CHALLENGING PROBLEMS WORTH SOLVING

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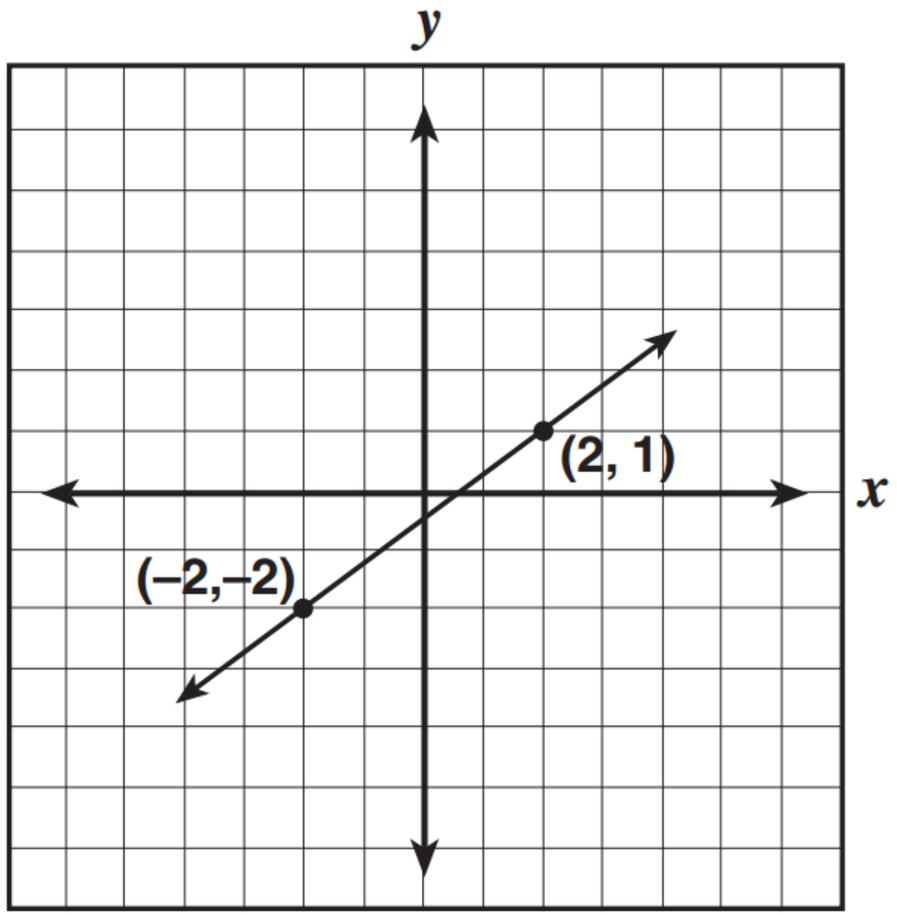
GOALS

- ❑ WHY DO WE NEED THEM?
- ❑ WHY ARE THEY DIFFERENT?
- ❑ HOW DO YOU IMPLEMENT THEM?
- ❑ HOW DO YOU CREATE YOUR OWN?
- ❑ WHERE DO YOU GET OTHERS?

Student Name	ID Number	Perf. Level	Scaled Score	Mathematics Clusters (Clusters where the percent correct is shown in bold represent proficiency for that cluster.)											
				Rational numbers		Exponents, powers, and roots		Quantitative relationships and evaluating expressions		Multi-step problems, graphing, and functions		Measurement and geometry		Statistics, data analysis, and probability	
				Number Correct	Percent Correct	Number Correct	Percent Correct	Number Correct	Percent Correct	Number Correct	Percent Correct	Number Correct	Percent Correct	Number Correct	Percent Correct
[redacted]	[redacted]	ADV	476	13	93%	8	100%	8	80%	14	93%	12	92%	5	100%
[redacted]	[redacted]	ADV	464	13	93%	7	88%	8	80%	15	100%	11	85%	5	100%
[redacted]	[redacted]	ADV	453	10	71%	8	100%	10	100%	14	93%	11	85%	5	100%
[redacted]	[redacted]	ADV	453	13	93%	8	100%	9	90%	12	80%	11	85%	5	100%
[redacted]	[redacted]	ADV	444	14	100%	7	88%	8	80%	13	87%	10	77%	5	100%
[redacted]	[redacted]	ADV	444	12	86%	8	100%	8	80%	15	100%	10	77%	4	80%
[redacted]	[redacted]	ADV	444	13	93%	8	100%	8	80%	14	93%	9	69%	5	100%
[redacted]	[redacted]	ADV	435	12	86%	6	75%	9	90%	14	93%	10	77%	5	100%
[redacted]	[redacted]	ADV	435	12	86%	6	75%	8	80%	14	93%	11	85%	5	100%
[redacted]	[redacted]	ADV	435	13	93%	7	88%	9	90%	12	80%	10	77%	5	100%
[redacted]	[redacted]	ADV	427	13	93%	6	75%	9	90%	12	80%	10	77%	5	100%
[redacted]	[redacted]	ADV	427	13	93%	7	88%	6	60%	13	87%	11	85%	5	100%
[redacted]	[redacted]	ADV	427	14	100%	5	63%	7	70%	14	93%	10	77%	5	100%
[redacted]	[redacted]	ADV	421	13	93%	6	75%	6	60%	14	93%	10	77%	5	100%
[redacted]	[redacted]	ADV	421	11	79%	5	63%	9	90%	13	87%	11	85%	5	100%
[redacted]	[redacted]	ADV	414	12	86%	6	75%	8	80%	11	73%	11	85%	5	100%
[redacted]	[redacted]	ADV	414	12	86%	8	100%	8	80%	13	87%	8	62%	4	80%
[redacted]	[redacted]	PRO	408	11	79%	6	75%	9	90%	11	73%	10	77%	5	100%
[redacted]	[redacted]	PRO	402	12	86%	8	100%	9	90%	8	53%	11	85%	3	60%
[redacted]	[redacted]	PRO	402	8	57%	7	88%	8	80%	13	87%	10	77%	5	100%
[redacted]	[redacted]	PRO	402	13	93%	6	75%	7	70%	13	87%	8	62%	4	80%
[redacted]	[redacted]	PRO	402	11	79%	5	63%	7	70%	11	73%	12	92%	5	100%
[redacted]	[redacted]	PRO	402	13	93%	7	88%	9	90%	10	67%	7	54%	5	100%
[redacted]	[redacted]	PRO	402	13	93%	7	88%	7	70%	11	73%	8	62%	5	100%
[redacted]	[redacted]	PRO	396	10	71%	6	75%	9	90%	14	93%	7	54%	4	80%
[redacted]	[redacted]	PRO	396	12	86%	8	100%	6	60%	9	60%	11	85%	4	80%

