THREE ENGAGING METHODS TO UNCOVER AND FIX HIDDEN STUDENT MISCONCEPTIONS

ROBERT KAPLINSKY

robert@robertkaplinsky.com

robertkaplinsky.com

@robertkaplinsky

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METHODS

To 44222

GOALS

- ❑ KING SOLOMON AND VAN HALEN
- ❑ OPEN MIDDLE
- ❑ ALWAYS, SOMETIMES, NEVER
- ❑ TRUTH TRUTH LIE
- ❑ NEXT STEPS


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INTERNATIONAL

Winner Of French Scrabble Title Does Not Speak French

July 21, 2015 · 1:00 PM ET

BILL CHAPPELL

GOALS

- [x] KING SOLOMON AND VAN HALEN
- [ ] OPEN MIDDLE
- [ ] ALWAYS, SOMETIMES, NEVER
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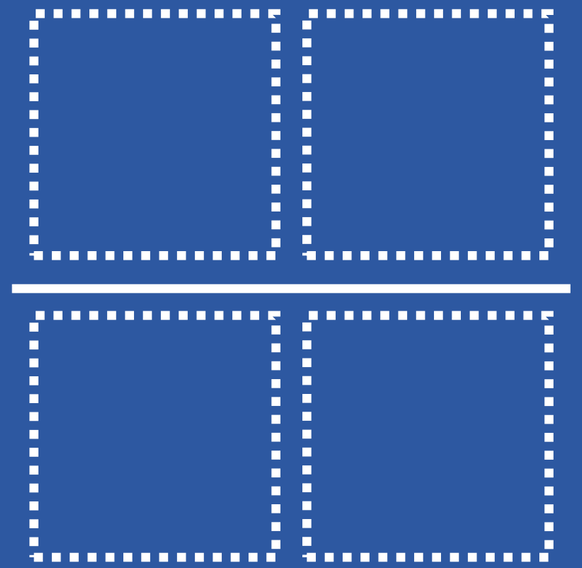
- [ ] NEXT STEPS

Using the digits 1-9 at most one time each, place a digit in each box to create a fraction that is as close to one as possible.



Extension: How many ways can you prove that you are correct?

Source: Peter Morris on openmiddle.com


0.975308
+/−
√
%
MC
MR
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1.0253169
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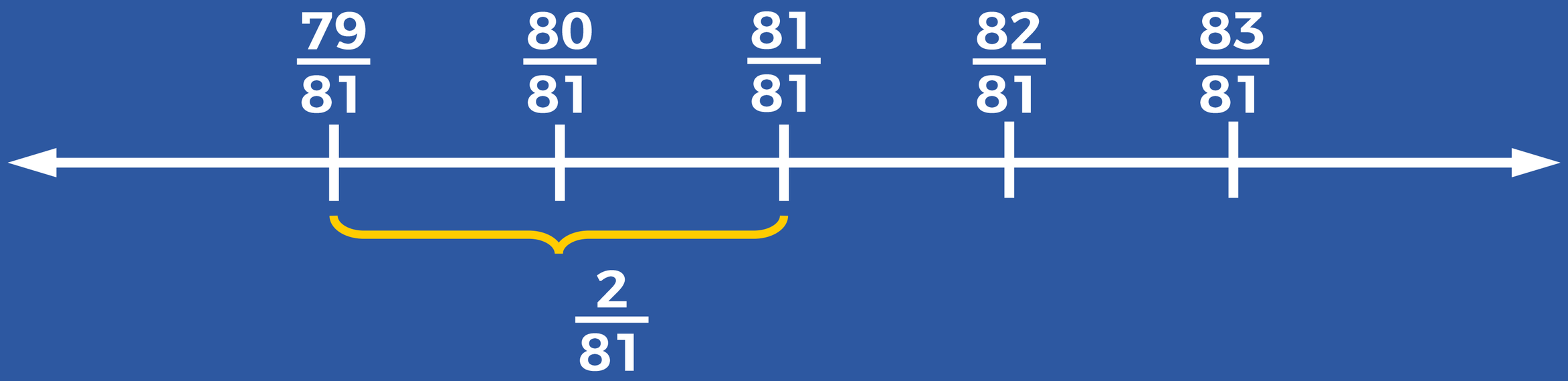
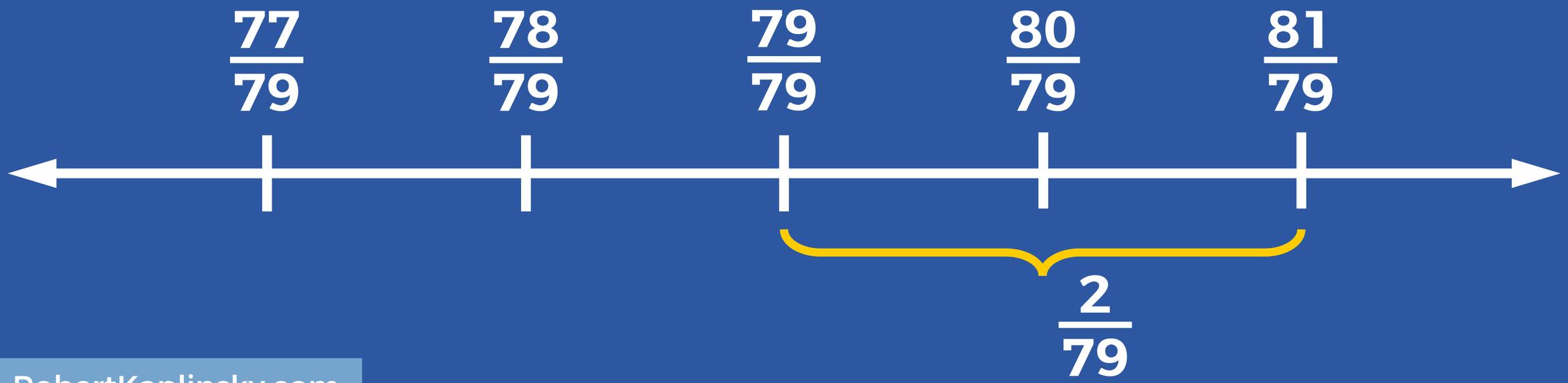
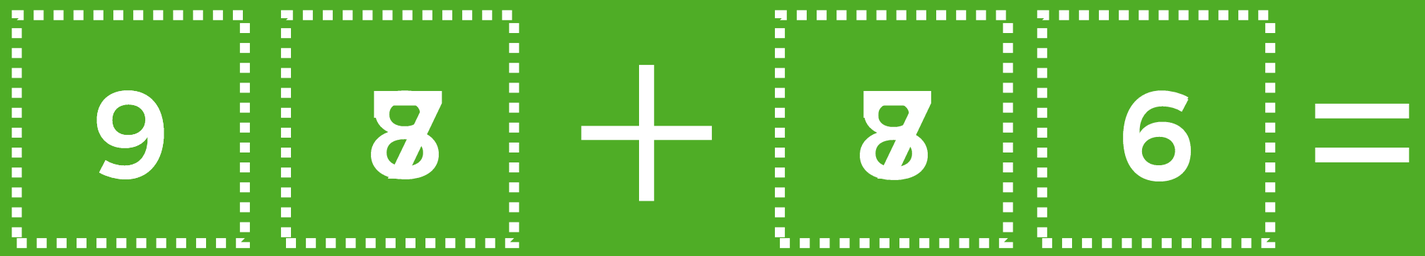

