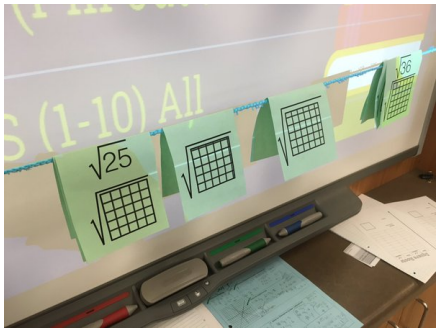
Clothesline Math
Around the Nation

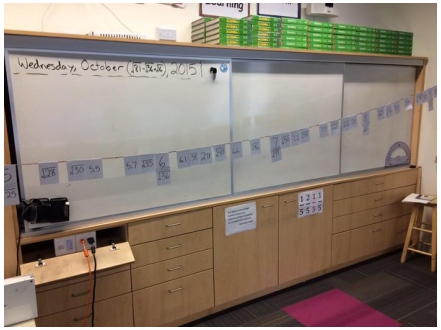


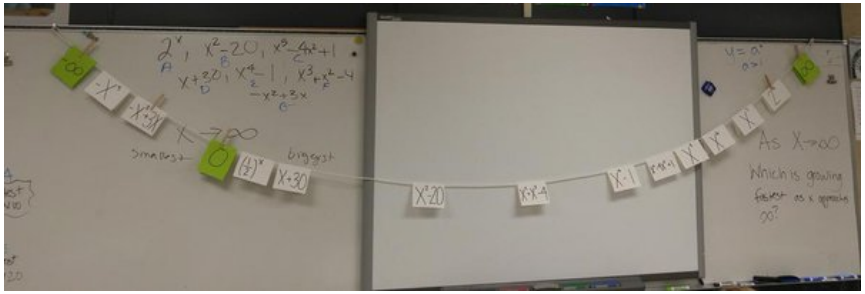


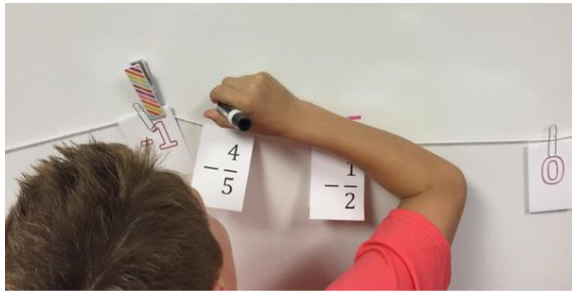




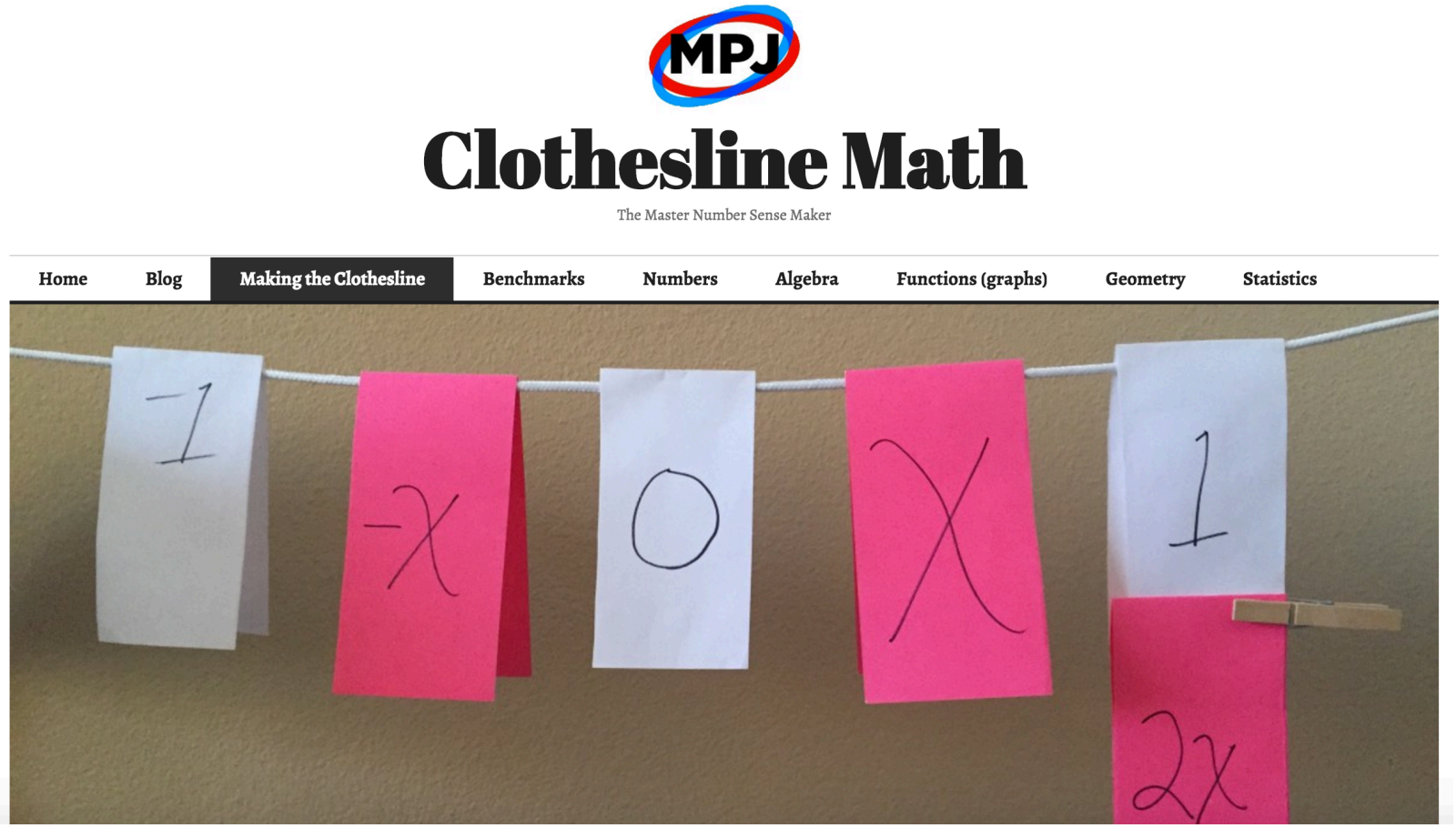








Clotheslinemath.com



Number Tricks

Pick a #	5	-4	$\frac{1}{4}$	x
Mult by 2	10	-8	$\frac{1}{2}$	2x
Add 3	13	-5	$3\frac{1}{2}$	2x + 3
Subtract twice original #	3	3	3	2x + 3 – 2x

simplified: 3

common result: always 3

Number Tricks

Pick a #	5	-4	$\frac{1}{4}$	x
Add 3	8	-1	$3\frac{1}{4}$	x + 3
Mult by 2	16	-2	$6\frac{1}{2}$	2(x + 3)
Subtract 6	10	-8	$\frac{1}{2}$	2(x + 3) – 6
Subtract the original #	5	-4	$\frac{1}{4}$	2(x + 3) – 6 – x

