Being a Math Person: Confidence-Building HiSet Math Instruction

Heather Mecham
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Literacy KC

Changing lives beyond words

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Are you a math person?

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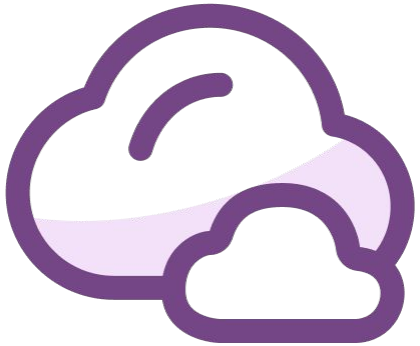

What feelings do you associate with you or a student saying, "I'm not a math person?"

Presenter: Heather Mecham
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Today's Goals

1. Examine Numeracy in Missouri
2. Consider How We Talk about Math
3. Take Steps to Be and Develop Math People
    a. Think Positively
    b. Focus on Operation Sense, not Memorization
    c. Get Comfortable with Letters
    d. Encourage Experimentation

What is Numeracy?

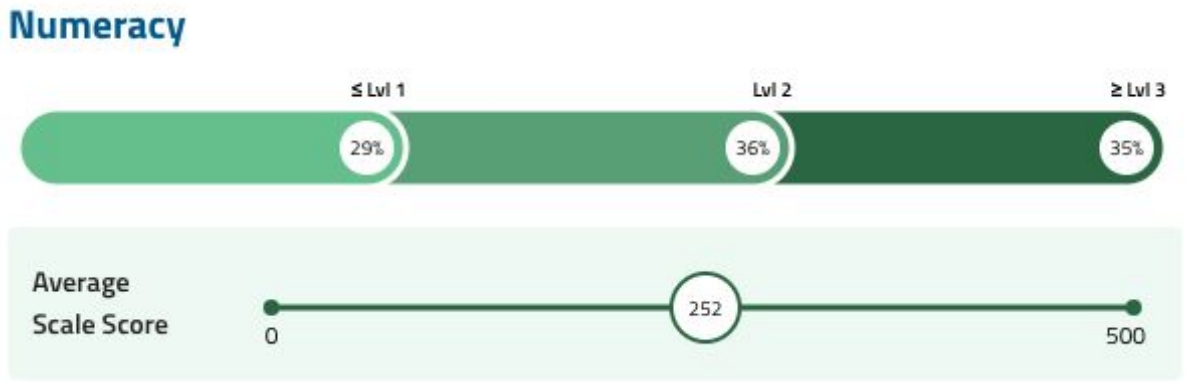
*"**Numeracy** is the ability to access, use, interpret, and communicate mathematical information and ideas, in order to engage in and manage the mathematical demands of a range of situations in adult life."*

p. 75, OECD 2013

The ability to use math when it is needed in real life.

Numeracy in Missouri

[PIAAC Study of adult literacy and numeracy]



29% low numeracy skills

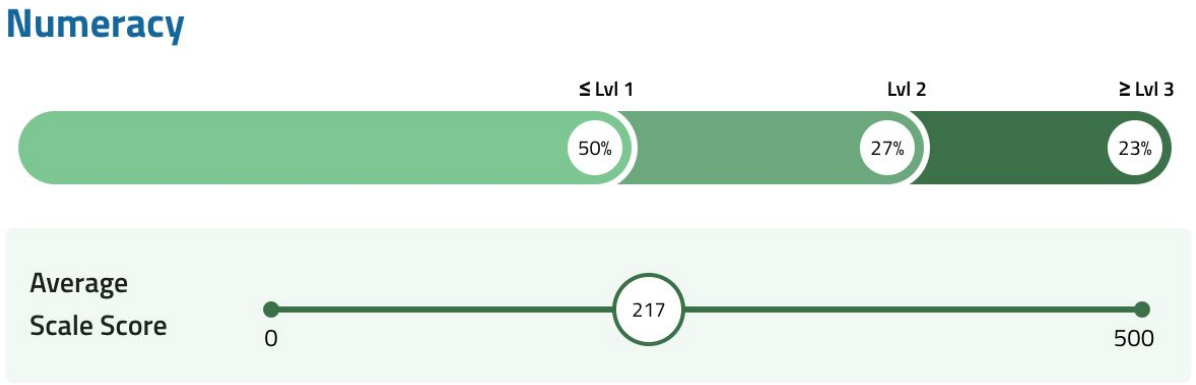
65% level 2 or below

Level 3 is proficiency

65% of all Missouri adults are not proficient in numeracy

Numeracy in Missouri without a high school diploma

[PIAAC Study of adult literacy and numeracy]