79/81
80/81
81/81
82/81
83/81
2/81


77/79
78/79
79/79
80/79
81/79
2/79

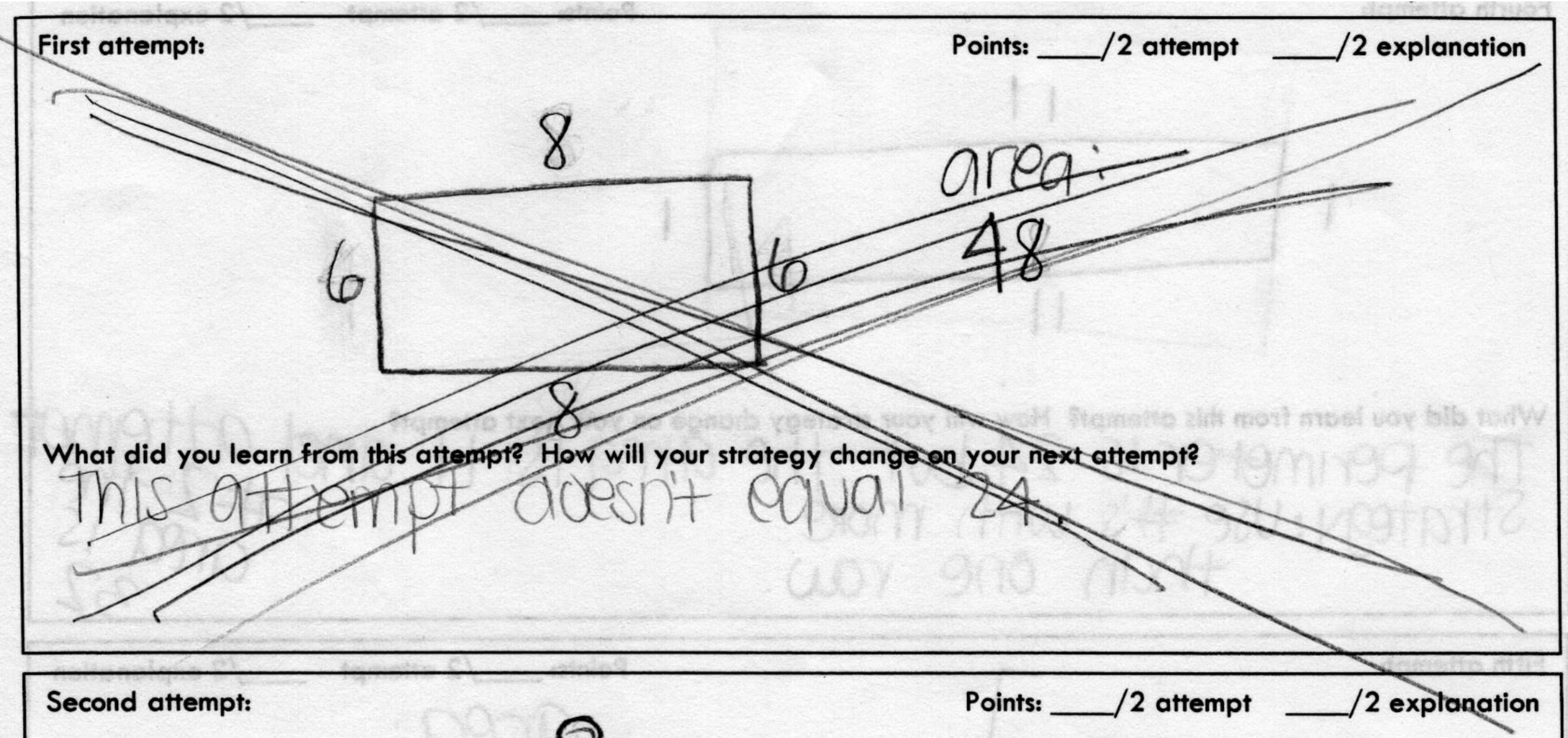
Using the digits 1 to 9 at most one time each, place a digit in each box to make the greatest possible sum.



What is the greatest area you can make from a rectangle with a perimeter of 24 units?

First attempt:

Points: ____/2 attempt ____/2 explanation



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

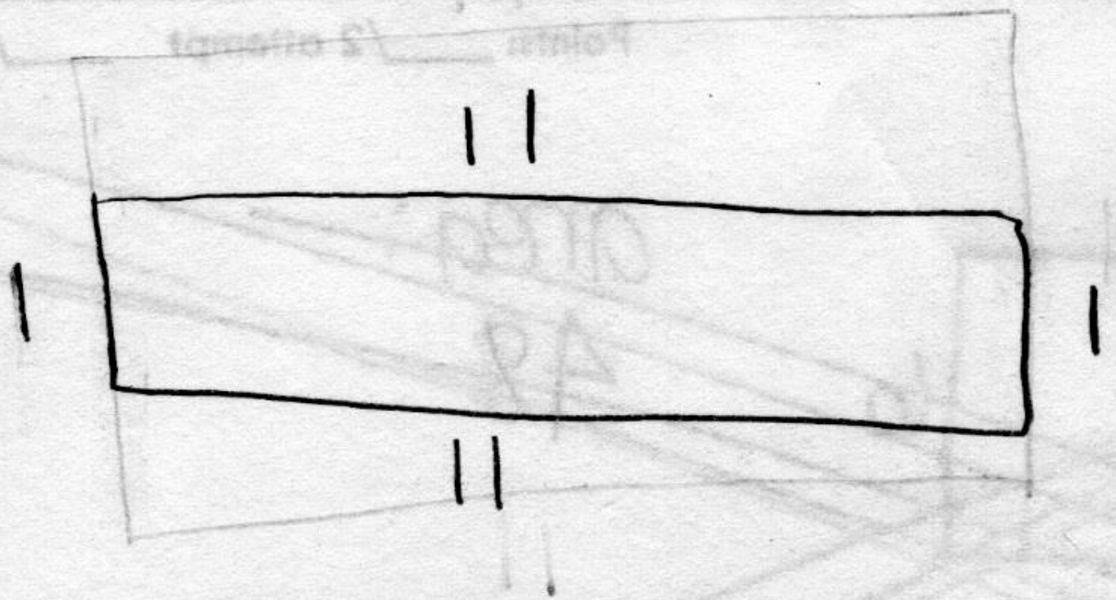
This attempt doesn't equal 24.

Second attempt:

Points: ____/2 attempt ____/2 explanation

Fourth attempt:

Points: ____/2 attempt ____/2 explanation



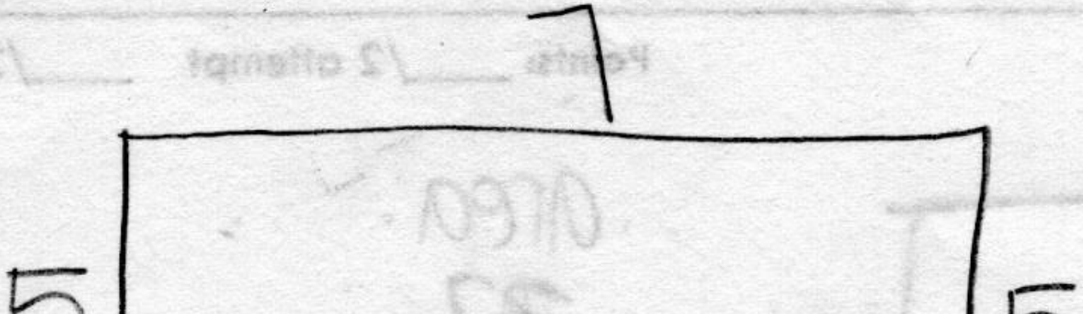
What did you learn from this attempt? How will your strategy change on your next attempt?