simplified: x

common result: number picked

Number Tricks

Number Tricks

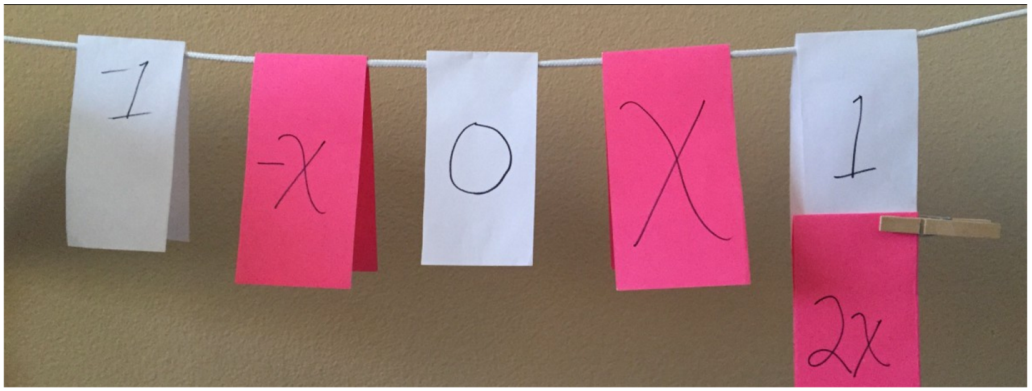
Rediscovered

FACTORING

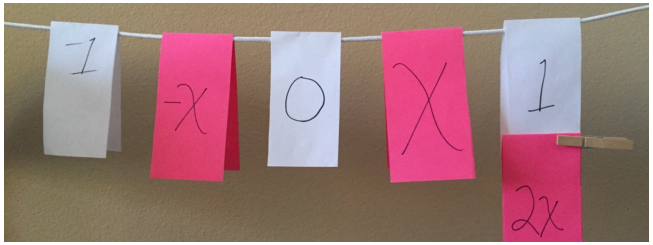
MPJ

numbertricks.net

Why Clothesline Math & Number Tricks?



Boot Camp Resources



Refine

MPJ

Boot Camp Intervention

Case Study:

Algebra Team Pre-Assessed w/ Textbook Resources: 15% Failed

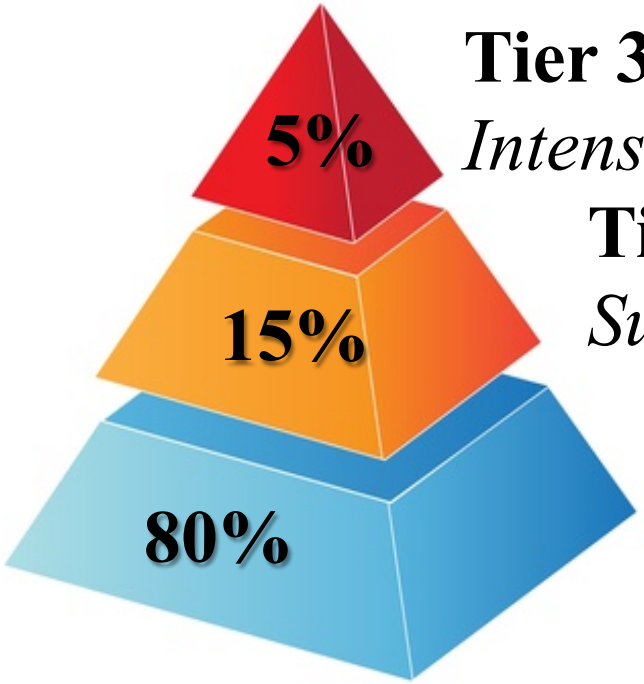
3-Day, 20-Min Intervention, then Post Test: 85% of those Passed

Acceleration = Extra Work

What are your pre-req's?