52 What is the slope of this line?



A $\frac{1}{2}$

B $\frac{3}{4}$

C 1

D $\frac{4}{3}$

Source: California Released Test Questions (7th Grade Math)


X-RAY
VISION

Mathematics Clusters

(Clusters where the percent correct is shown in bold represent proficiency for that cluster.)

Student Name	ID Number	Perf. Level	Scaled Score	Rational numbers		Exponents, powers, and roots		Quantitative relationships and evaluating expressions		Multi-step problems, graphing, and functions		Measurement and geometry		Statistics, data analysis, and probability	
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[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	8	100%	[redacted]	[redacted]	[redacted]	[redacted]	11	85%	5	100%
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	10	77%	5	100%
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	10	77%	4	80%
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[redacted]	[redacted]	[redacted]	[redacted]	12	[redacted]	[redacted]	75%	[redacted]	[redacted]%	[redacted]	[redacted]	10	77%	5	100%
[redacted]	[redacted]	[redacted]	[redacted]	12	[redacted]	[redacted]	75%	[redacted]	[redacted]%	[redacted]	[redacted]	11	85%	5	100%
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	88%	[redacted]	[redacted]	[redacted]	[redacted]%	10	77%	5	100%
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	6	75%	[redacted]	[redacted]	[redacted]	[redacted]%	10	77%	5	100%
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	7	88%	[redacted]	[redacted]	[redacted]	[redacted]7%	11	85%	5	100%
[redacted]	[redacted]	ADV	[redacted]	[redacted]	[redacted]	5	63%	[redacted]	[redacted]	[redacted]	93%	10	77%	5	100%
[redacted]	[redacted]	ADV	[redacted]	[redacted]	[redacted]	6	75%	6	[redacted]	[redacted]	93%	10	77%	5	100%
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GOALS

- [x] WHY DO WE NEED THEM?
- [ ] WHY ARE THEY DIFFERENT?
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PROBLEM ONE

Solve for x.

$$21 + x = 70$$

PROBLEM TWO

Using the digits 1 to 9, at most one time each, create two equations: one where x has a positive value and one where x has a negative value.

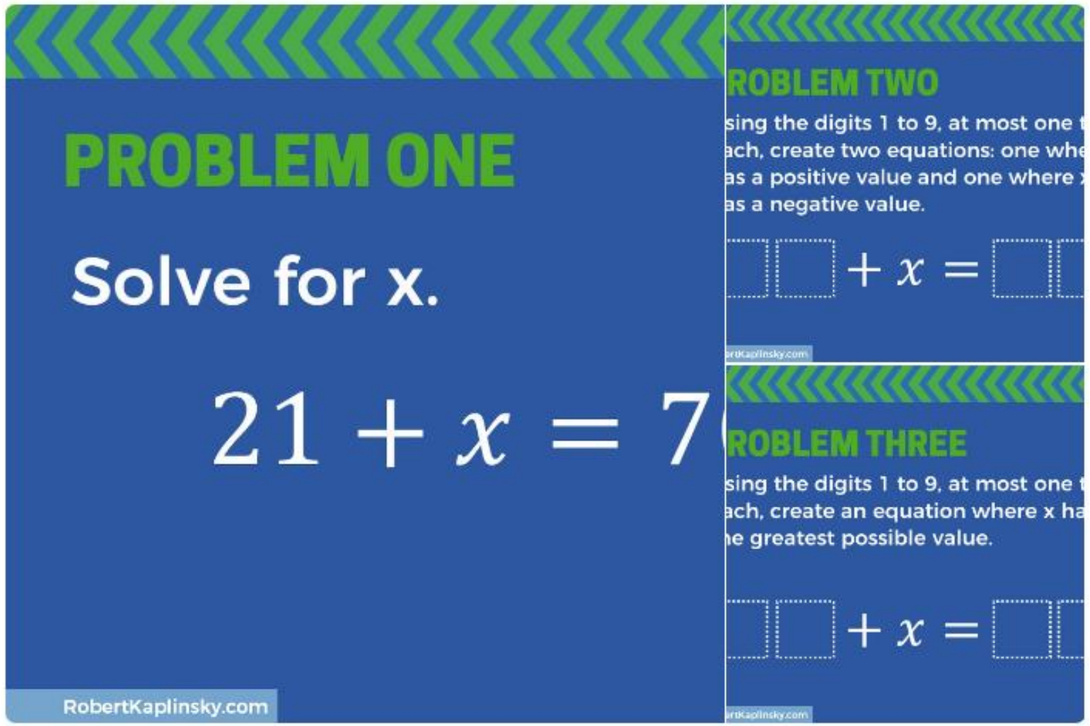
PROBLEM THREE

Using the digits 1 to 9, at most one time each, create an equation where x has the greatest possible value.