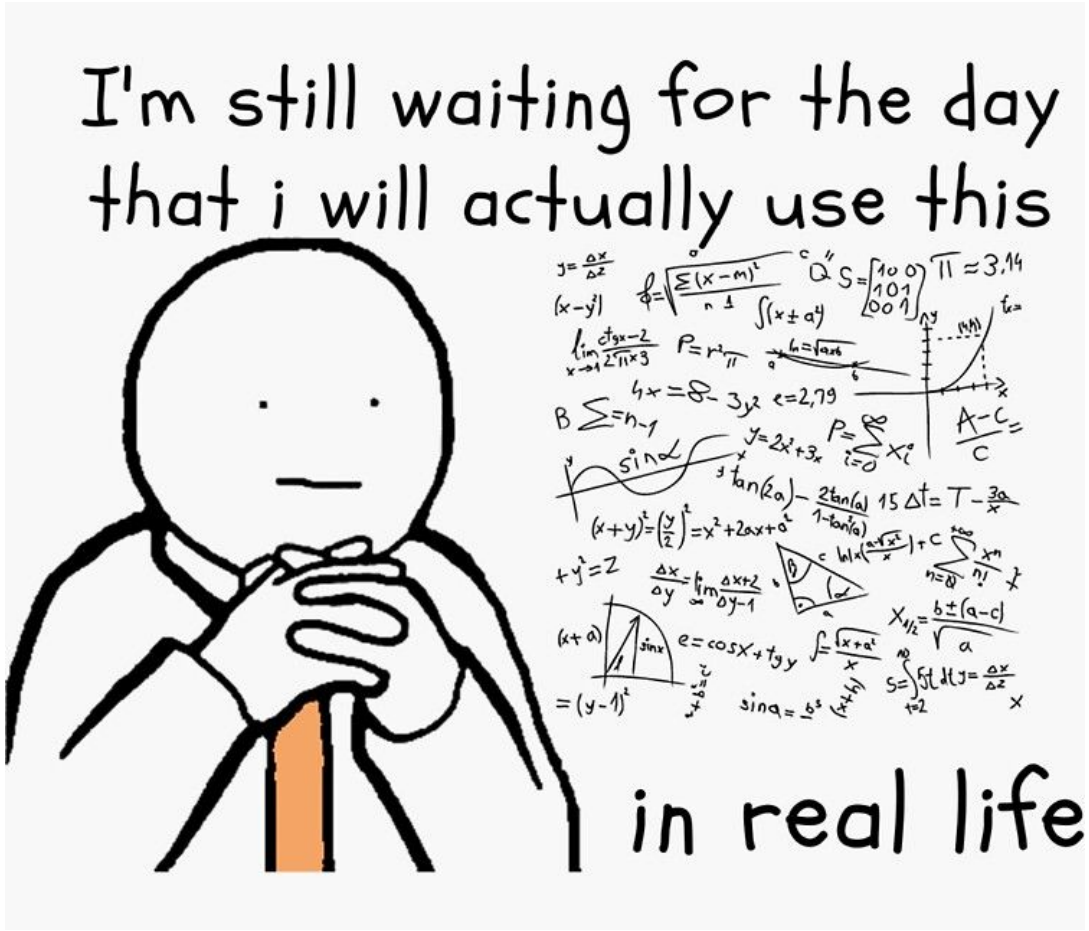
50% low numeracy skills

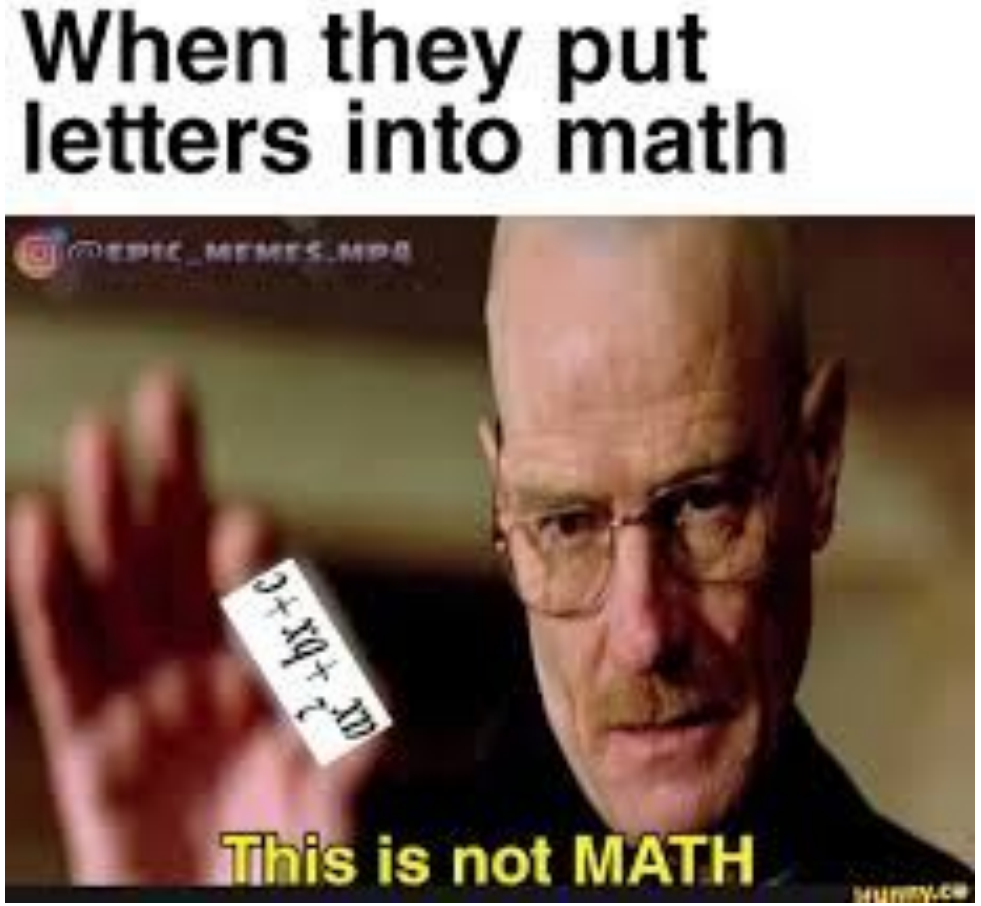
77% level 2 or below

Level 3 is proficiency

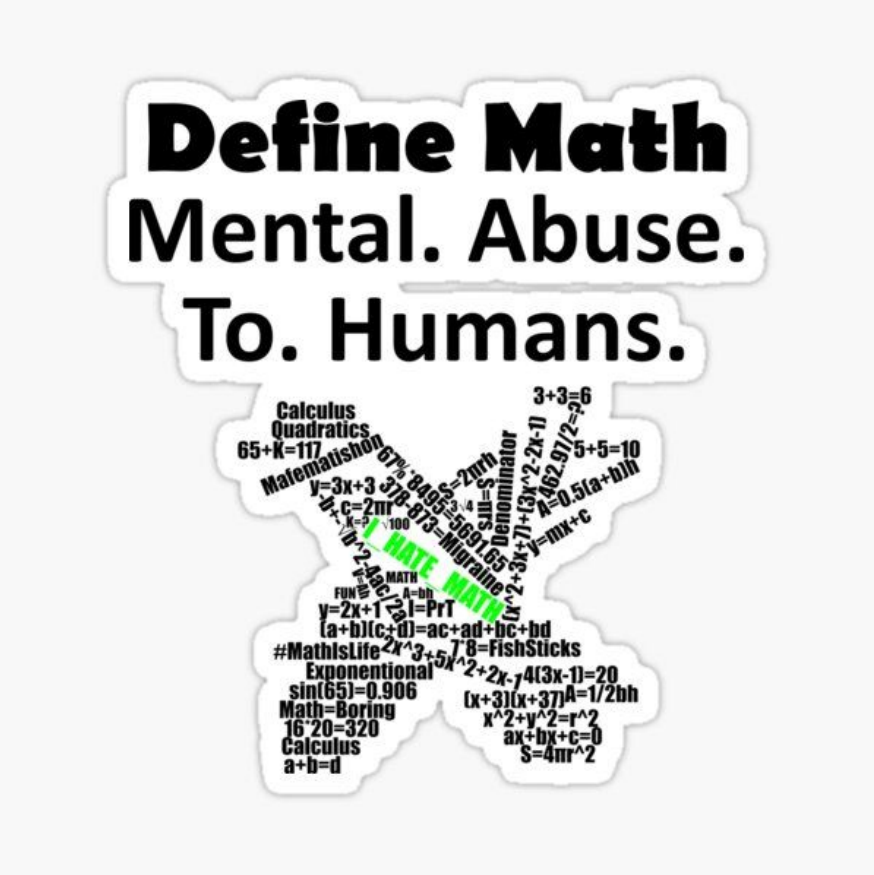
77% of MO adults w/out diplomas are not proficient in numeracy