MPJ

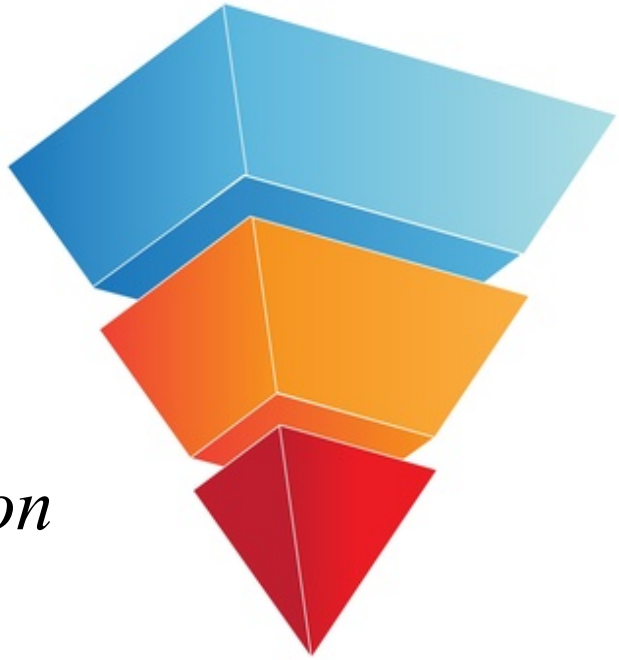
Boot Camp Numbers



Tier 3:
Intensive

Tier 2:
Supplemental

Tier 1:
Core Instruction



Boot Camp

Refresh

Warm-ups

Refine

Numeracy

Accelerate

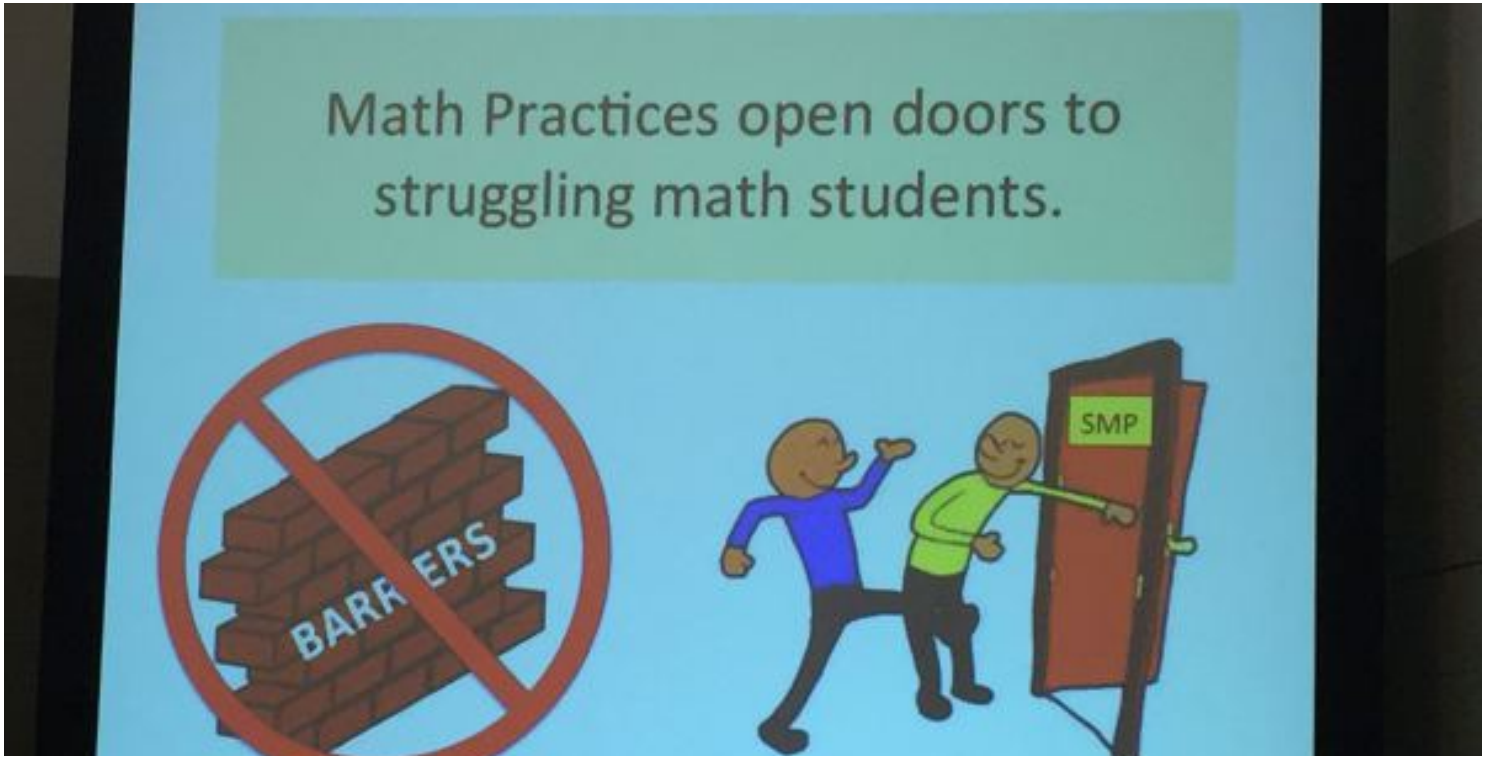
Intervention
(pre-emptive)

Lunch

Up next:

Revisiting HOT Tasks

H.O.T.S. Are For All Kids!



