Multiplication: More Than Repeated Addition and Times Tables

Northwest Mathematics Conference
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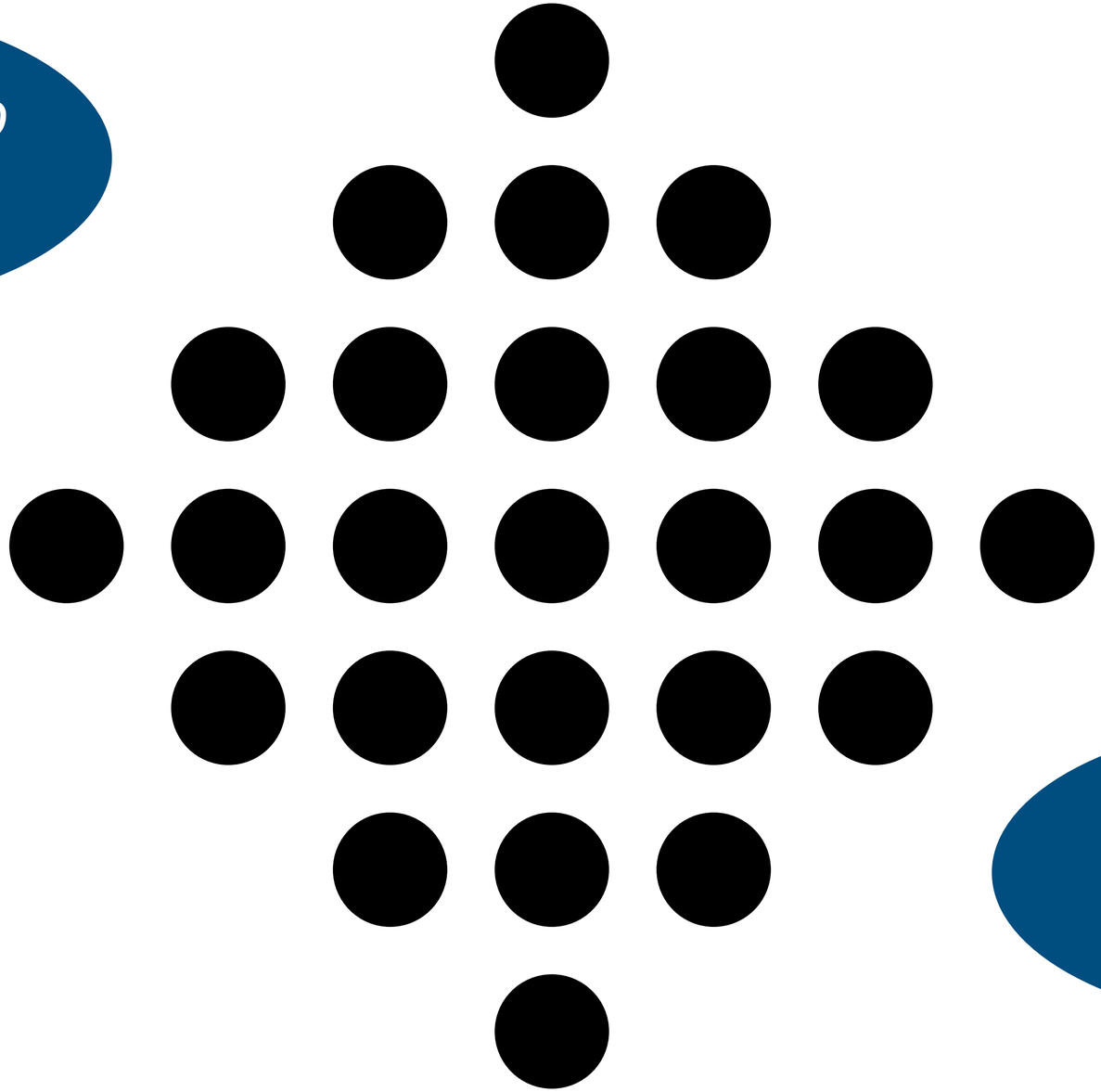
BCAMT