How We Talk About Math





How We Talk About Math



Negative Cognition

University of Delaware's Jessica Namkung defines negative cognition as:

"students' negative beliefs about their math performance, self-deprecating thoughts and worries, even during moments of calm."

and found that

"negative cognition in particular significantly and negatively affected students' grade-level computational skills."

The Effect of Negative Cognition about Math

- Self-fulfilling prophecy
  "I'm not good at math" ⟶ difficulty with math problems
- Takes up valuable mental resources
  Thinking about math instead of doing math
- Fixed mindset: All or nothing
  Either I'm a math person or I'm not
- Failure instead of learning
  Students focus on mistakes instead of the process of learning

Instead of . . .

Mental	I can’t do it.
Abuse	I’m not good at math.
To	I got it wrong.
Humans	I’m just not a math person.

Think Positively

Mistakes	I will work to learn math.
Allow	I will try.
Thinking to	I like to learn.
Happen	I am curious.

Operation Sense, not Memorization

Understanding the way numbers group together is far more important than the rote act of memorizing math facts.

Strategies to understand and process math can lead to memorization.

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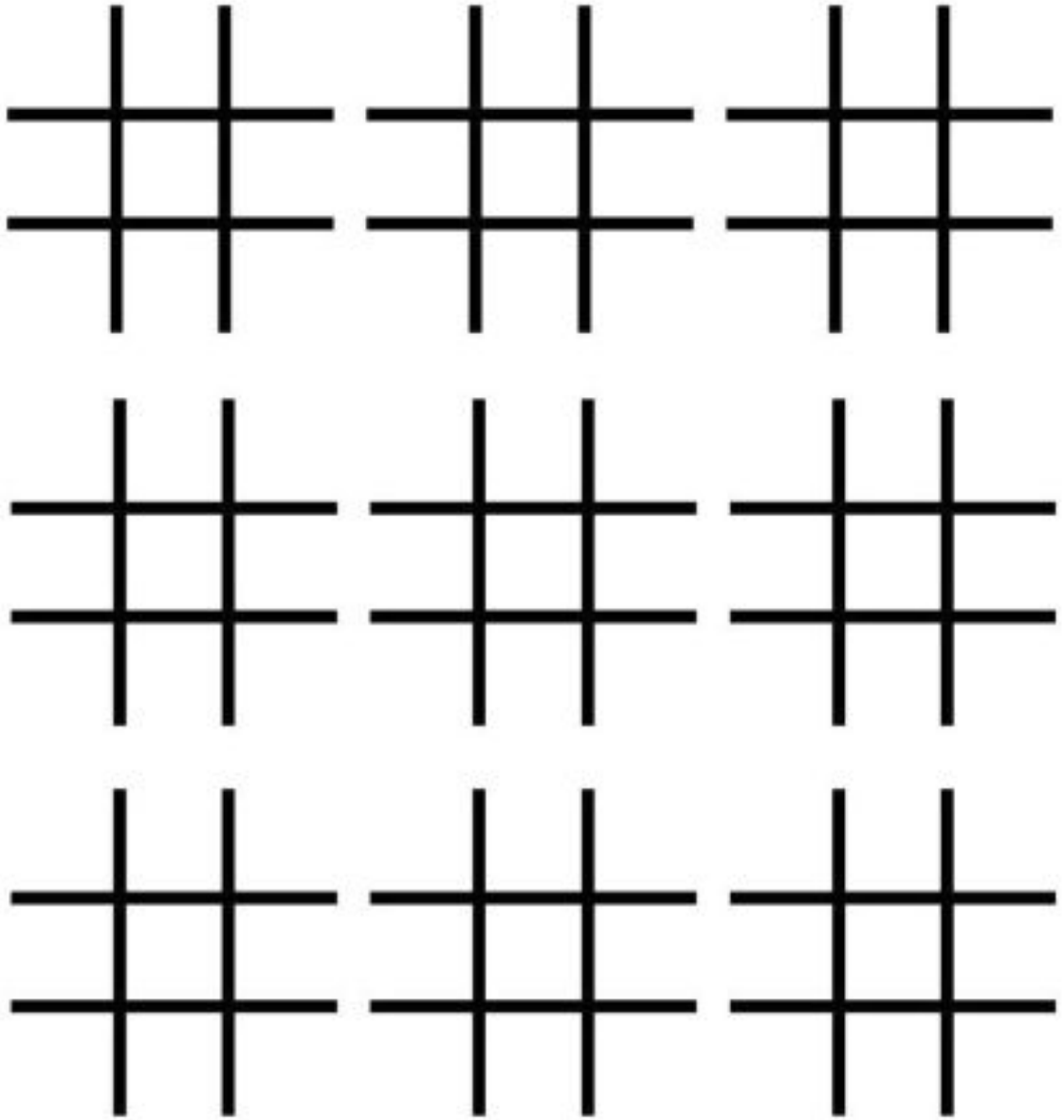
Multiplication Tic Tac Toe

Draw nine tic tac toe boards on your paper.