$$\square\square + x = \square\square$$

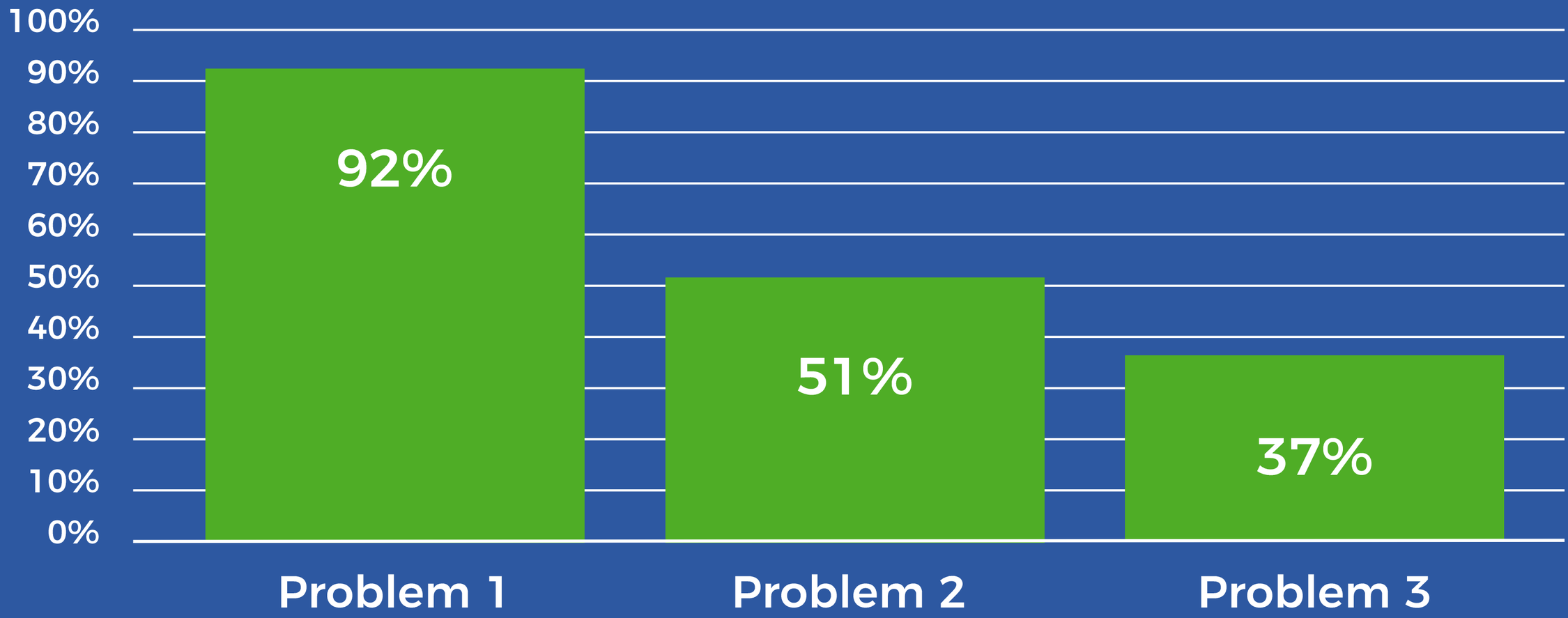
Robert Kaplinsky
@robertkaplinsky

MS & HS #MTBoS Ts, please ask your Ss these 3 ?s and put the % who answered correctly here: docs.google.com/forms/d/e/1FAI …. Answers at top of form.



RETWEETS 36 LIKES 54

PROBLEM RESULTS

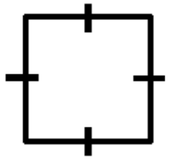


Depth of Knowledge Matrix - Secondary Math

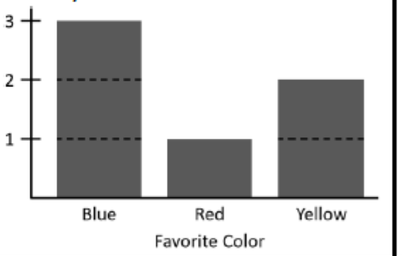
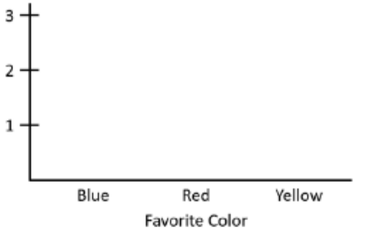
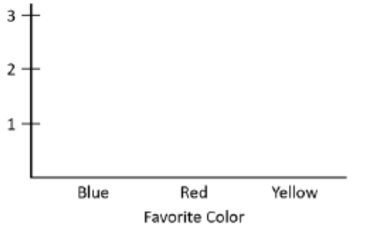
Topic	Dividing Fractions	Solving Two-Step Equations	Exponents	Solving Equations with Variables on Both Sides
CCSS Standard(s)	• 6.NS.1	• 7.EE.4a	• 8.EE.1	• 8.EE.8 • A-REI.3
DOK 1 Example	Evaluate. $\frac{4}{9} \div \frac{2}{5}$	Solve for x. $2x + 3 = 9$	Evaluate. 3^4	Solve for x. $3x + 2 = -2x + 4$
DOK 2 Example	Use the digits 1 to 9, at most one time each, to fill in the boxes to make two different pairs of fractions that have a quotient of 2/3. $\frac{\square}{\square} \div \frac{\square}{\square} = \frac{2}{3}$	Use the digits 1 to 9, at most one time each, to create two equations: one where x has a positive value and one where x has a negative value. $\square x + \square = \square$	Use the digits 1 to 9, at most one time each, to fill in the boxes to make two true number sentences. $\square^{\square} = 64$	Use the digits 1 to 9, at most <u>two</u> times each, to fill in the boxes to make an equation with no solutions. $\square x + \square = \square x + \square$
DOK 3 Example	Use the digits 1 to 9, at most one time each, to fill in the boxes to make two fractions that have a quotient that is as close to 4/11 as possible. $\frac{\square}{\square} \div \frac{\square}{\square}$	Use the digits 1 to 9, at most one time each, to create an equation where x has the greatest possible value. $\square x + \square = \square$	Use the digits 1 to 9, at most one time each, to fill in the boxes to make a result that has the greatest value possible. $\square^{\square} = \square\square\square$	Use the digits 1 to 9, at most one time each, to fill in the boxes so that the solution is closest to zero. $\square x + \square = \square x + \square$