British Columbia Association
of Mathematics Teachers

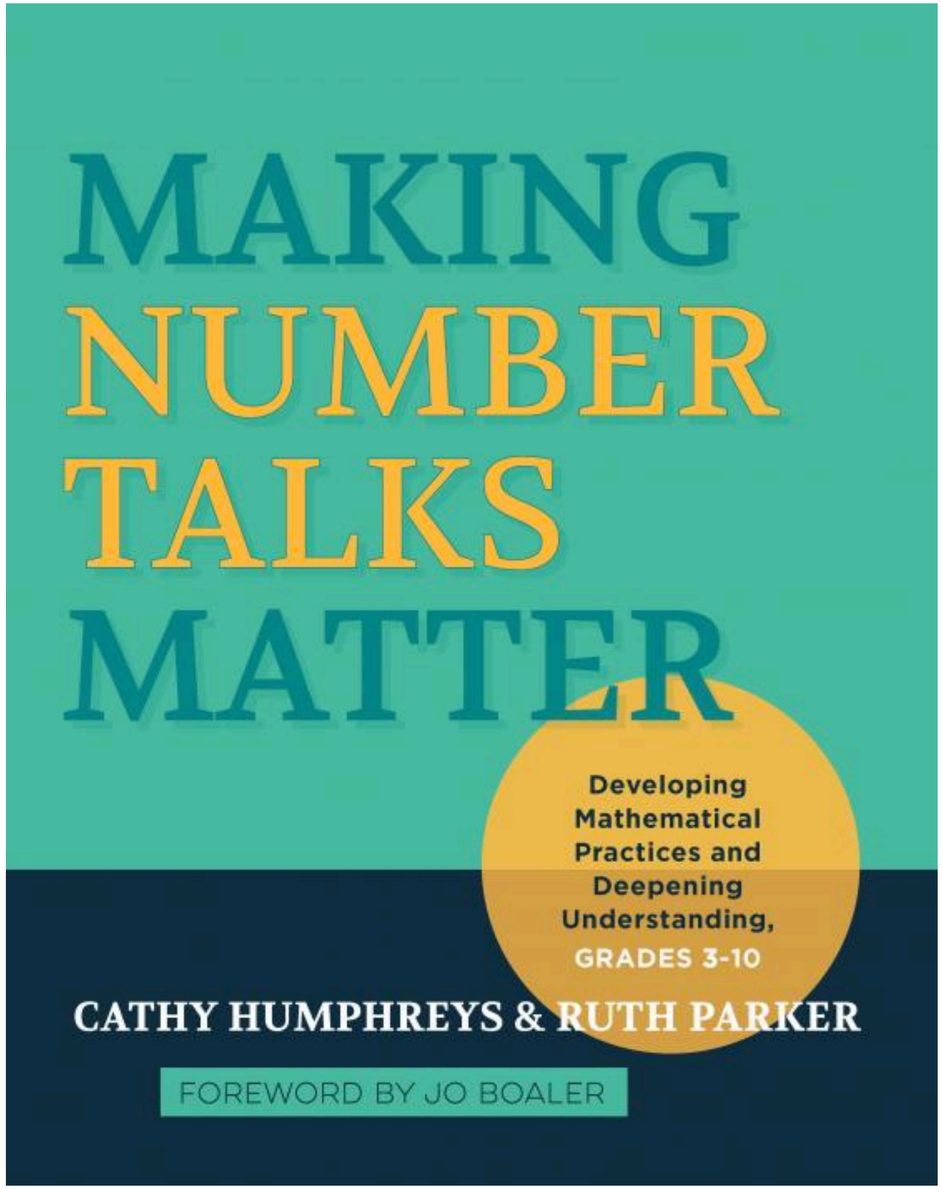
*How many do you **see**?*



*How do **you** see them?*

chrishunter.ca

"No matter what grade you teach, even high school, so-called 'dot cards' (which may or may not have dots) are a great way to start your students on the path to mathematical reasoning. We say this because, from experience, we have realized that with dot cards, students only need to describe what they see—and ***people have many different ways of seeing!****"*



NUMBER TALK IMAGES

En vedette / Featured...

Custom Number Talk Images

Créer vos propres images! Voici une ressource de Berkeley Everett. Offert en format PowerPoint ou Google Slides, vous n'avez qu'à modifier les diapositives afin de produire des images sur mesure.
You can create your own Number Talk Images thanks to Berkeley Everett! Using his shared PowerPoint or Google Slides templates, you simply edit/re-arrange images of kumquats, blueberries, nuts and toaster pastries.

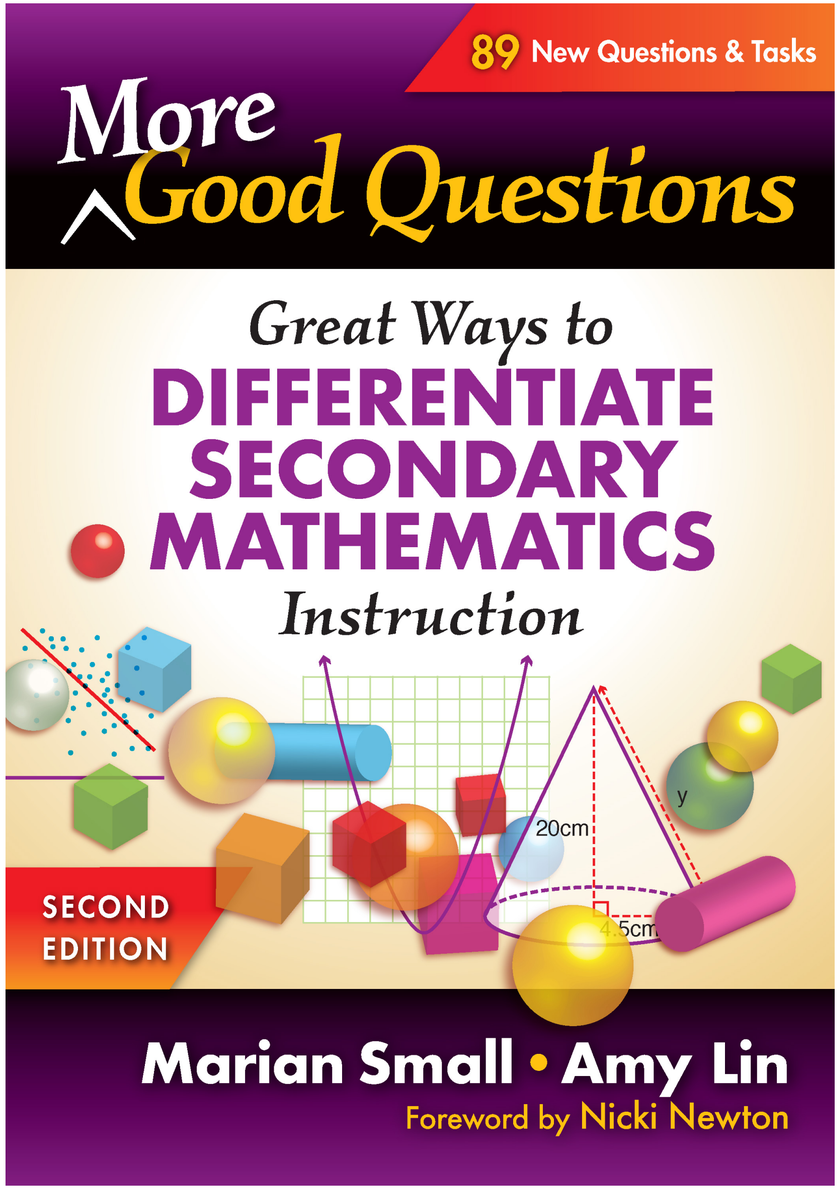
Ca-Lishea served at the Houston Food Bank by putting together food boxes that go to senior citizens. Each box contains 26 meals. The boxes are loaded onto a pallet that holds 45 boxes. How many meals are there on the pallet?

71

“When you’re a grown-up, nobody says
‘Please multiply these numbers.’
You have to know ***when*** *to do it.*
That’s all that actually matters when you’re a big person.”

Marian Small OAME2024

*"The operations of addition, subtraction, multiplication, and division hold the **same fundamental meanings** no matter the domain in which they are applied."*