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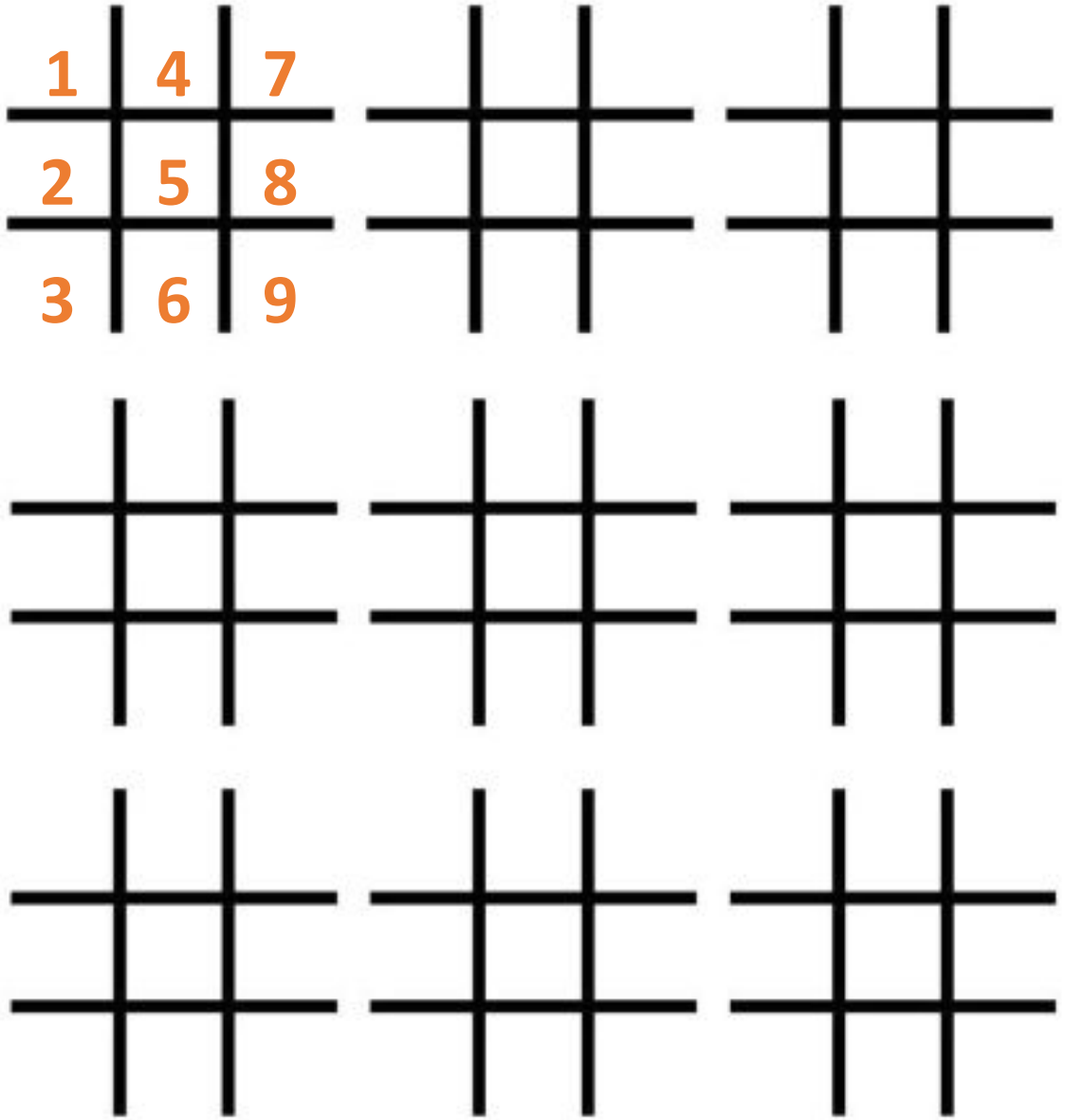
Multiplication Tic Tac Toe

Fill in the numbers 1-9 in the first board. This is your 1x table.