Version 1.5

Depth of Knowledge Matrix - Secondary Math

Topic	Geometric Proofs	Complex Numbers	Trigonometric Functions	Definite Integral
CCSS Standard(s)	• G-CO.11	• N-CN.2	• F-TF.3	• N/A
DOK 1 Example	Add one geometric marking to demonstrate the quadrilateral is a square. 	Multiply the binomials. $(3+4i)(2+3i)$	Evaluate. $\sin\frac{\pi}{3}$	Solve. $\int_2^6 x^3\,dx$
DOK 2 Example	Use exactly 5 geometric markings to show that a quadrilateral is a square.	Use the integers -9 to 9, at most one time each, to fill in the boxes twice: once to make a positive real number product and once to make a negative real number product. $(\square+\square i)(\square+\square i)$	Use the digits 1 to 9, at most one time each, to fill in the boxes and make two true number sentences. $\sin\frac{\square\pi}{\square}=0$	Use the digits 1 to 9, at most one time each, to fill in the boxes and make a positive and a negative solution. $\int_{\square}^{\square} x^{\square}\,dx$
DOK 3 Example	What is the least number of geometric markings needed to demonstrate that a quadrilateral is a square?	Use the integers -9 to 9, at most one time each, to fill in the boxes and make a real number product with the greatest value. $(\square+\square i)(\square+\square i)$	Use the digits 1 to 9, at most one time each, so that the function has the greatest possible value. $\sin\frac{\square\pi}{\square}=\frac{\sqrt{\square}}{\square}$	Use the digits 1 to 9, at most one time each, to fill in the boxes and make a solution that is as close to 100 as possible. $\int_{\square}^{\square} x^{\square}\,dx$

Depth of Knowledge Matrix - Elementary Math

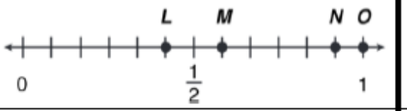
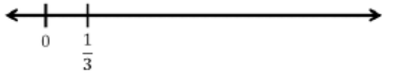
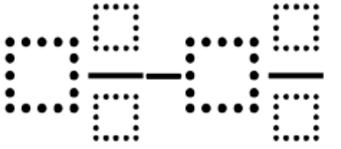
Topic	Adding 1-Digit Numbers (< 5)	Equality	Interpreting Data	Money
CCSS Stand.	• K.OA.5	• 1.OA.7	• 1.MD.4	• 2.MD.8
DOK 1 Example	Solve. $3 + 1 =$	Determine whether the number sentence is true or false. $4 + 1 = 5 - 2$	How many people were surveyed? 	If you have 1 quarter, 4 dimes, 2 nickels, and 3 pennies, how many cents do you have?
DOK 2 Example	Use the digits 1 to 5, at most one time each, to fill in the boxes to create two true number sentences. $\square + \square = \square$	Use the digits 1 to 9, at most one time each, to fill in the boxes to create two true number sentences. $\square + \square = \square - \square$	Make a graph that shows a possible result of 7 students' favorite color. 	Make 72¢ in two different ways with either quarters, dimes, nickels, or pennies.
DOK 3 Example	Use the digits 1 to 5, at most one time each, to fill in the boxes to create a true number sentences with the greatest possible sum. $\square + \square = \square$	Use the digits 1 to 9, at most one time each, to fill in the boxes to create a true number sentence with the greatest possible value. $\square + \square = \square - \square$	Make a graph that shows a possible result of 7 students' favorite color with red being the most popular color. 	Make 72¢ using exactly 9 coins that are either quarters, dimes, nickels, or pennies.

Version 1.2

Depth of Knowledge Matrix - Elementary Math

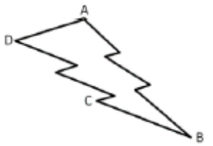
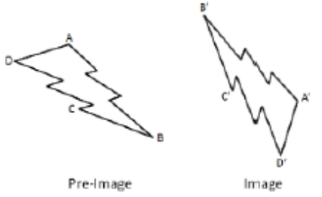
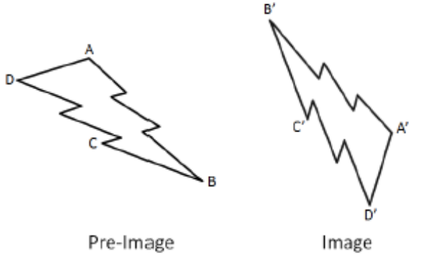
Topic	Subtracting 3-Digit Numbers	Operations with Time	Comparing Fractions	Multiplying Decimals
CCSS Stand.	• 3.NBT.2	• 3.MD.1	• 4.NF.2	• 5.NBT.7
DOK 1 Example	Solve. $821 - 357 =$	What time will it be 14 minutes after 1:27 pm?	Place a < or > between the two fractions to make a true number sentence. $\frac{4}{7} \quad \frac{3}{5}$	Solve. $3.4 \times 2.5 =$
DOK 2 Example	Use the digits 1 to 9, at most one time each, to fill in the boxes to make two different pairs of three-digit numbers that form a true number sentence. □□□-291=□□□	Use the digits 1 to 9, at most one time each, to fill in the boxes to make a time that is 4:37 pm. □□ minutes after □:□□ pm	Use the digits 1 to 9, at most one time each, to fill in the boxes to create two different fractions: one that is less than one half and one that is more than one half. $\frac{\square}{\square} < \frac{1}{2}$ and $\frac{\square}{\square} > \frac{1}{2}$	Use the digits 1 to 9, at most one time each, to fill in the boxes to make a true number sentence. □.□ × 3.2=□.□
DOK 3 Example	Use the digits 1 to 9, at most one time each, to fill in the boxes to make a difference that is as close to 329 as possible. □□□-□□□=	Use the digits 1 to 9, at most one time each, to fill in the boxes to make the latest possible time. □□ minutes after □:□□ pm	Use the digits 1 to 9, at most one time each, to fill in the boxes to create a fraction that is as close to 5/11 as possible. $\frac{\square}{\square}$	Use the digits 1 to 9, at most one time each, so that the product is as close to 50 as possible. □.□ × □.□ =