The perimeter is 24, but the area is 11 and attempt #2 the area is 32

Strategy: Use #'s with more than one raw.

Fifth attempt:

Points: ____/2 attempt ____/2 explanation



area:

35

11 units

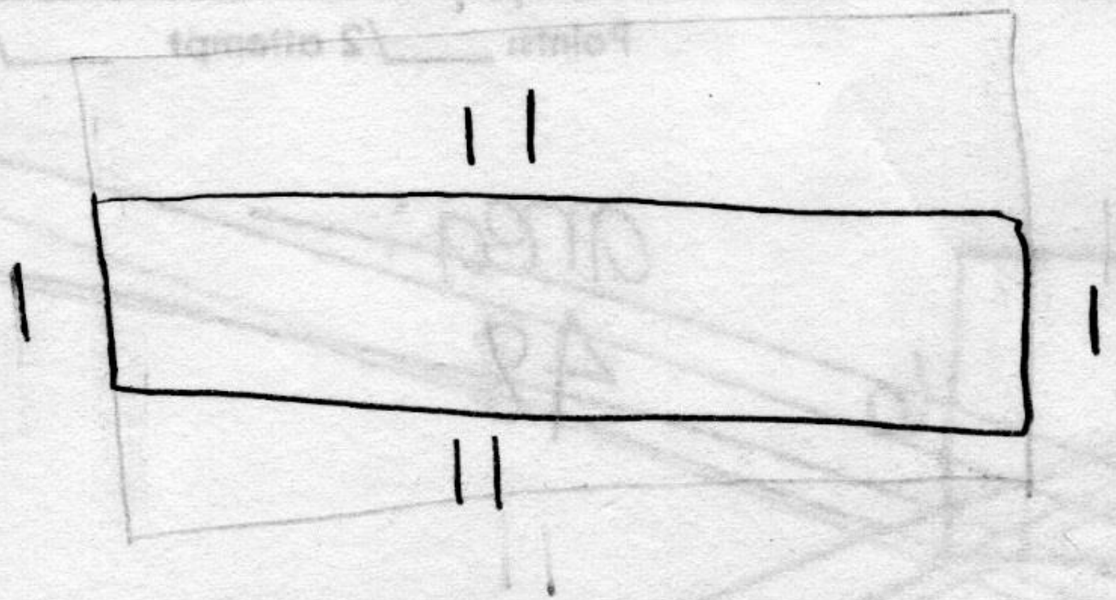
1 unit

10 units

2 units

Fourth attempt:

Points: ____/2 attempt ____/2 explanation



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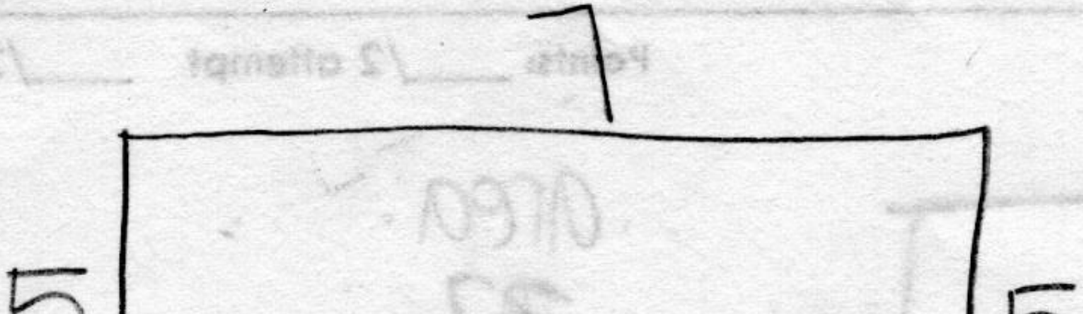


area:

35

GOALS

- [x] KING SOLOMON AND VAN HALEN
- [x] OPEN MIDDLE
- [ ] ALWAYS, SOMETIMES, NEVER
- [ ] TRUTH TRUTH LIE
- [ ] NEXT STEPS

A number with 3 digits is larger than a number with 2 digits.

Source: Joe Schwartz

ALWAYS, SOMETIMES, NEVER

- How do you prove something is:
  - always true?
  - sometimes true?
  - never true?

ALWAYS, SOMETIMES, NEVER

- Can be used:
  - as a collection of statements

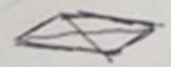
A square has opposite angles congruent.

- Yes bc all angles are 90°

13. A parallelogram is a quadrilateral.

- Yes bc it has 2 pairs of sides parallel to each other

14. A parallelogram has diagonals that bisect each other.



always when both pairs of sides are parallel

1. A square is a rectangle.

- because it's a rectangle with all equal sides & angles

Sometimes

12. A rhombus is a rectangle.

- only when there are 90° angles

6. A square is a rhombus.

- when the angles are all 90°

15. A rectangle is a rhombus.

- only when it is a square and when the sides are equal

4. A rhombus is a square.

- Only when the angles are 90°

16. A rhombus has congruent diagonals.

- when all of the sides are equ

Never

3. A rectangle is a square.

- a square can be a rectangle but a rectangle can never be a square

8. A trapezoid has legs congruent.

~~- Yes bc one pair is parallel (base)~~ None ~~but they are~~ not ~~par~~ congruent

5. A trapezoid has opposite sides parallel.

- One pair of opposite sides are parallel but the other pair is not.

11. A rectangle has perpendicular diagonals.

- never because only diagon are perpendicular with squares and

Source: Lisa Bejarano

Always

11. A rectangle has perpendicular diagonals.

5. A trapezoid has opposite sides parallel.

1. A square is a rectangle.

3. A parallelogram is a quadrilateral.

A square has opposite angles congruent.

trapezoid has legs ongruent

Sometimes

10. A parallelogram has congruent diagonals.

7. A parallelogram is a rectangle.

18. The diagonals of a rhombus are congruent.

2. The diagonals of a rhombus are perpendicular.

4. A rhombus is a square.

16. A rhombus has congruent diagonals.

17. A parallelogram has diagonals that bisect

NEVER

6. A square is a rhombus.

12. A rhombus is a rectangle.

3. A rectangle is a square.

15. A rectangle is a rhombus.

14. A parallelogram has diagonals that bisect each other.

has to be the same

not evenly

not

Always!

square has to have all congruent si

NO

not

Source: Lisa Bejarano

ALWAYS, SOMETIMES, NEVER

- Can be used:
  - as a collection of statements
  - a single statement

A Hexagon is...

six sided figure with equal side lengths with each side coming together at a 60° angel on the inside

Source: mathmistakes.org

Sort the carts into three groups. Put all the statements that are always true with the ALWAYS card. Put all the statements that are sometimes true with the SOMETIMES card. Put all the statements that are never true with the NEVER card.