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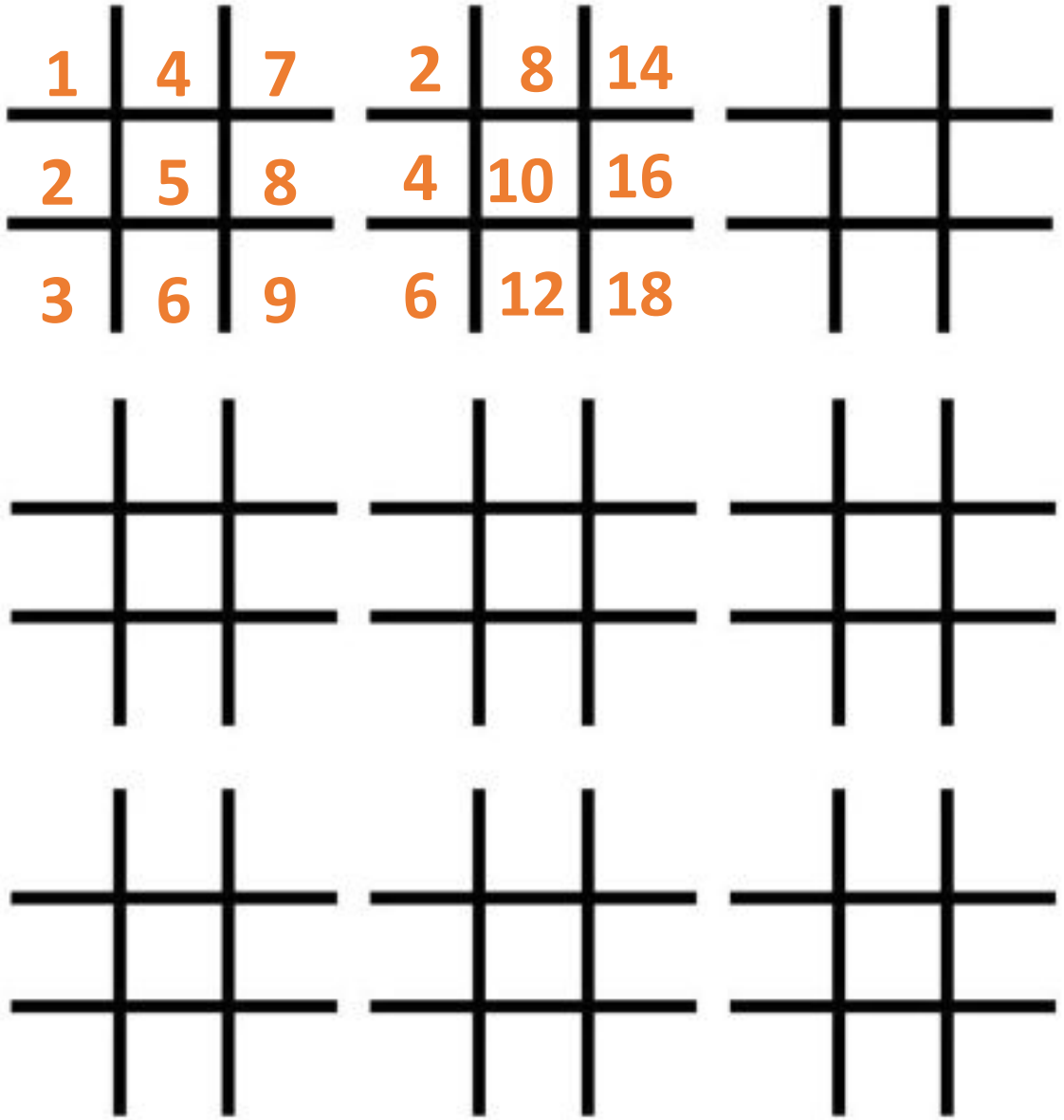
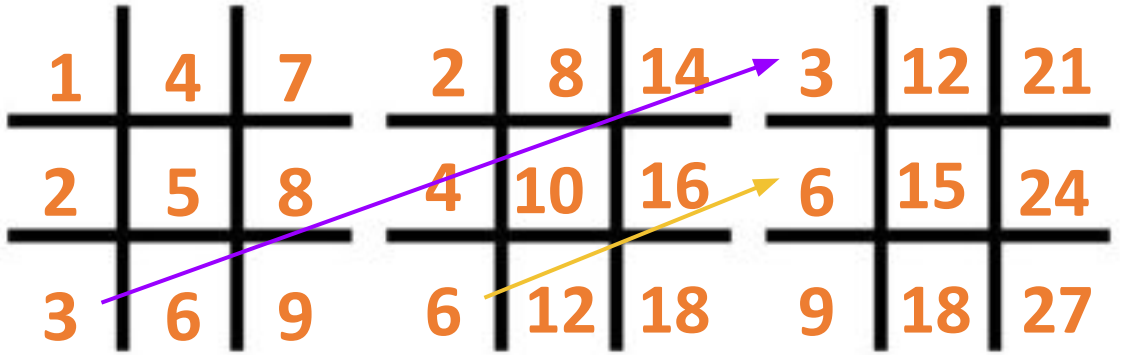
Multiplication Tic Tac Toe

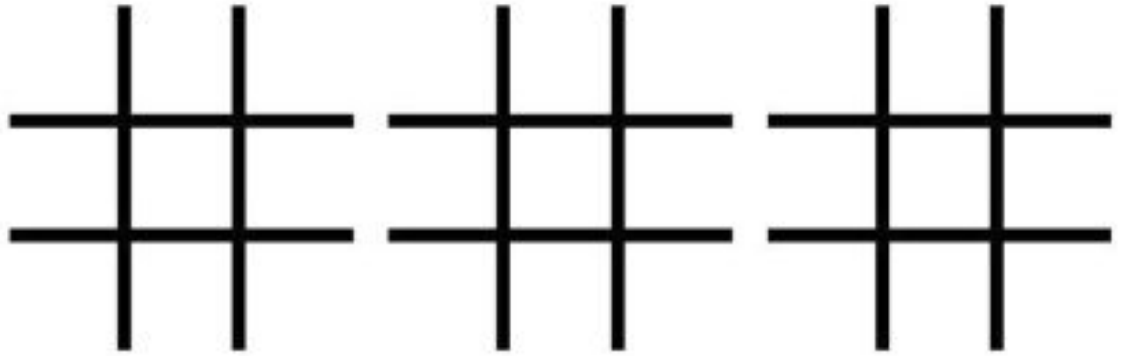
Count by 2s to fill in the second board.This is your 2x table.

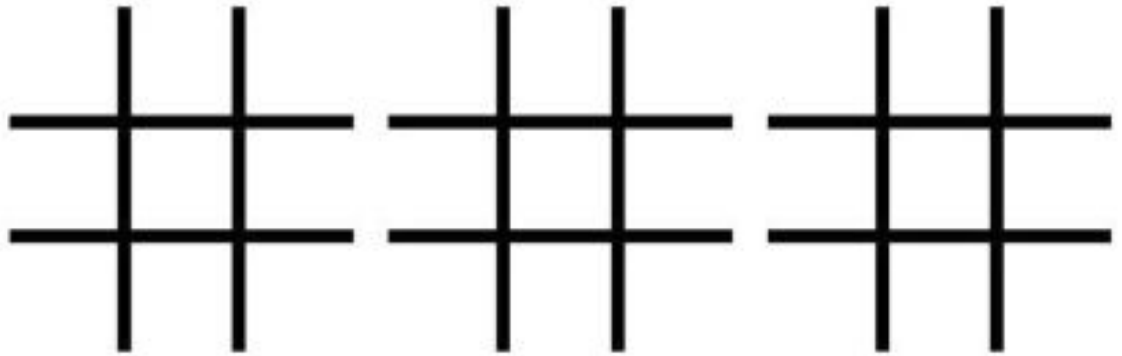


Multiplication Tic Tac Toe

Repeat your 3s, then count by 3.