Depth of Knowledge Matrix - Elementary & Secondary Math

Topic	Adding Whole Numbers	Money	Fractions on a Number Line	Area and Perimeter	Subtracting Mixed Numbers
CCSS Standard(s)	• 1.NBT.4 • 2.NBT.5	• 2.MD.8	• 3.NF.2	• 3.MD.8 • 4.MD.3	• 5.NF.1
DOK 1 Example	Find the sum. $44 + 27 =$	If you have 2 dimes and 3 pennies, how many cents do you have?	Which point is located at $\frac{7}{12}$ below? 	Find the perimeter of a rectangle that measures 4 units by 8 units.	Find the difference. $5\frac{1}{2} - 4\frac{2}{3} =$
DOK 2 Example	Fill in the boxes below using the whole numbers 1 through 9, no more than one time each, so that you make a true equation. $\square\square + 53 = \square\square$	Make 47¢ in three different ways with either quarters, dimes, nickels, or pennies.	Label the point where $\frac{3}{4}$ belongs on the number line below. Be as precise as possible. 	List the measurements of three different rectangles that each has a perimeter of 20 units.	Create three different mixed numbers that will make the equation true by using the whole numbers 1 through 9, no more than one time each. You may reuse the same whole numbers for each of the three mixed numbers. $5\frac{4}{5} - \square\frac{\square}{\square} = 3\frac{1}{20}$
DOK 3 Example	Make the largest sum by filling in the boxes below using the whole numbers 1 through 9, no more than one time each. $\square\square + \square\square =$	Make 47¢ using exactly 6 coins with either quarters, dimes, nickels, or pennies.	Create 5 fractions using the whole numbers 0 through 9, exactly one time each as numerators and denominators, and place them all on a number line.	What is the greatest area you can make with a rectangle that has a perimeter of 24 units?	Make the smallest difference by filling in the boxes below using the whole numbers 1 through 9, no more than one time each. 

Version 1.17

Depth of Knowledge Matrix - Elementary & Secondary Math

Topic	Surface Area and Volume	Probability	Transformations	Factoring Quadratics	Quadratics in Vertex Form
CCSS Standard(s)	• 6.G.4 • 7.G.6	• 7.SP.5 • 7.SP.7	• 8.G.1 • G-CO.5	• A-SSE.3a	• F-IF.7a
DOK 1 Example	Find the surface area of a rectangular prism that measures 3 units by 4 units by 5 units.	What is the probability of rolling a sum of 5 using two 6-sided dice?	Rotate the image below 90° counterclockwise about point D and reflect it across a horizontal line. 	Find the factors: $2x^2 + 7x + 3$	Find the roots and maximum of the quadratic equation below. $y = -3(x-4)^2 - 3$
DOK 2 Example	List the measurements of three different rectangular prisms that each have a surface area of 20 square units.	What value(s) have a 1/12 probability of being rolled as the sum of two 6-sided dice?	List three sequences of transformations that take pre-image ABCD to image A'B'C'D'. 	Find three different integers to put in the blank that will make the quadratic expression factorable. $x^2 + \_\_x + 4$	Create three equations for quadratics in vertex form that have roots at 3 and 5 but have different maximum and/or minimum values.
DOK 3 Example	What is the greatest volume you can make with a rectangular prism that has a surface area of 20 square units?	Fill in the blanks to complete this sentence using the whole numbers 1 through 9, no more than one time each. Rolling a sum of ___ on two ___-sided dice is the same probability as rolling a sum of ___ on two ___-sided dice.	What is the fewest number of transformations needed to take pre-image ABCD to image A'B'C'D'? 	Fill the blank by finding the largest and smallest integers that will make the quadratic expression factorable. $2x^2 + 3x + \_\_$	Create a quadratic equation with the largest maximum value using the whole numbers 1 through 9, no more than one time each. $y = -\square(x-\square)^2 + \square$

Version 1.17

DOK ONE

6. $9 + a = 46$

DOK TWO

11. Anton walked 8.9 miles of his 13.5-mile goal for this week. Use the equation $m + 8.9 = 13.5$ to find which path Anton should walk so that he meets his goal for the week.

Path Lengths	
Meadow Path	3.2 miles
Circle Path	4.2 miles
Oak Tree Path	4.6 miles

DOK THREE

14. Reasoning Kyle bought a movie ticket for $8.45 and a drink for $1.80. He had just enough money remaining to buy a large popcorn. How much money did Kyle start with? Write an equation to show your reasoning. © MP.2

Cost of Popcorn	
Small	$2.85
Medium	$3.75
Large	$4.75
Extra Large	$4.85

GOALS

- [x] WHY DO WE NEED THEM?
- [x] WHY ARE THEY DIFFERENT?
- [ ] HOW DO YOU IMPLEMENT THEM?
- [ ] HOW DO YOU CREATE YOUR OWN?
- [ ] WHERE DO YOU GET OTHERS?

IMPLEMENTATION

- Open Middle Worksheet

First attempt: Points: _____/2 attempt _____/2 explanation

What did you learn from this attempt? How will your strategy change on your next attempt?