Amy Lucenta & Grace Kelemanik of the Boston Plan for Excellence, NCTM Boston, 2015

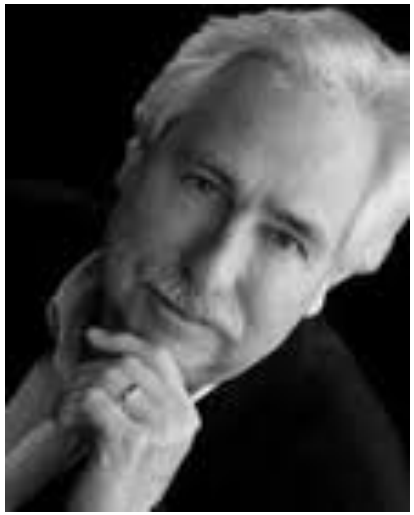
H.O.T.S. Are For All Kids!

"Accelerated" Remedial Math Students with Rich & Robust Tasks

ALL!

Dr. Uri Treisman

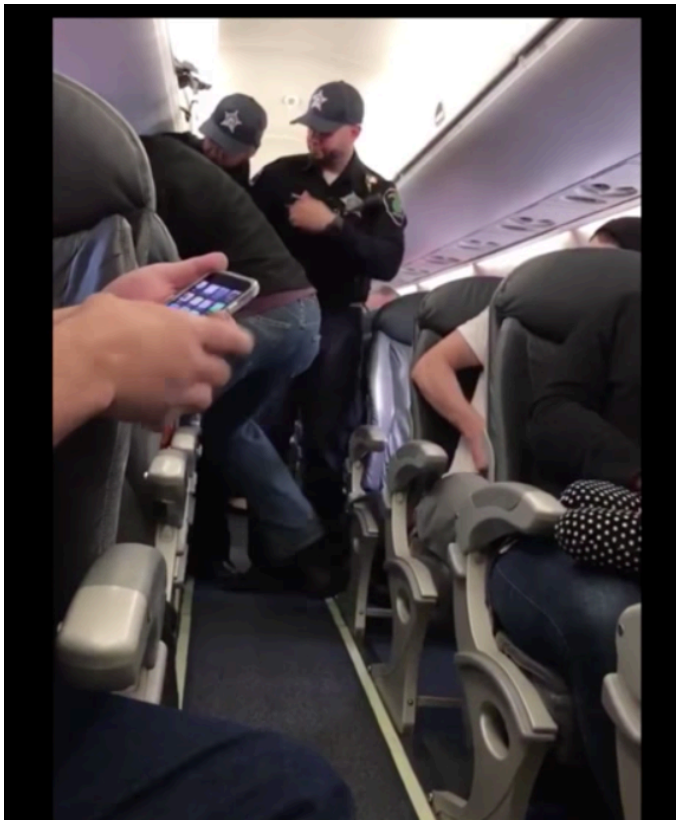
Dave Foster



50% False Positives
Among 8th Grade Geometry
From CST to SBAC

MPJ

Bumping Airlines



Solve a VERY important problem for Mr. Shore using percentages.

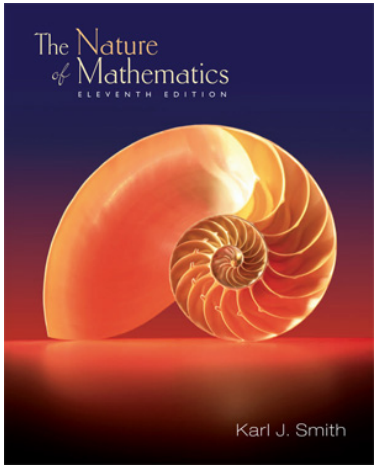
Optimal Bait

Model average cost with rational functions.