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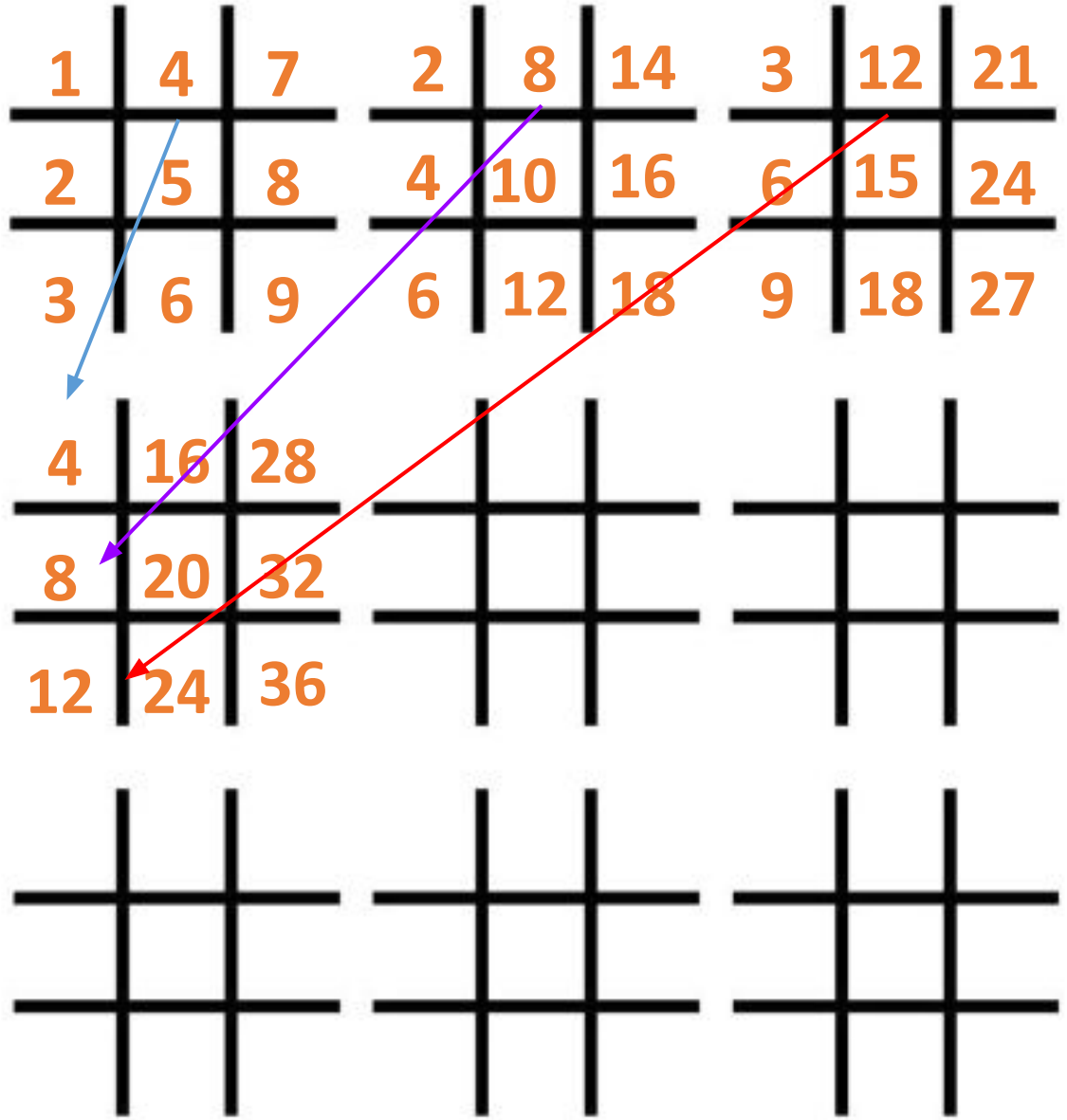
Multiplication Tic Tac Toe

Repeat your 4s, then count by 4.



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Multiplication Tic Tac Toe

1	4	7
2	5	8
3	6	9

2	8	14
4	10	16
6	12	18

3	12	21
6	15	24
9	18	27

Repeat your 5s, then count by 5.

Repeat your 6s, then count by 6.

Repeat your 7s, then count by 7.

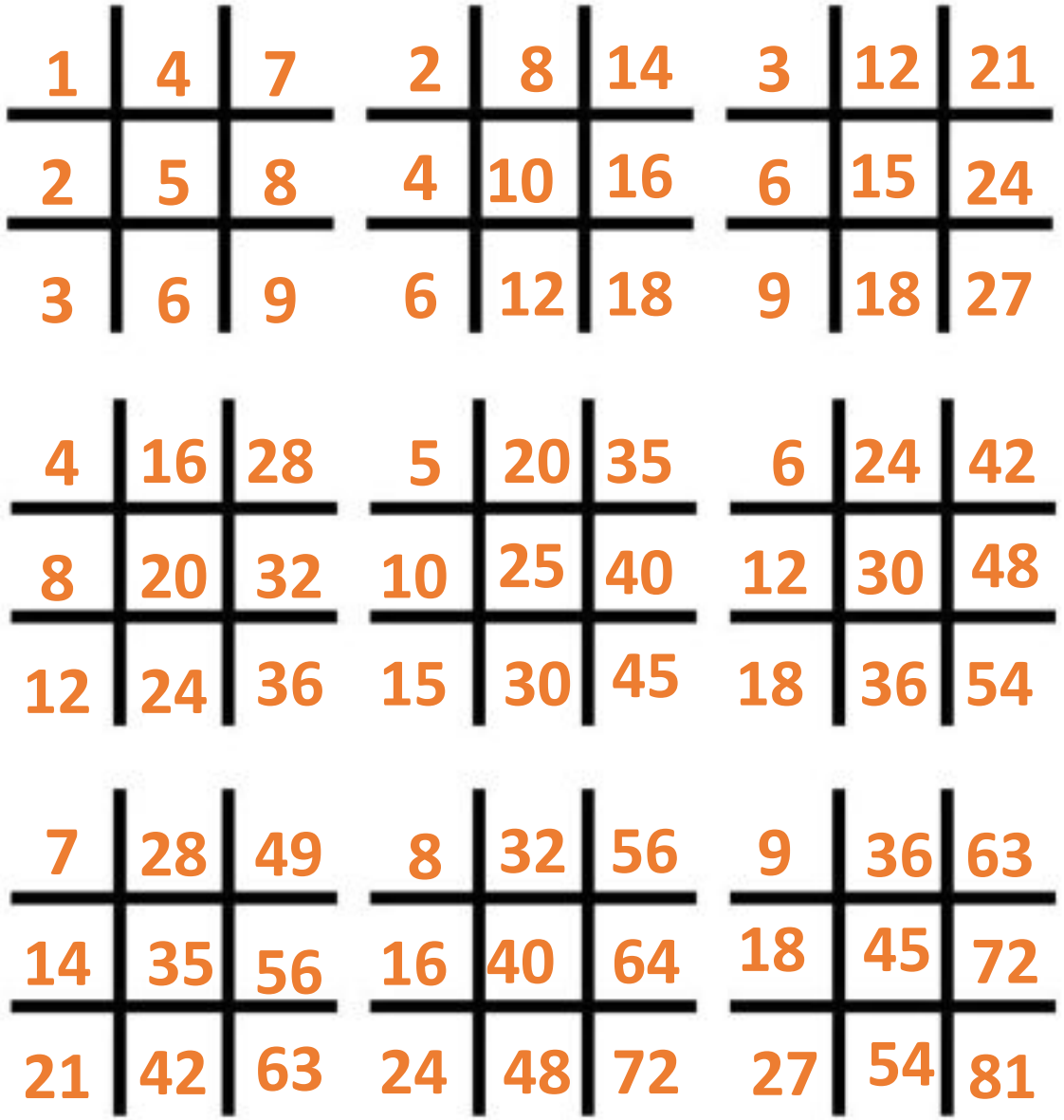
Repeat your 8s, then count by 8.