Name: _____ Period: _____ Date: _____

First attempt: Points: ____/2 attempt ____/2 explanation

What did you learn from this attempt? How will your strategy change on your next attempt?

Second attempt: Points: ____/2 attempt ____/2 explanation

IMPLEMENTATION

- Open Middle Worksheet
- Classwork
  - Single problem for entire class
  - Extensions menu

QUESTION #1

Use the digits 1 to 9, at most one time each, to create an equation where x has the greatest possible value.

$$\square\square + x = \square\square$$

4 points

QUESTION #2

Solve for x.

$$3x + 7 = 19$$

1 point

QUESTION #3

Use the digits 1 to 9, at most one time each, to create two equations: one where x has a positive value and one where x has a negative value.

$$\square\square + x = \square\square$$

2 points

QUESTION #4

Use the digits 1 to 9, at most one time each, to make each equation true.

$$\square + a = \square$$

$$\square - b = \square$$

3 points

SOLVING EQUATIONS EXTENSION MENU

You must earn <u>at least 12 points</u> by doing the problems of your choice. Circle the questions you

QUESTION #5

Use the digits 1 to 9, at most one time each, to create an equation where x has the greatest possible value.

IMPLEMENTATION

- Open Middle Worksheet
- Classwork
  - Single problem for entire class
  - Extensions menu
- Homework
- Assessments

GOALS

- [x] WHY DO WE NEED THEM?
- [x] WHY ARE THEY DIFFERENT?
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STEP ONE

- Find a One-Operation Problem
  - Addition
  - Subtraction
  - Multiplying
  - Dividing
  - Exponents (including square root)
  - Trigonometric functions

ADDING 2-DIGIT NUMBERS

Solve.

$$41 + 36 =$$

MULTIPLYING FRACTIONS

Solve.

$$\frac{3}{7} \times \frac{2}{9} =$$

THINKING TIME

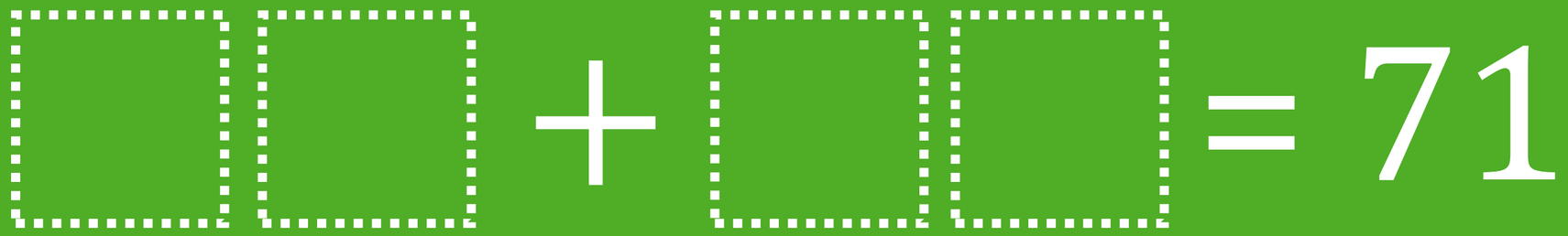
RobertKaplinsky.com

STEP TWO

- Go from DOK 1 to DOK 2
  - Strategically remove some information from the problem to prevent immediate calculation
  - Increase the quantity of solutions needed to increase the need to look for patterns

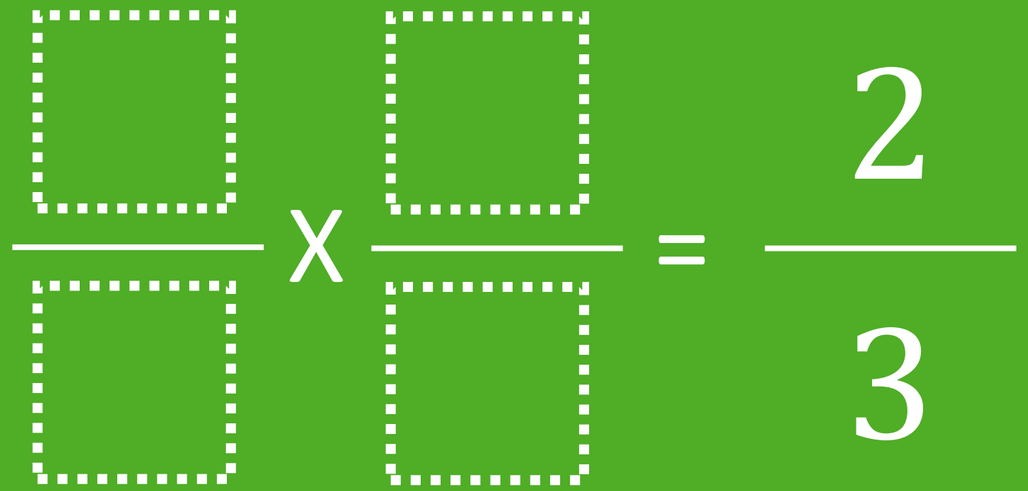
ADDING 2-DIGIT NUMBERS

Using the digits 1 to 9, at most one time each, fill in the boxes to make two different pairs of two-digit numbers that have a sum of 71.



MULTIPLYING FRACTIONS

Using the digits 1 to 9, at most one time each, fill in the boxes to make two different pairs of fractions that have a product of 2/3.