Fractions are numbers less than one.

Fifths are bigger than sixths

If two fractions have the same denominator, the one with one with the larger numerator is greater.

You can represent the area of the fraction like 1/2 in different ways as long as they have each have the same total area.

Tenths are smaller than hundredths

One-third is one of three pieces.

The fractions 1/2, 3/6, and 4/8 all appear in the same place on a number line.

SOMETIMES

The numerator is less than the denominator.

The bigger the denominator, the bigger the pieces.

Fractions have a value between 0 and 1.

ALWAYS

$\frac{3}{6} > \frac{1}{2}$

You can't simplify a fraction with an odd denominator.

NEVER

$\frac{3}{5} > \frac{3}{4}$

Equal-sized pieces have the same shape.

The bigger the numerator, the more pieces there are.

ALWAYS, SOMETIMES, NEVER

- Grades K-5: Arithmetic
  - robertkaplinsky.com/arithmetic
- Grade 3-8: Fractions
  - robertkaplinsky.com/fractions
- Grades 9-12: Systems of Equations
  - robertkaplinsky.com/systems

LESSONS LEARNED ABOUT ASN

- Be careful using statements that expire:
  - When you subtract a number, you can never take away a larger number from a smaller number.
  - When you divide, the quotient is always smaller.
  - Only positive numbers have square roots.

LESSONS LEARNED ABOUT ASN

- Don’t do it individually.
- Jigsaw groups.
- Look for problematic statements.
- Talk about sufficient reasoning.

ALWAYS, SOMETIMES, NEVER

Lisa Bejarano

Grace Chen

Sarah Carter

Beth Ferguson

Kristin Gray

Chris Luzniak

Fawn Nguyen

Joe Schwartz

Christy Sutton

Tracy Zager

GOALS

- [x] KING SOLOMON AND VAN HALEN
- [x] OPEN MIDDLE
- [x] ALWAYS, SOMETIMES, NEVER
- [ ] TRUTH TRUTH LIE
- [ ] NEXT STEPS

TRUTH TRUTH LIE

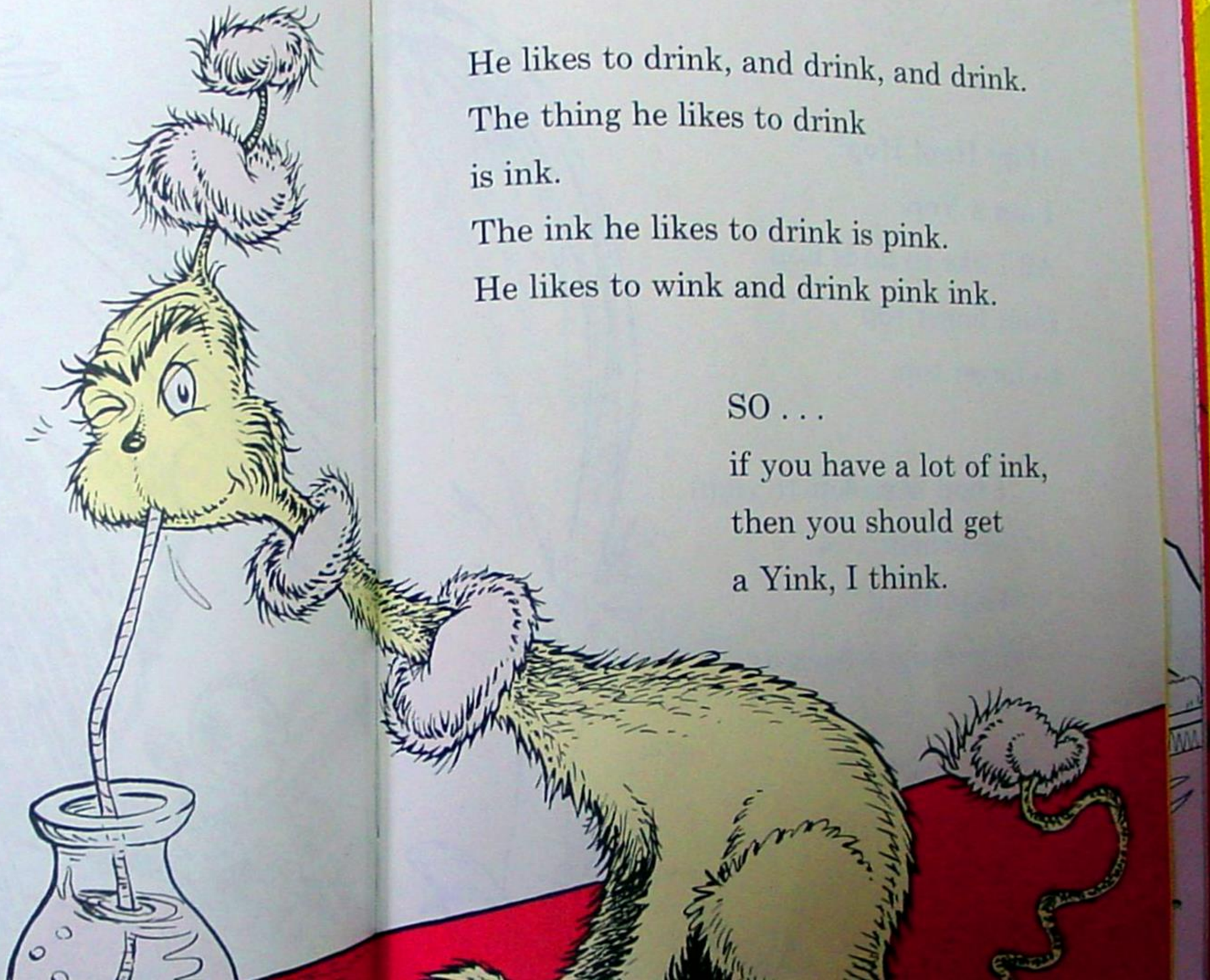
- I've been in two commercials but have only seen one of them.
- I always skip a page of the *Cat in the Hat* because it scares me.
- I have a rap video on YouTube with over 19,000 views


KAY-Z

This one,
I think,
is called
a Yink.

He likes to wink,

he likes to drink.