Repeat your 9s, then count by 9.

Multiplication Tic Tac Toe

What are some uses you can think of for this grid?

What are some patterns you see ir the numbers?



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Getting Comfortable with Letters

How many is it?

1. 2 C
2. 6 A
3. 12 B
4. X A B C

A.

B.

C.

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Getting Comfortable with Letters

The value of a number is CONSTANT.

2= 

The value of a letter can change, it is a VARIABLE.

A letter represents the unknown or something that can change.

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Variable

Hourly Pay

If you make $15/hour, how much will you make when you work 20 hours?

15(20)=300

But the number of hours you work can change.

15(?)=pay

So you can use a letter.

15h

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Variable

Hourly Pay

15h

If I work 10 hours. h=10

15(10)=150

If I work 40 hours. h=40

15(40)=600

I use the letter to represent the changing value.

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Always Use Letters for Unknown

6 + 2 = T

S + 2 = 8

6 + R = 8

T has the value of 8; in these equations, T = 8

S = 6

R = 2

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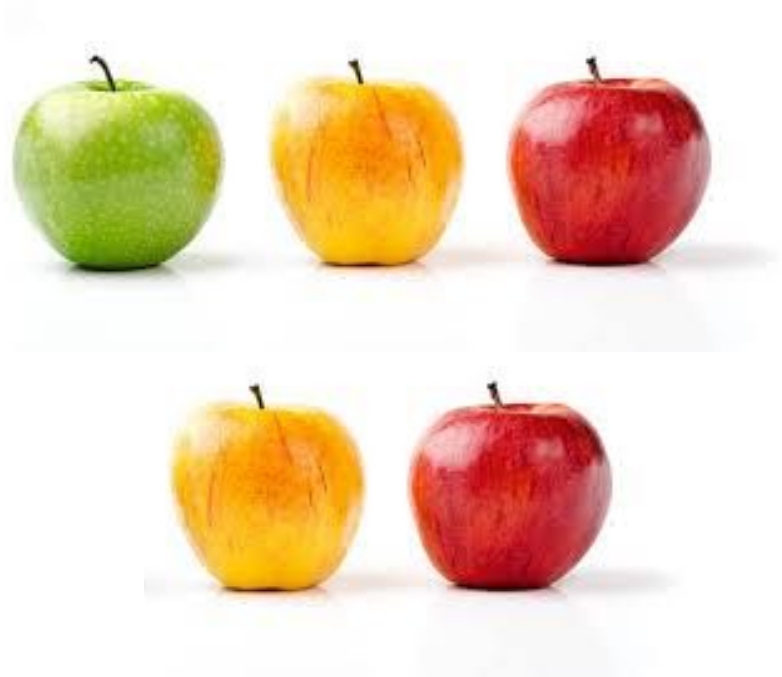
Always Use Letters for Unknown

I have three apples. I buy two more. How many do I have now?

3 + 2 = A

A = 5



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Always Use Letters for Unknown

HiSet Practice Test FPT8

Oliver runs an apparel store. He employs three people and spends $210 each day on their wages, in addition to $40 on other daily expenses. The plastic bags they use cost $0.05 each, and the number of bags used in a day is $\boldsymbol{x}$. He models this situation using the equation $\mathbf{250 + 0.05}\boldsymbol{x}$. What does $\mathbf{0.05}\boldsymbol{x}$ represent?

A. Other daily expenses
B. Fixed daily expenses
C. Salary of each employee
D. Salary of the sales people
E. Cost of plastic bags used in a day

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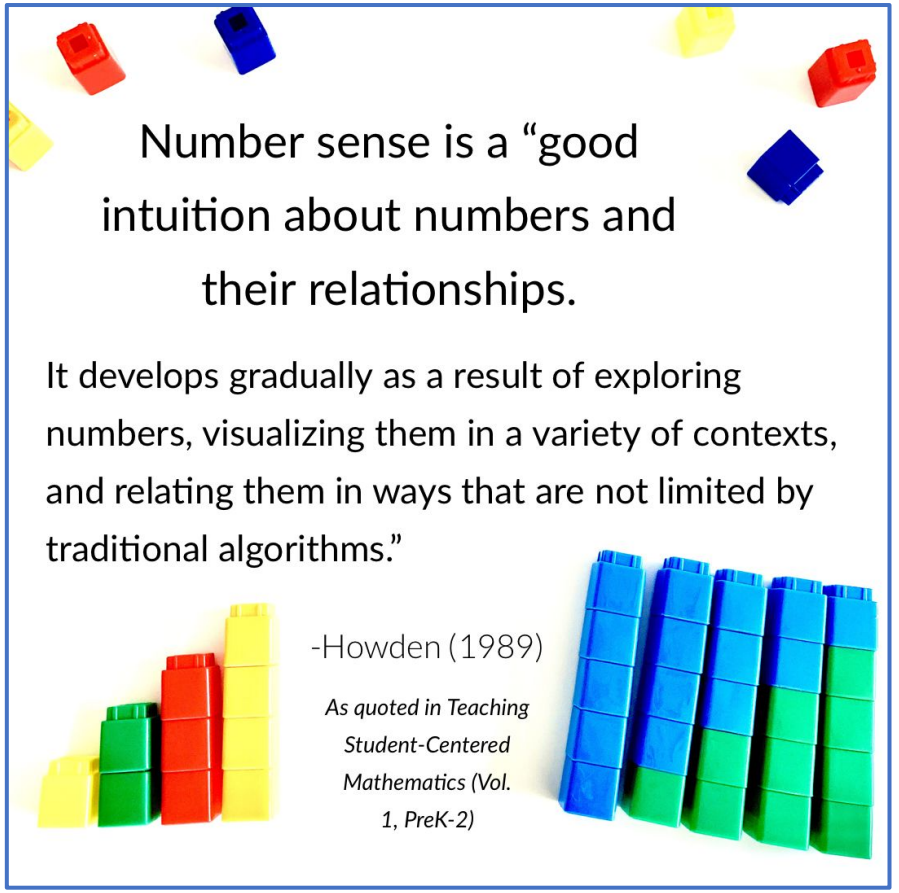
Encourage Experimentation