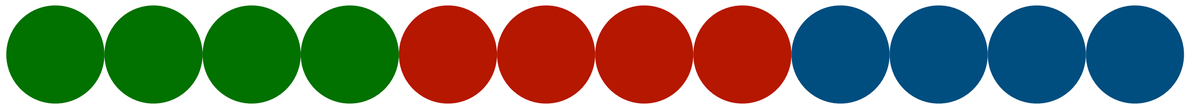


*What does multiplication **mean**?*

What does 3×4 ***look** like?*

Meanings

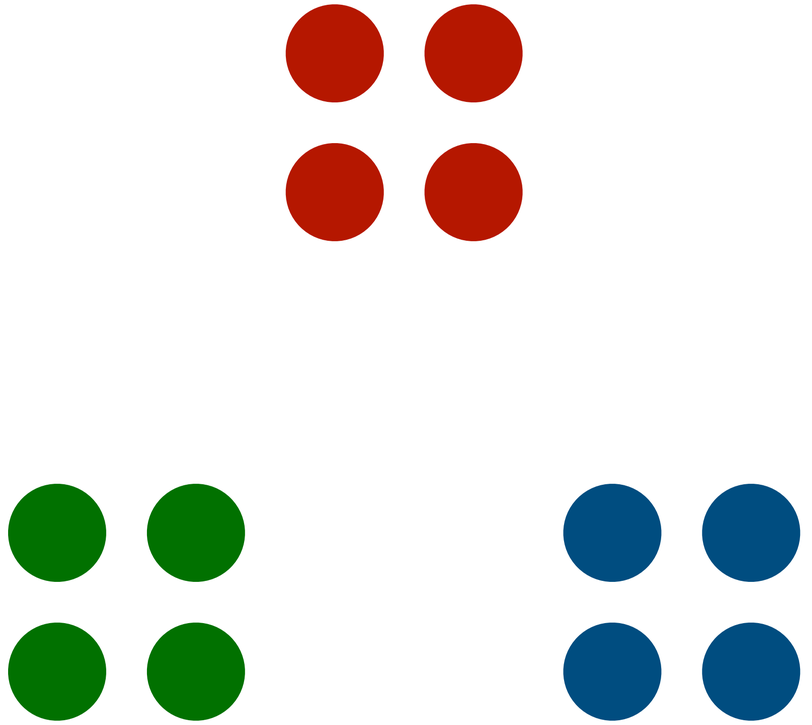
- Repeated Addition



$4 + 4 + 4$

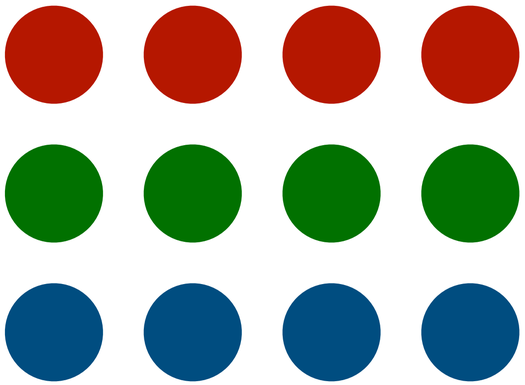
Meanings

- Repeated Addition
- Equal Groups or Sets



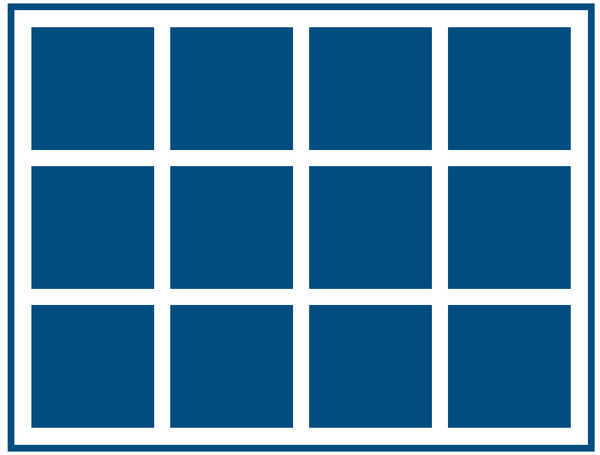
Meanings

- Repeated Addition
- Equal Groups or Sets
- Array



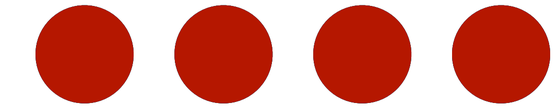
Meanings

- Repeated Addition
- Equal Groups or Sets
- Array
- Area of a Rectangle



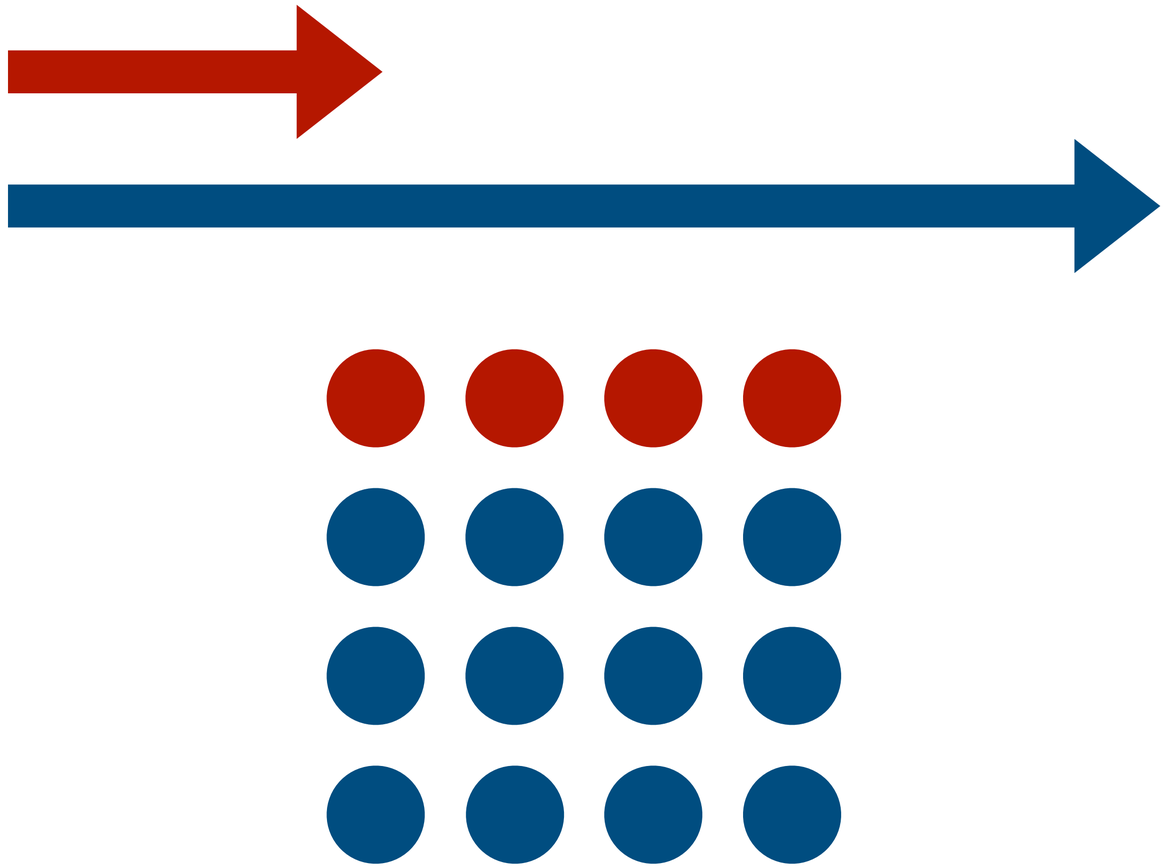
Meanings

- Repeated Addition
- Equal Groups or Sets
- Array
- Area of a Rectangle
- Comparison