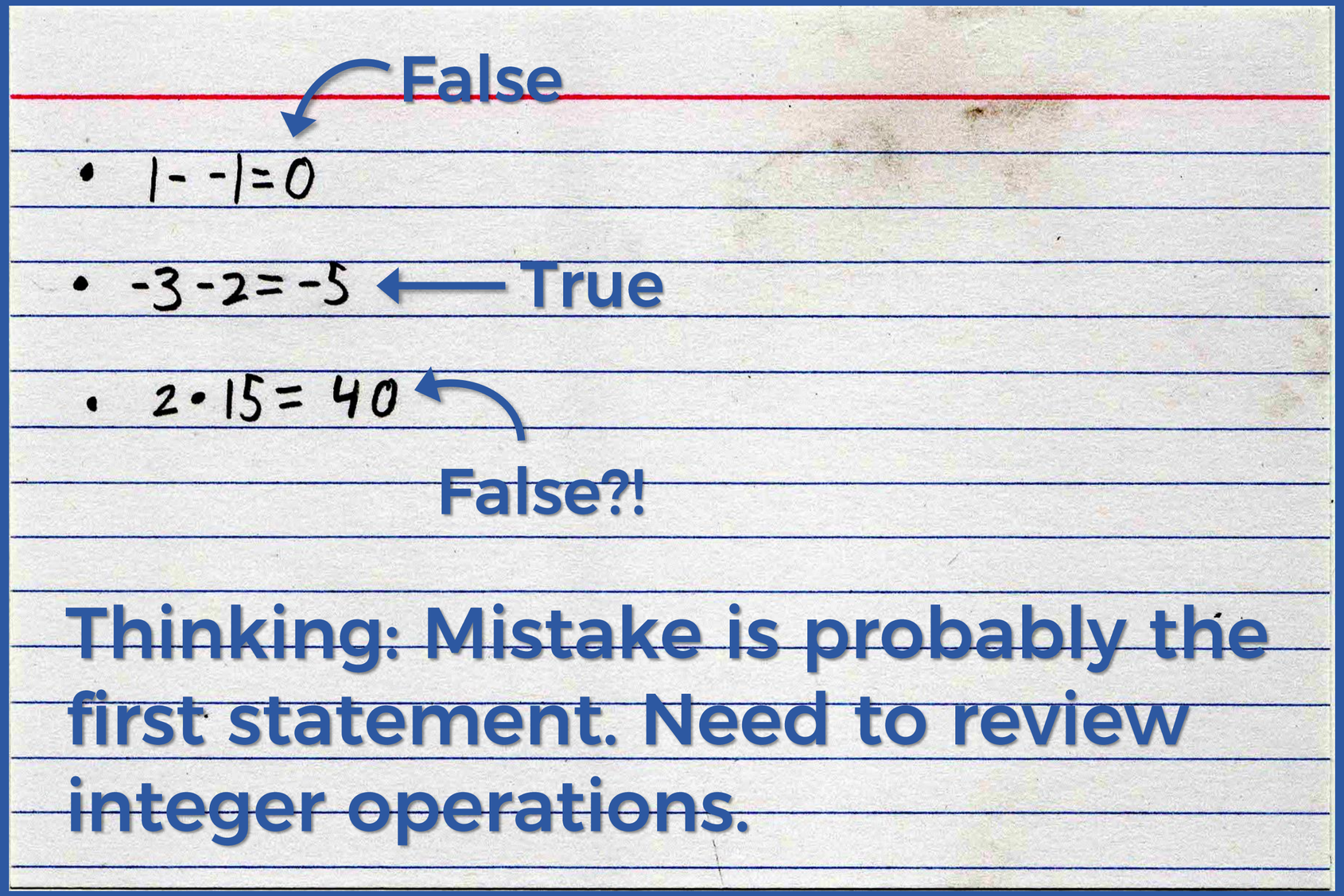
He likes to drink, and drink, and drink.
The thing he likes to drink
is ink.
The ink he likes to drink is pink.
He likes to wink and drink pink ink.

SO . . .
if you have a lot of ink,
then you should get
a Yink, I think.