1. Teach the WHY
2. Show one HOW
   a. Let students try it. Discuss how they like it.
   b. Does the answer make sense?
3. Show another HOW or ask students if they know or have ideas for other HOWs
   a. Try them
   b. Does the answer make sense?



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Encourage Experimentation

HiSet Practice Test FPT8

A store is offering a discount of $5 on a minimum purchase of $25. A customer purchases x identical coffee mugs worth $9 each. The customer writes the equation $y = 9x - 25$ to find the net amount y in $ to be paid by him.

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HiSet Practice Test FPT8

A store is offering a discount of $5 on a minimum purchase of $25. A customer purchases x identical coffee mugs worth $9 each. The customer writes the equation $y = 9x - 25$ to find the net amount y in $ to be paid by him.

Which of these statements is true?

A. The equation is incorrect because 25 should be replaced by 5.
B. The equation is incorrect because – should be replaced by +.
C. The equation is incorrect because $9x$ and 25 should be interchanged.
D. The equation is correct because the discount used by the customer on his purchase is $25.
E. The equation is correct because $9x$ represents the number of coffee mugs purchased by the customer.

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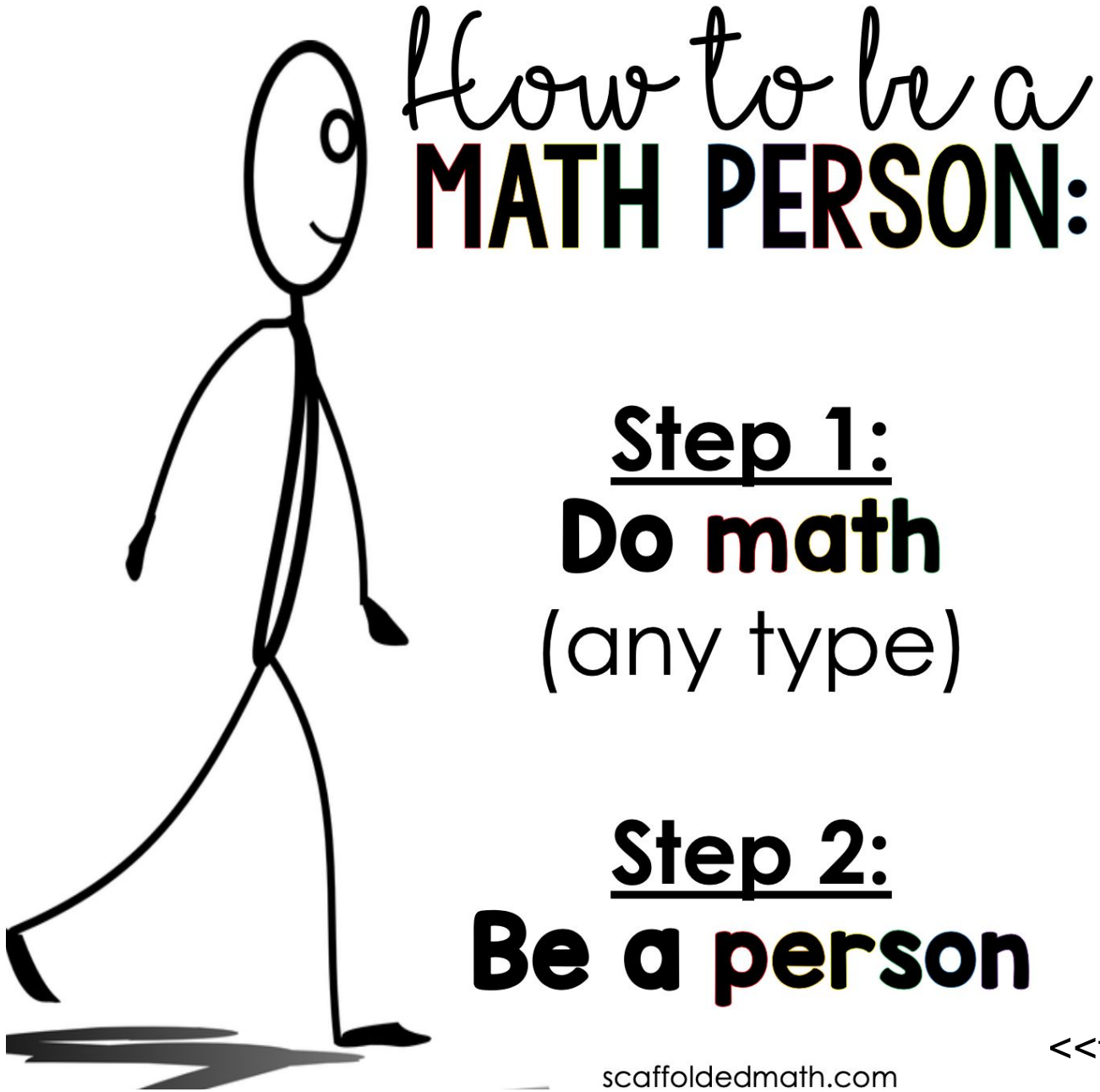
In Conclusion



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