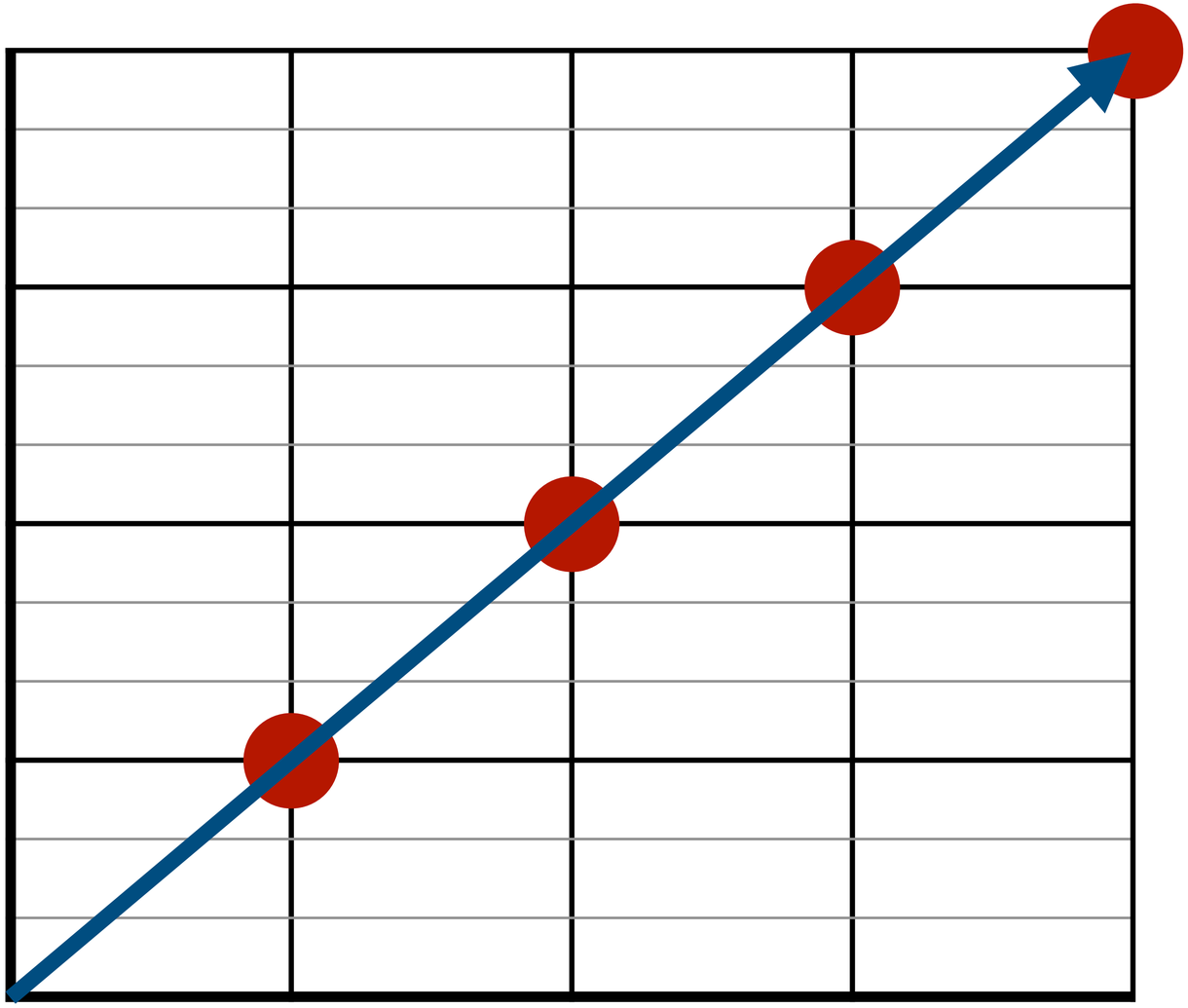
Meanings

- Repeated Addition
- Equal Groups or Sets
- Array
- Area of a Rectangle
- Comparison



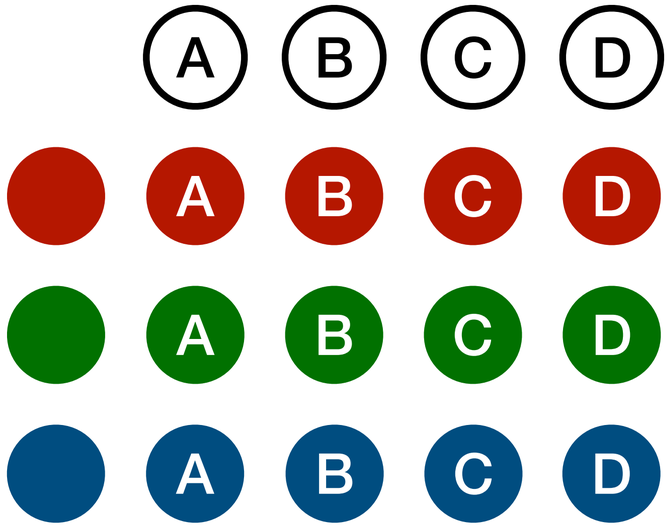
Meanings

- Repeated Addition
- Equal Groups or Sets
- Array
- Area of a Rectangle
- Comparison
- Rate