Task Resources

MPJ

NCTM ILLUMINATIONS Resources for Teaching Math



Illustrative Mathematics

mathalicious

Robert KAPLINSKY Glenrock Consulting

MARS

MVP

MPJ

But Did They Learn Any More?

Work ► Learn ► Earn

Work ► ► ► ►► Earn

External Data

6% of Geometry Total failed state test (2% failed course)

98% of SL Studies Seniors passed IB Exam

Your Take-Aways?

How successful was your brain surgery?

Which No-Options Engagement technique are you most likely to use?

How might you implement Boot Camp?

How might you bring HOT Tasks to your students?

My Take-Aways (hopefully)

With an *emotional investment,*

hold students accountable to *no-options engagement*

while reaching back for *boot camp* skills and pushing forward with *HOT tasks.*

Call to Action

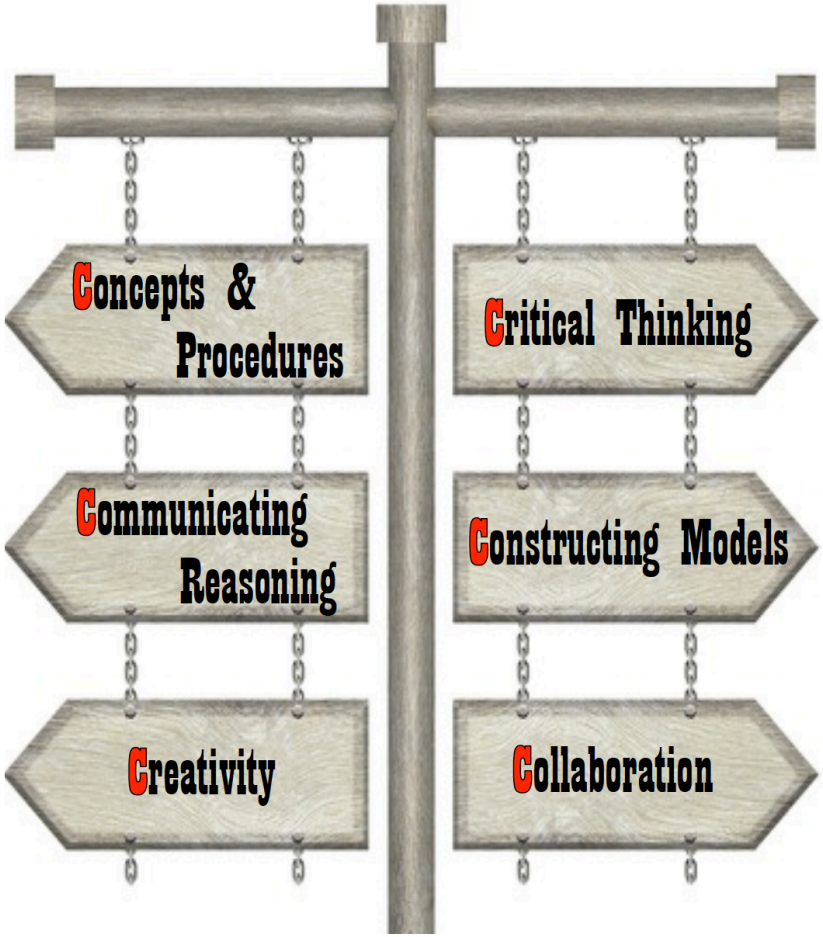
2-Week Rule

Topics for Sept 13?

shore@mathprojects.com

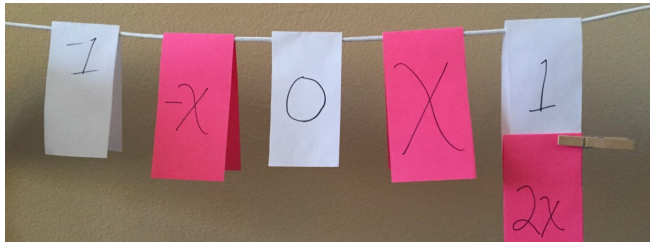
The Transformation Question

First Day Challenge



Reach & Teach ALL kids …

…by transforming the world,



one math lesson at a time.

www.mathprojects.com

See you on Sept 13