THINKING TIME

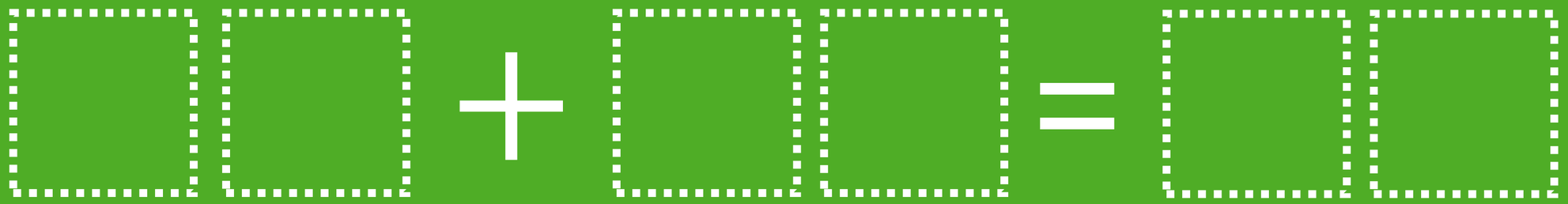
- Go from DOK 1 to DOK 2
  - Strategically remove some information from the problem to prevent immediate calculation
  - Increase the quantity of solutions needed to increase the need to look for patterns

STEP THREE

- Go from DOK 2 to DOK 3
  - Introduce the need to optimize the solution by making the greatest or least product / sum / difference / quotient / answer.
  - Another optimization option is make the answer closest to a specific value.

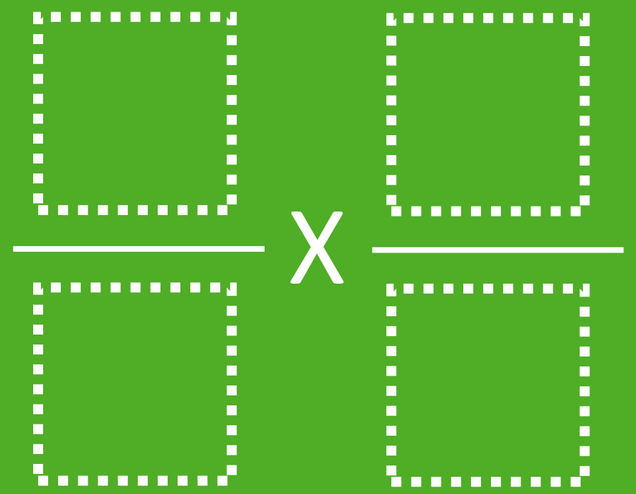
ADDING 2-DIGIT NUMBERS

Using the digits 1 to 9, at most one time each, fill in the boxes to make the smallest sum.



MULTIPLYING FRACTIONS

Using the digits 1 to 9, at most one time each, fill in the boxes to make two fractions that have a product that is as close to 4/11 as possible.



THINKING TIME

- Go from DOK 2 to DOK 3
  - Introduce the need to optimize the solution by making the greatest or least product / sum / difference / quotient / answer.
  - Another optimization option is make the answer closest to a specific value.

3 Steps to Increase Math DOK Levels

Step 1: Find a One-Operation Problem

- Procedural problems with one operation are easiest to modify.
- Other problems may also be modified but may not be as easy.

Adding 2-Digit Numbers
Solve.

$41 + 36 = \_\_\_$

Multiplying Fractions
Solve.

$\frac{3}{7} \times \frac{2}{9} = \_\_\_$

Trigonometry
Solve.

$\sin \frac{\pi}{3} = \_\_\_$

Step 2: Go from DOK 1 to DOK 2

- Strategically remove some information from the problem to prevent immediate calculation
- Increase the quantity of solutions needed to increase the need to look for patterns

Adding 2-Digit Numbers
Using the digits 1 to 9, at most one time each, fill in the boxes

Multiplying Fractions
Using the digits 1 to 9, at most one time each, fill in the boxes