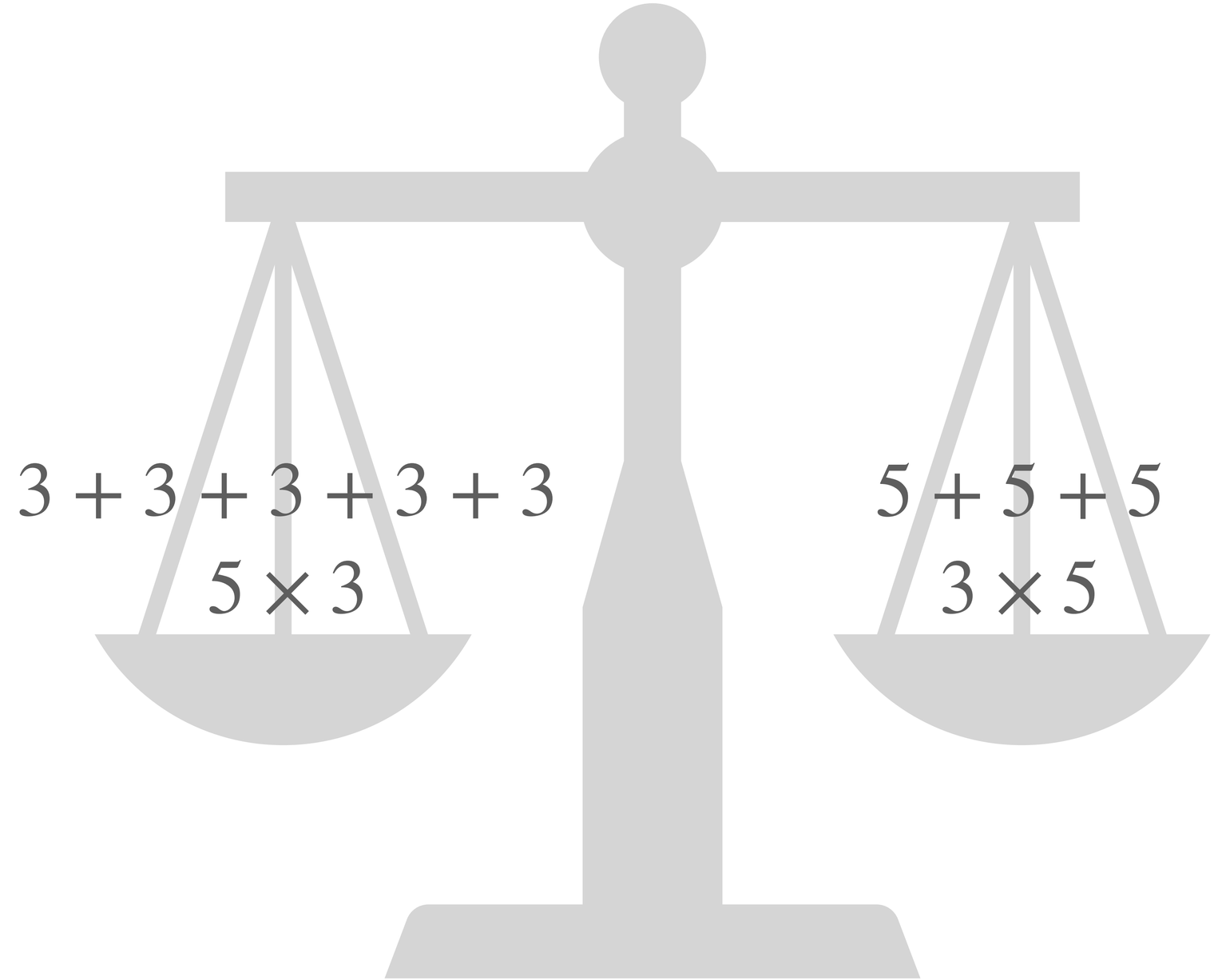


Meanings

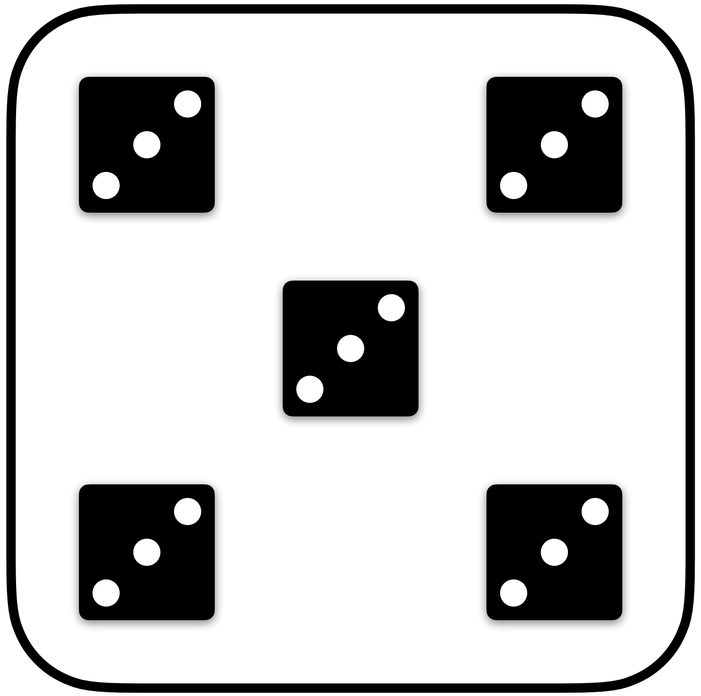
- Repeated Addition
- Equal Groups or Sets
- Array
- Area of a Rectangle
- Comparison
- Rate
- Combinations



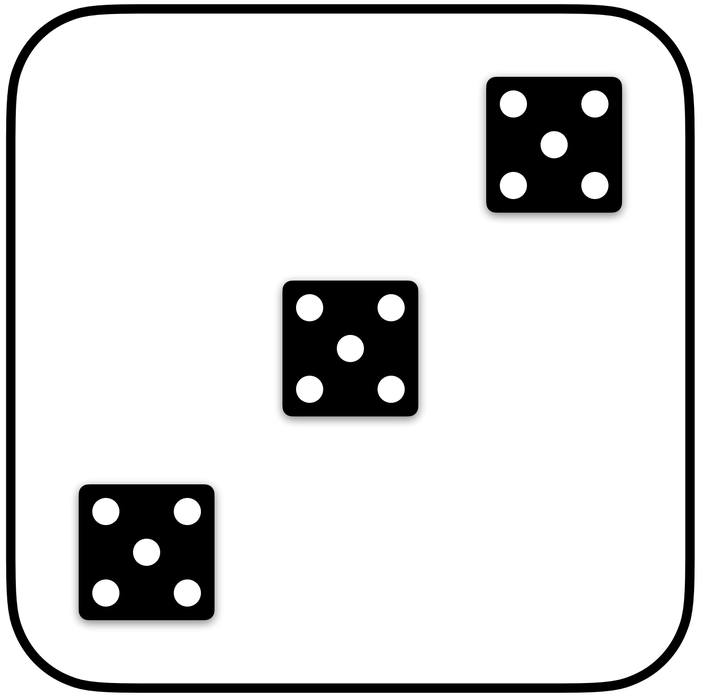

ORIGINAL
EggSquisites


3 + 3 + 3 + 3 + 3
5 × 3
5 + 5 + 5
3 × 5

5×3

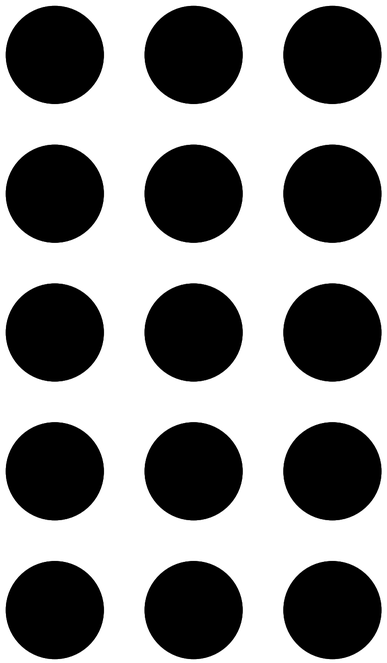


3×5



You can multiply numbers in any order.