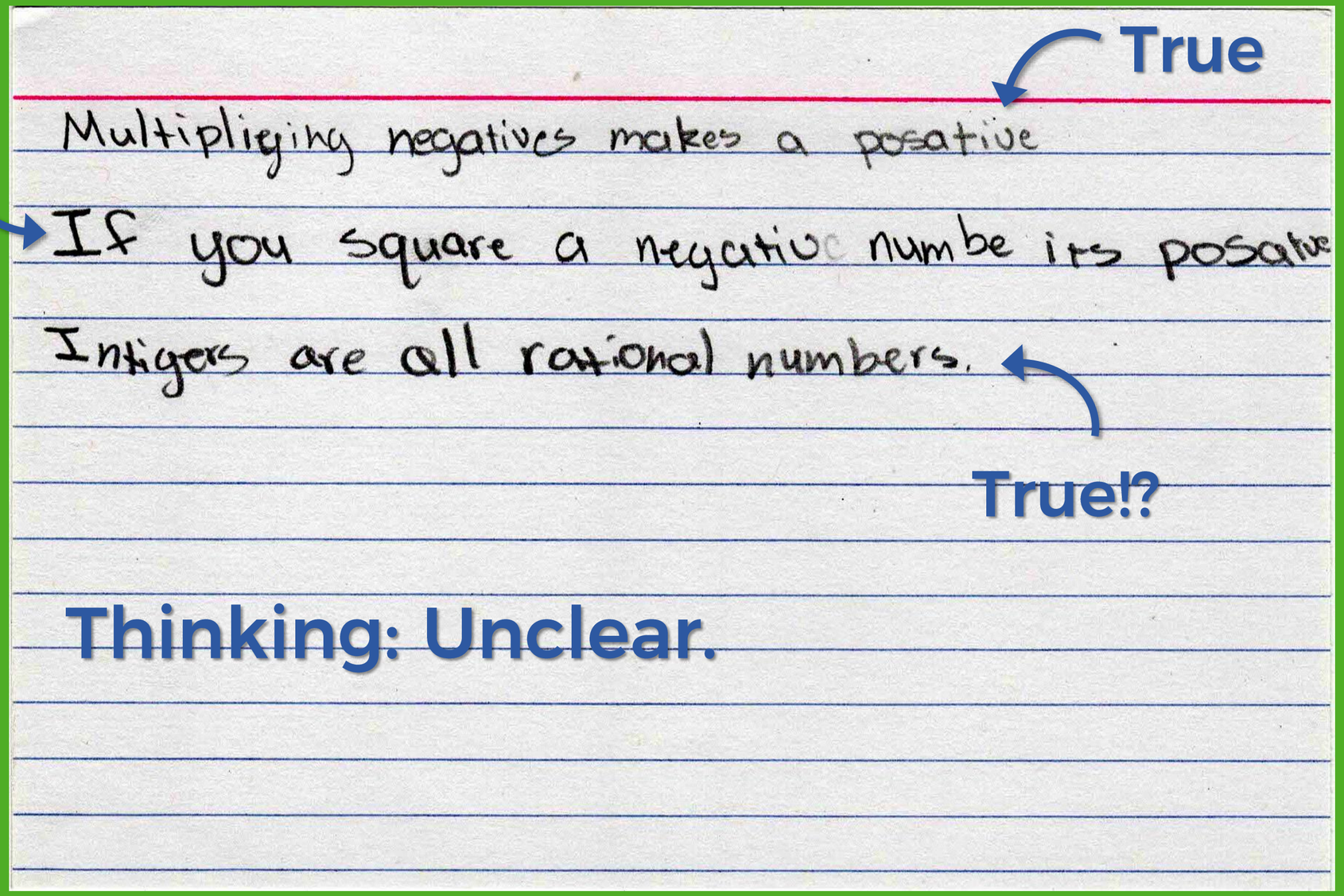
TRUTH TRUTH LIE

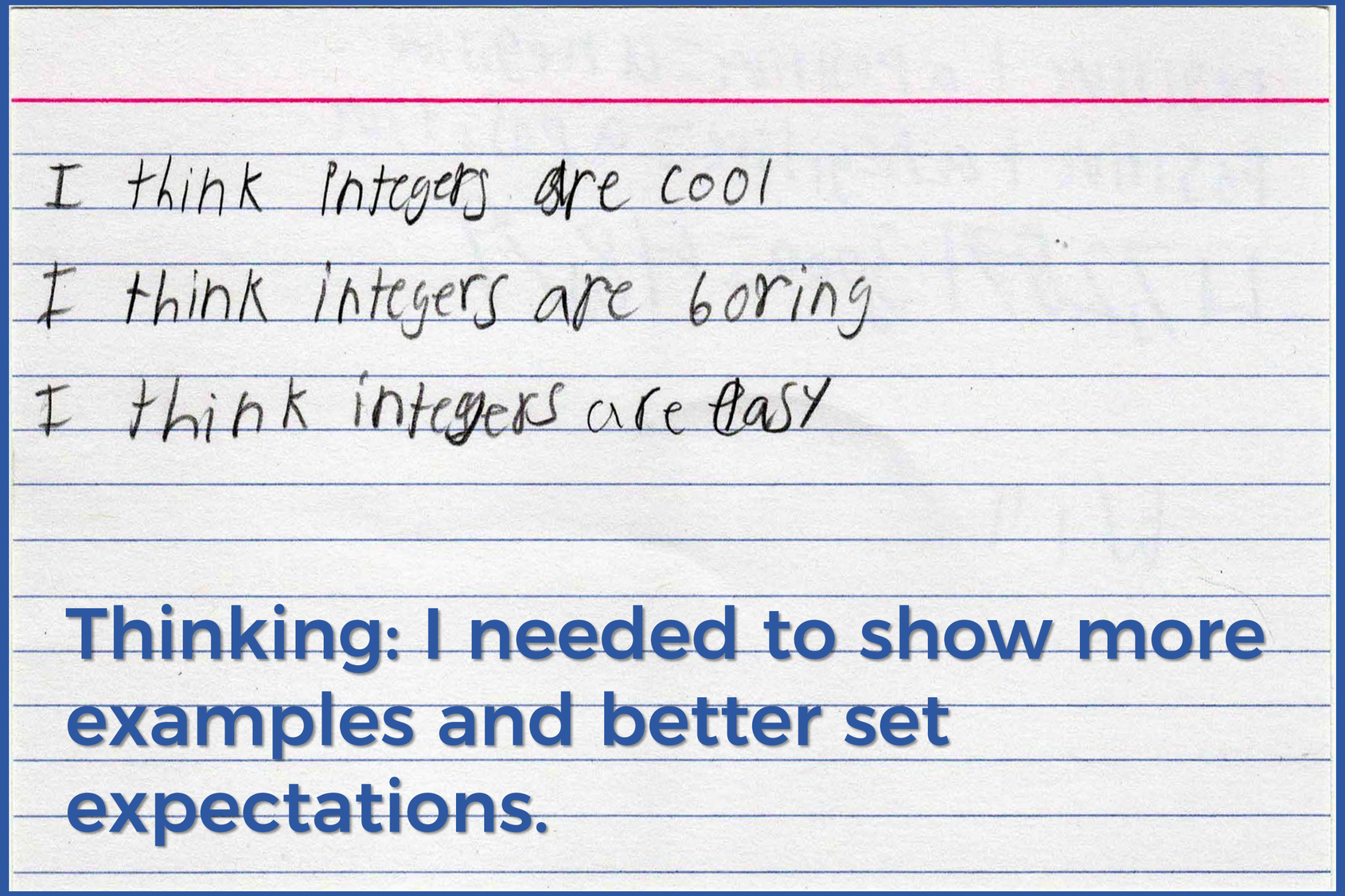
- My name is Robert.
- I eat food.
- I am 14 feet tall.

- Adding two negative numbers always gives you a negative sum.
- Subtracting two negative numbers always gives you a positive difference
- Multiplying two negative numbers always gives you a positive product.



Thinking: Mistake is probably the first statement. Need to review integer operations.


True
Multipliging negatives makes a posative
True
If you square a negative numbe its posative
Intigers are all rational numbers.
True!?
Thinking: Unclear.



Thinking: I needed to show more examples and better set expectations.