Trigonometry
Using the digits 1 to 9, at most one time each, fill in the boxes

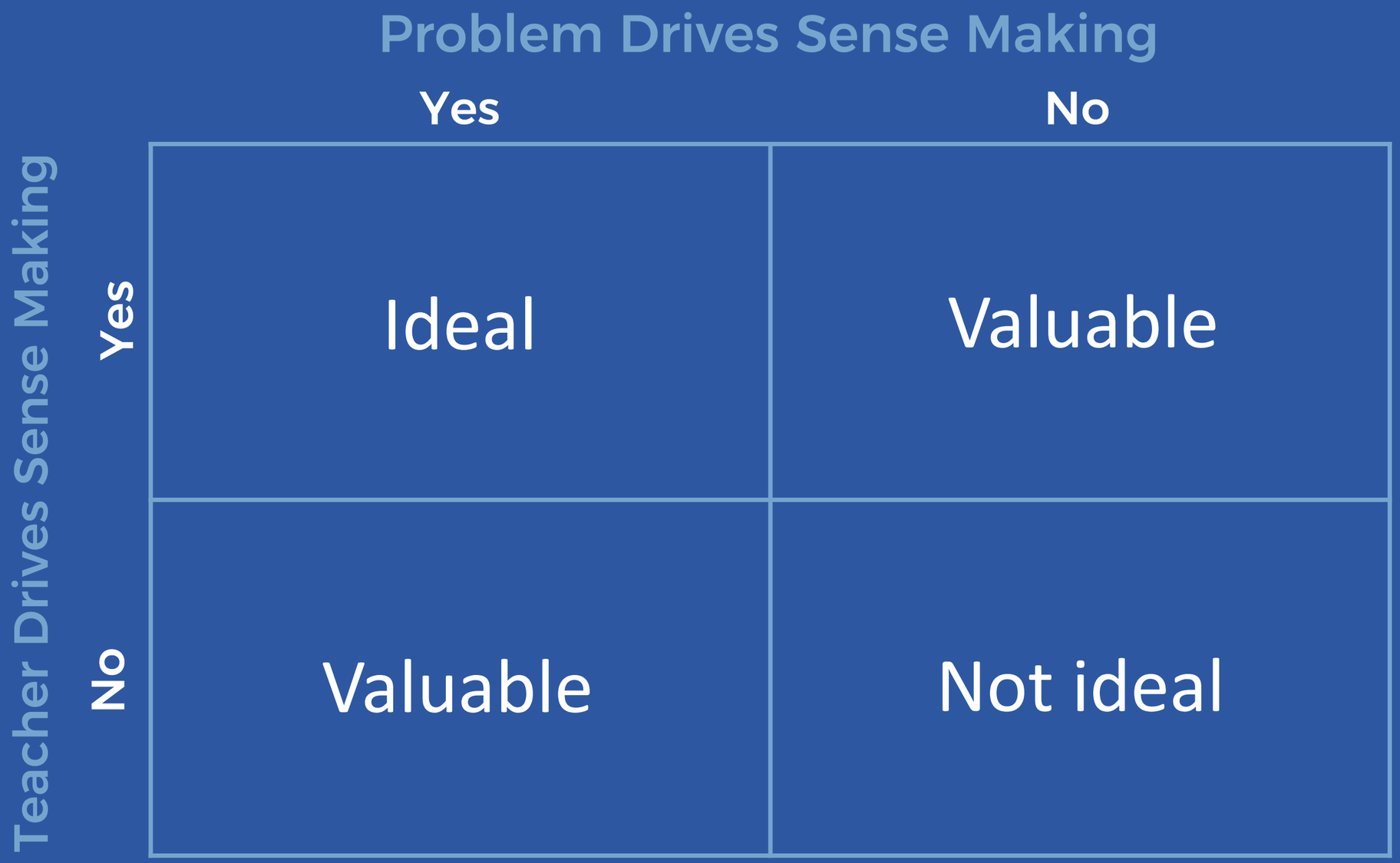
TWO PROBLEMS

Problem One

Find the sum: 37 + 27

Problem Two

Using the digits 1 to 9, at most one time each, fill in the boxes to make the smallest sum.


Problem Drives Sense Making
Yes
No
Teacher Drives Sense Making
Yes
No
Ideal
Valuable
Valuable
Not ideal

GOALS

- [x] WHY DO WE NEED THEM?
- [x] WHY ARE THEY DIFFERENT?
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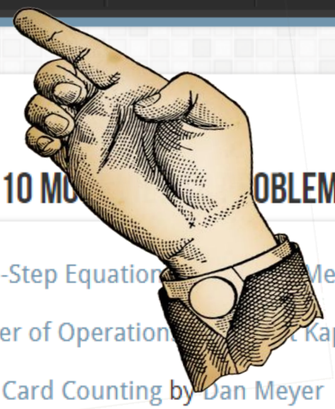
Open Middle

Challenging math problems worth solving



THE TOP 10 MO OBLEMS OF 2016

1. Two-Step Equation Mendivil, Daniel Luevanos, and Robert Kaplinsky
2. Order of Operation Kaplinsky with answer from Michael Fenton and his students
3. Dot Card Counting by Dan Meyer
4. Rational and Irrational Numbers by Bryan Anderson
5. One Solution, No Solutions, Infinite Solutions by Bryan Anderson
6. Multiplying a Two-Digit Number by a Single-Digit Number by Robert Kaplinsky
7. Exponents and Order of Operations by Zack Miller
8. Converting Between Fractions and Decimals by Robert Kaplinsky
9. Interpretting Percentages by Robert Kaplinsky
10. Two-Step Equations 3 by Erick Lee

WHAT ARE PEOPLE SAYING ABOUT OPEN MIDDLE?

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OPEN MIDDLE WORKSHEET

Download the Open Middle Worksheet (Regular): Version 1.2

Download the Open Middle Worksheet (Large): Version 1.1

BROWSE BY DEPTH OF KNOWLEDGE LEVEL

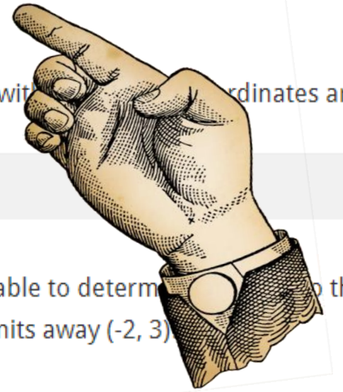
DOK 2: Skills and Concepts

DOK 3: Strategic Thinking

BROWSE BY COMMON CORE STATE STANDARDS

- Kindergarten (10)
  - Counting & Cardinality (2)
  - Geometry (2)
  - Number & Operations in Base Ten (1)
  - Operations & Algebraic Thinking (5)

EQUIDISTANT POINTS



Directions: How many points wit[illegible]rdinates are 5 units away from (-2, 3)?

Hint

Which methods are available to determ[illegible]o this problem? What shape is defined by *all* of the points that are 5 units away (-2, 3)

Answer

12 points: (-5, 7), (-7, 3), (-5, -1), (-2, -2), (3, 3), (1, -1), (-2, 8), (1, 7), (2,6), (-6, -6), (-6, 0), and (2, 0)

Source: Dylan Kane

Search

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BROWSE BY DEPTH OF KNOWLEDGE LEVEL

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Hey @openmiddle fans, we want to hear from you. Why do you use our problems with your students? Share your success stories or lessons learned.

RETWEETS	LIKES
7	6

2:10 PM - 11 Jan 2017

8 7 6 •••

1 2 •••

GOALS

- [x] WHY DO WE NEED THEM?
- [x] WHY ARE THEY DIFFERENT?
- [x] HOW DO YOU IMPLEMENT THEM?
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- [x] WHERE DO YOU GET OTHERS?

CALL TO ACTION

Action	Do Now	Start Planning	Yes & No	Don't Do
Incorporate higher DOK problems on assessments.		✓		
Replace all DOK 1 problems with higher DOK problems.				✓
Share these resources with colleagues to make them aware.	✓			
Find problems I can integrate on Open Middle.	✓			
Use the 3 steps process to strengthen existing problems.			✓	

CHALLENGING PROBLEMS WORTH SOLVING

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