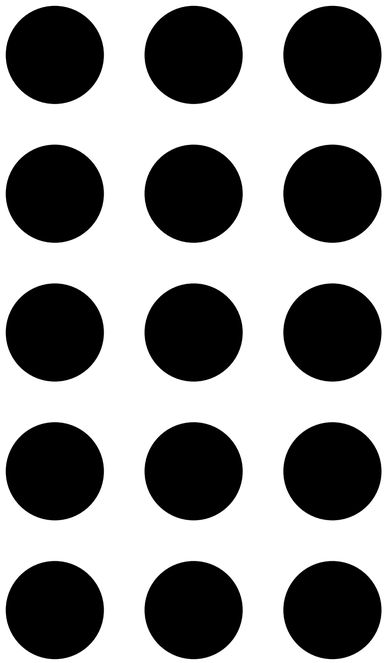
5×3



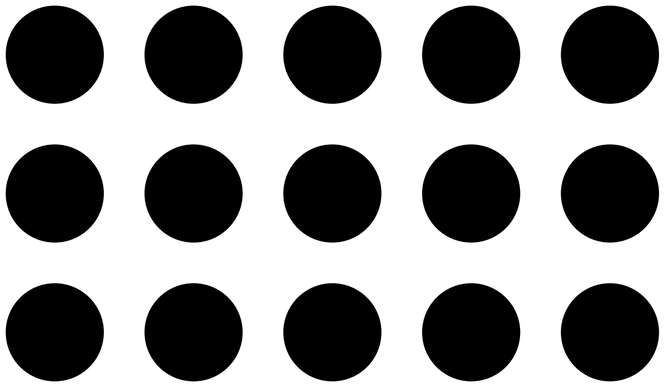
3×5

You can multiply numbers in any order.