LESSONS LEARNED ABOUT TTL

- Huge reality check
- Easier to answer than create.
- Smoother later in unit

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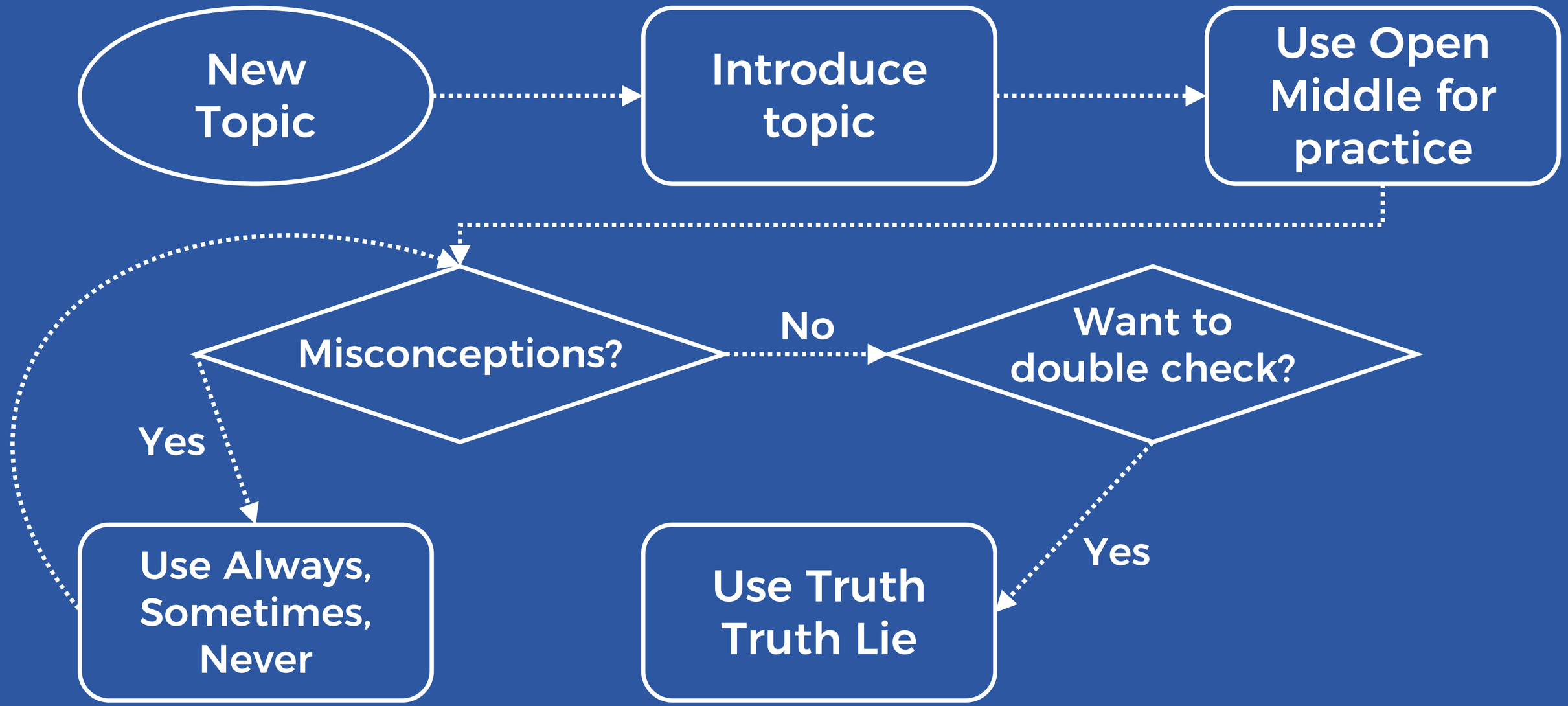
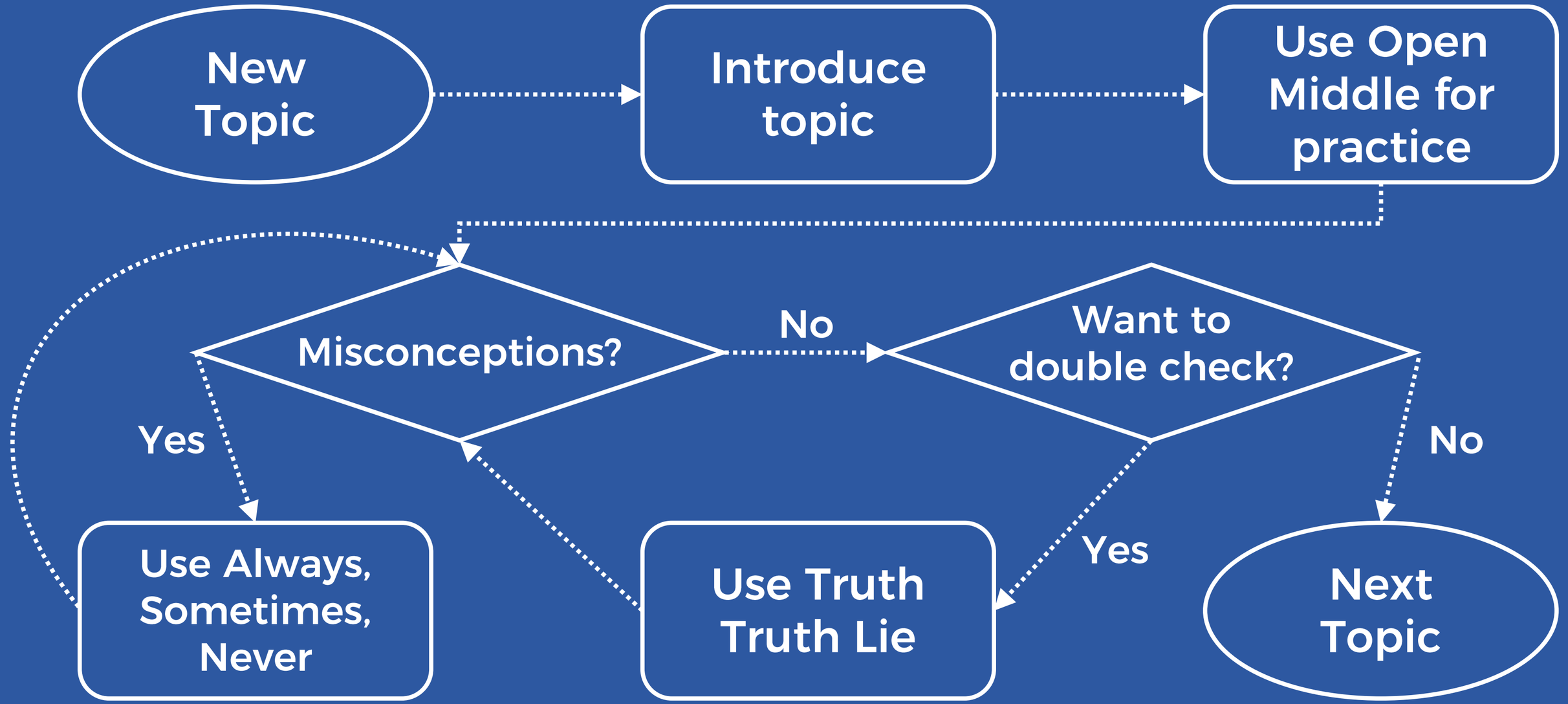

New Topic
Introduce topic
Use Open Middle for practice
Misconceptions?
No
Want to double check?
Yes
Use Always, Sometimes, Never
Use Truth Truth Lie
Yes

1.) a negative Plus a negative is a positive

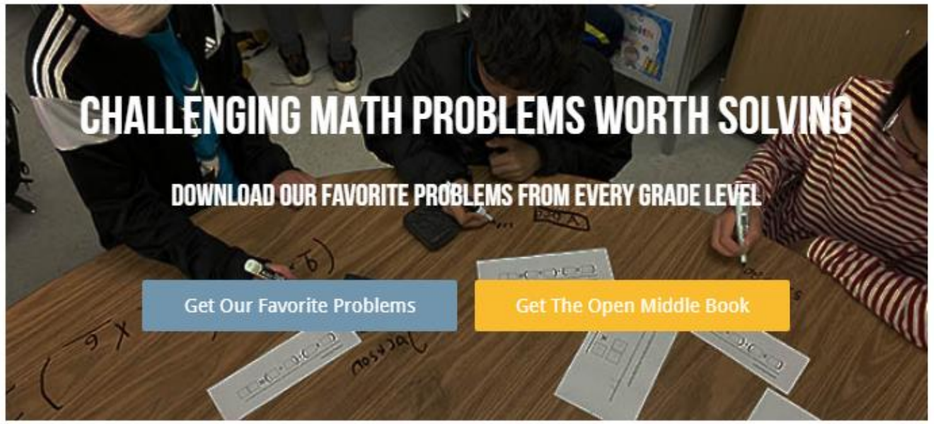
2.) adding 2 numbers together gives you a bigger number

3.) a - Plus a + can be a - & a + depending on which is bigger


New Topic
Introduce topic
Use Open Middle for practice
Misconceptions?
No
Want to double check?
Yes
No
Use Always, Sometimes, Never
Use Truth Truth Lie
Yes
Next Topic

OPEN MIDDLE

Get The Open Middle Book



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- Kindergarten (13)
  - Counting & Cardinality (3)
  - Geometry (3)
  - Number & Operations in Base Ten (1)
  - Operations & Algebraic Thinking (6)
- Grade 1 (21)
  - Geometry (3)

TWO-STEP EQUATIONS

Directions: Using the digits 1 to 9 at most one time each, place a digit in each box to find the greatest (or least) possible values for x.

Hint

How does each constant's value affect the solution's value?
How does the coefficient's value affect the solution's value?