5×3

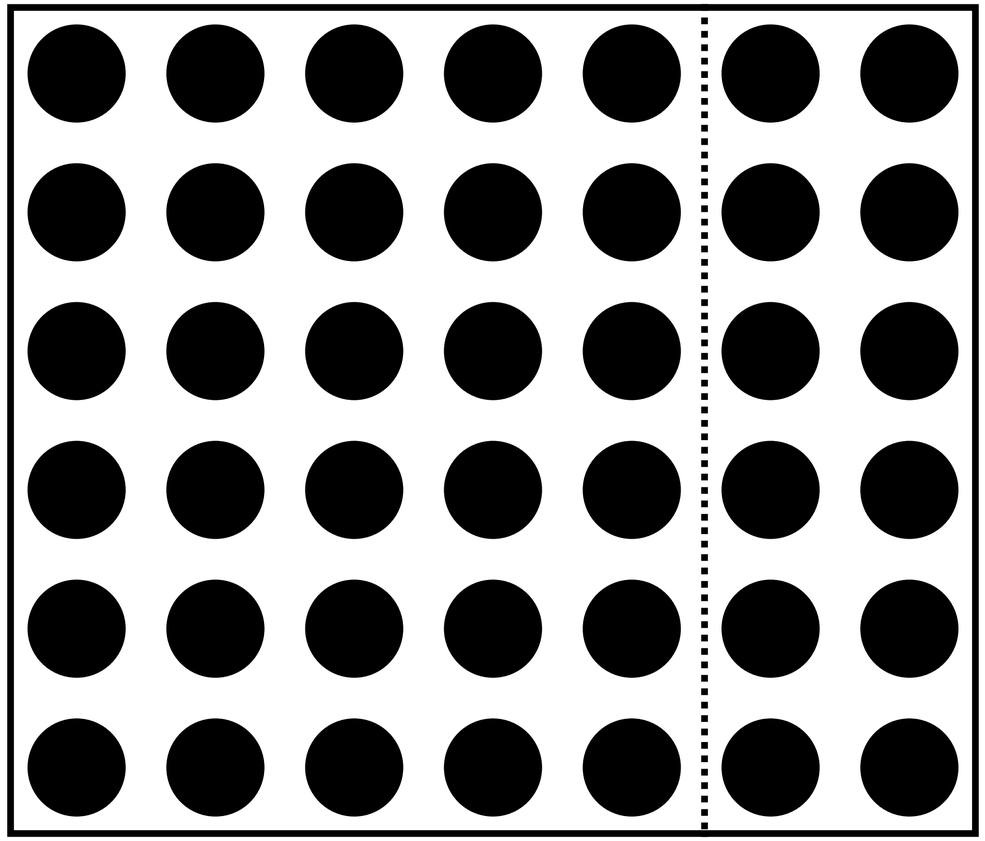


3×5



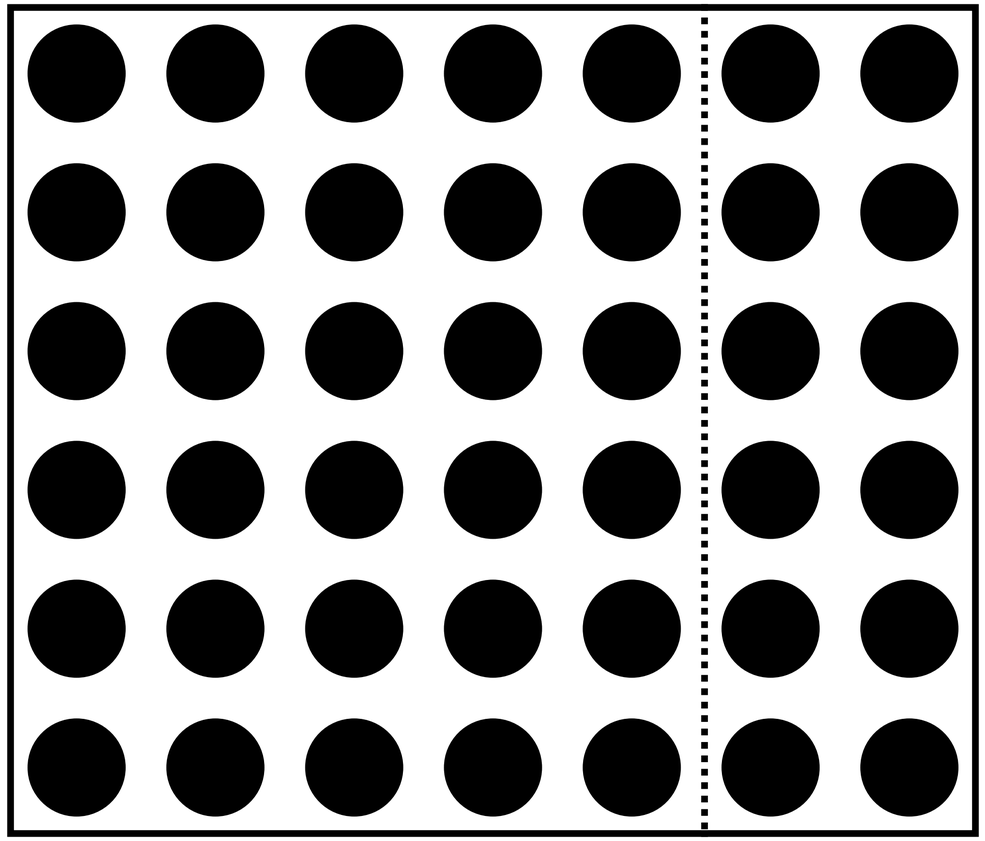
You can multiply numbers in any order.

6×7



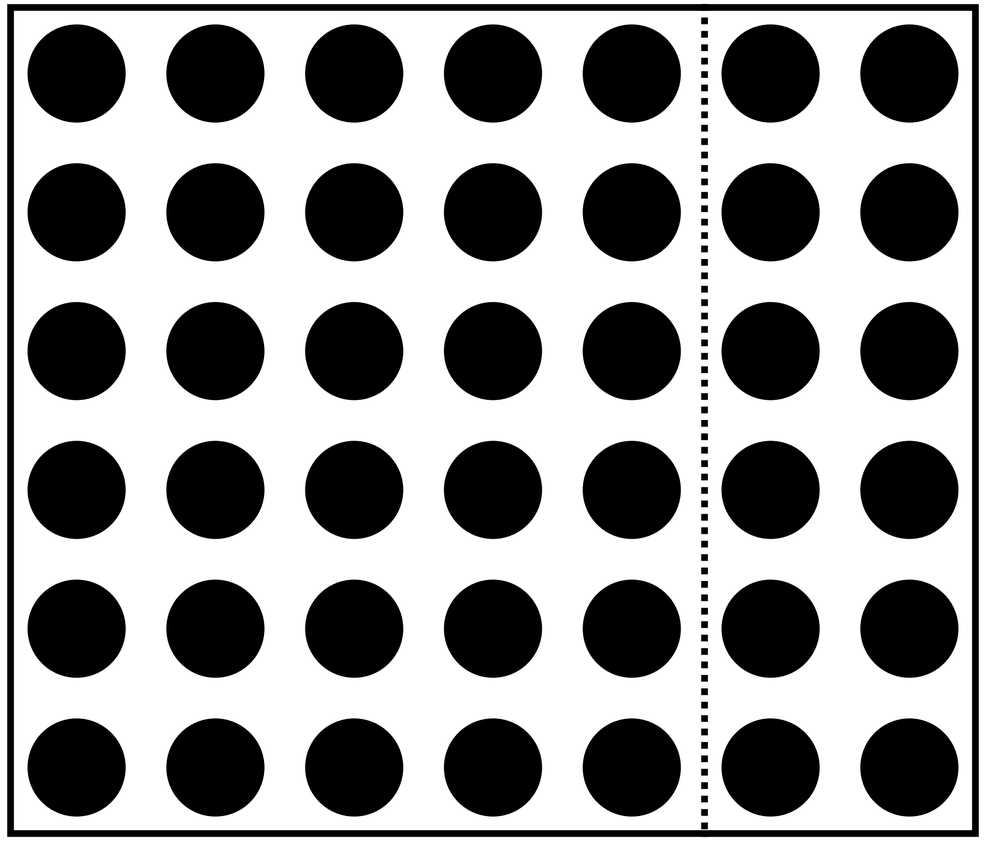
You can multiply in parts.

$$6 \times (5 + 2)$$



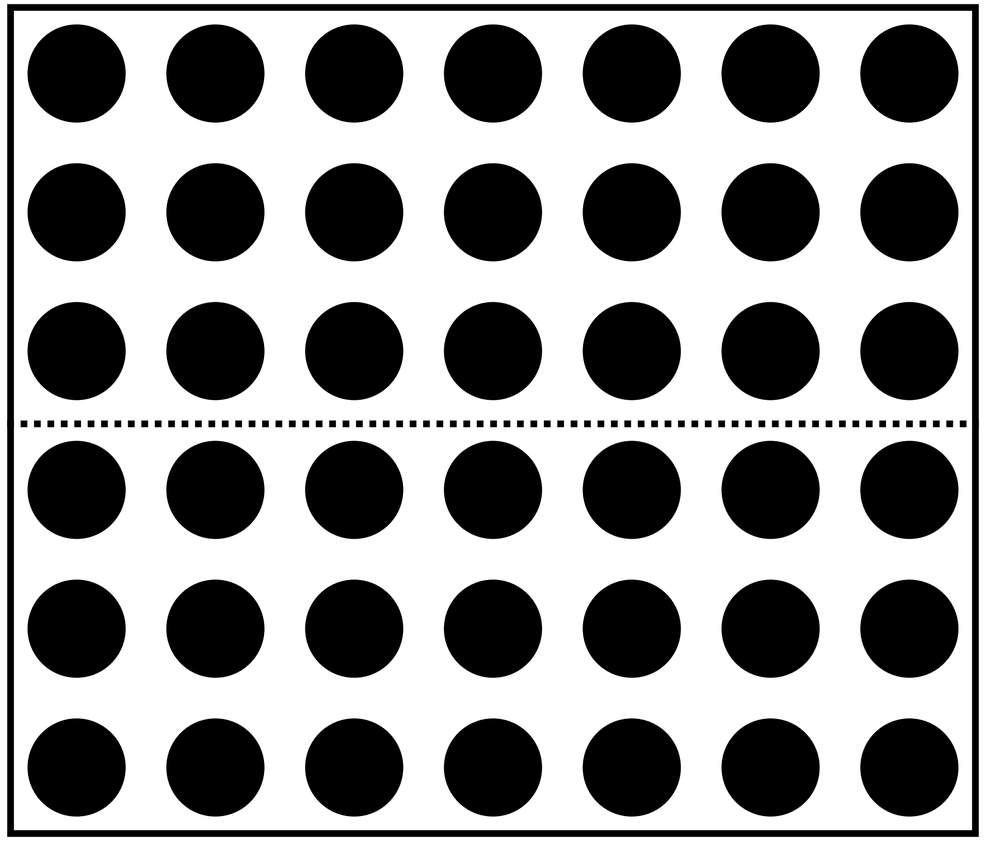
You can multiply in parts.