Answer

Assuming x can be a negative value, 1x + 9 = 2 gives the least possible value of -7. The greatest possible value would be, 1x + 2 = 9

Source: Audrey Mendivil, Daniel Luevanos, and Robert Kaplinsky

Tags 7.EE.4.A AUDREY MENDIVIL DANIEL LUEVANOS DOK 3: STRATEGIC THINKING ROBERT KAPLINSKY

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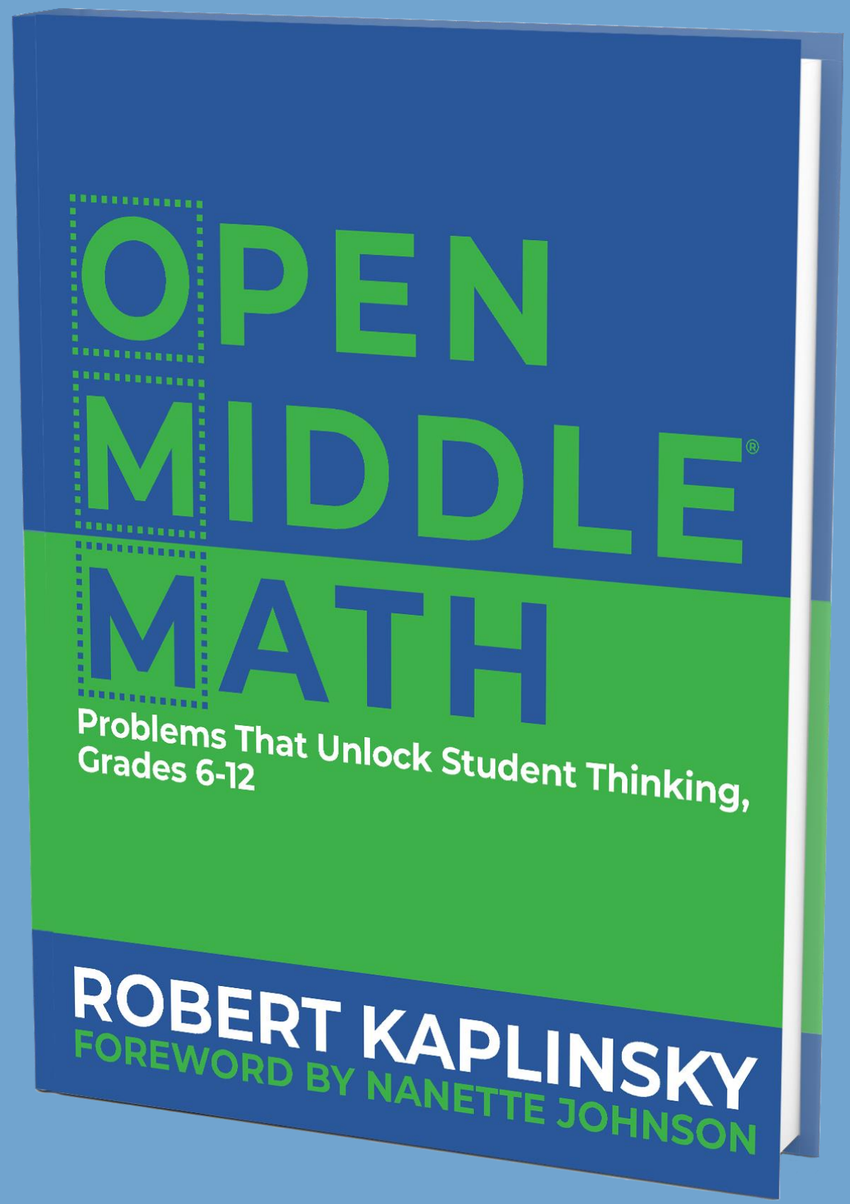

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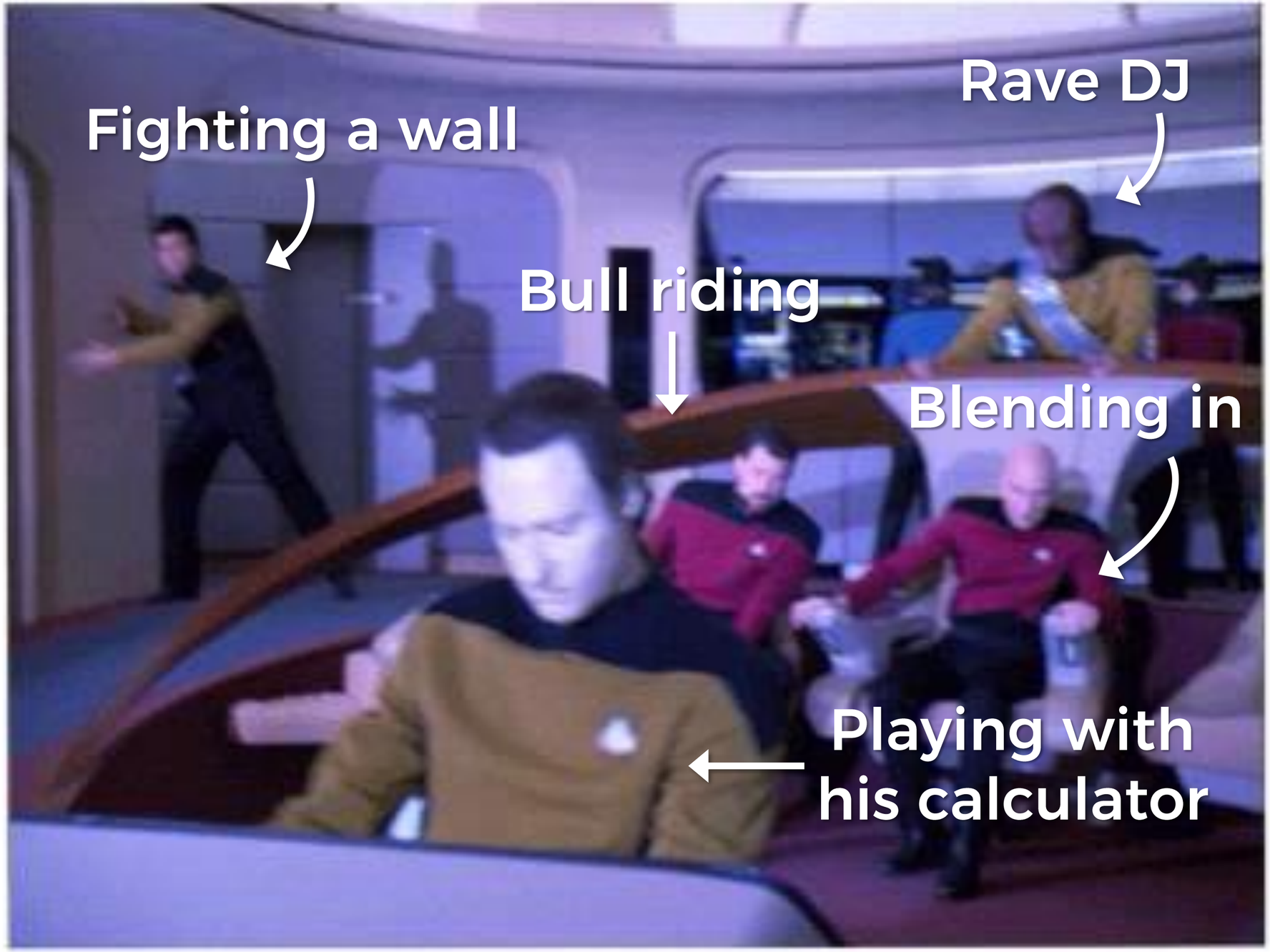
Fighting a wall
Rave DJ
Bull riding
Blending in
Playing with
his calculator

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robert@robertkaplinsky.com

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