$$6 \times 5 + 6 \times 2$$



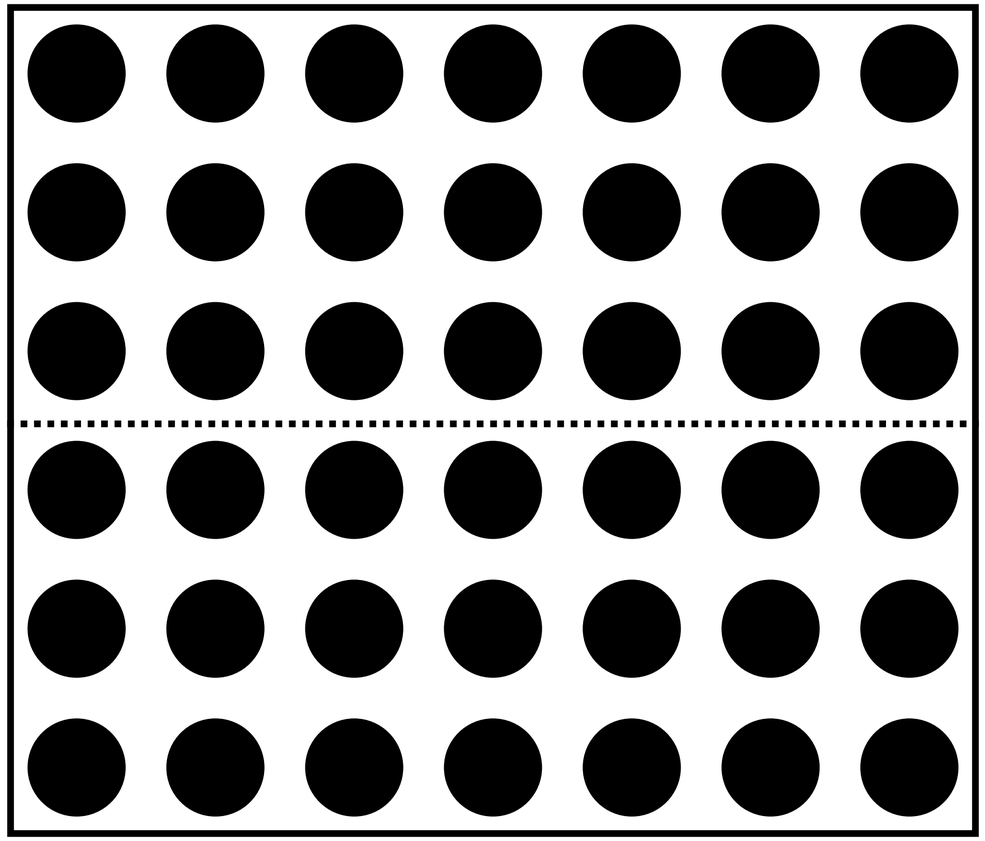
You can multiply in parts.

6×7



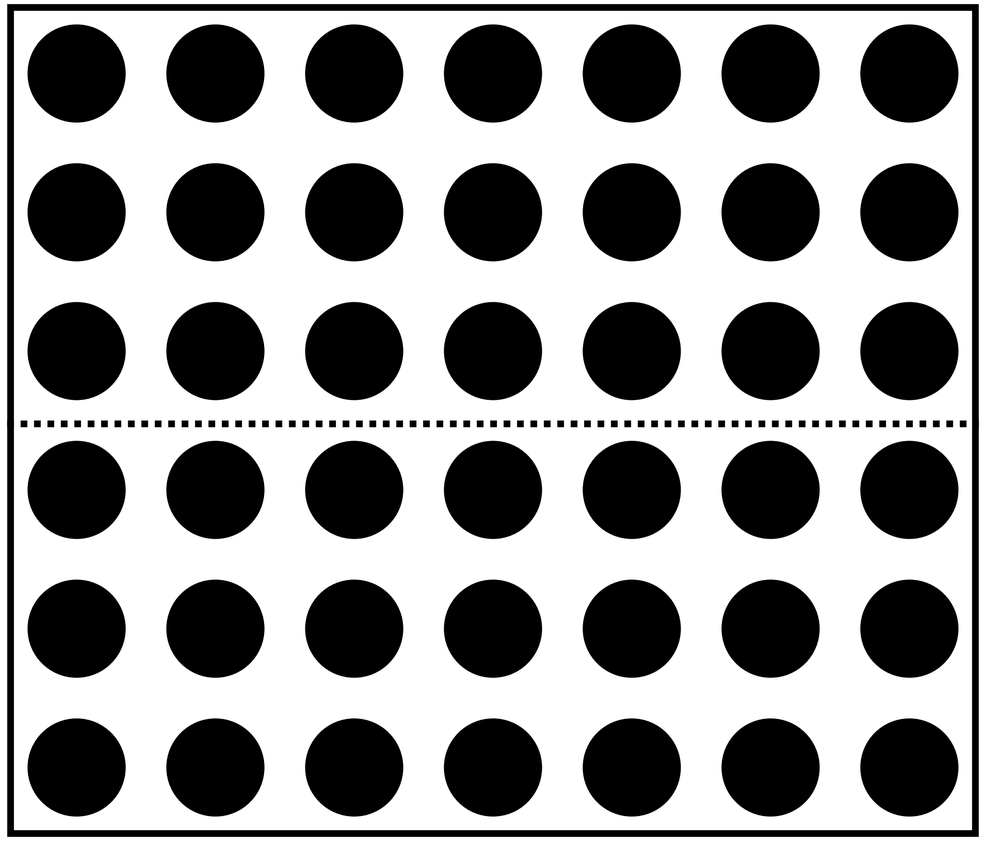
You can multiply in parts.

$$(2 \times 3) \times 7$$



You can multiply in parts.

$$2 \times (3 \times 7)$$

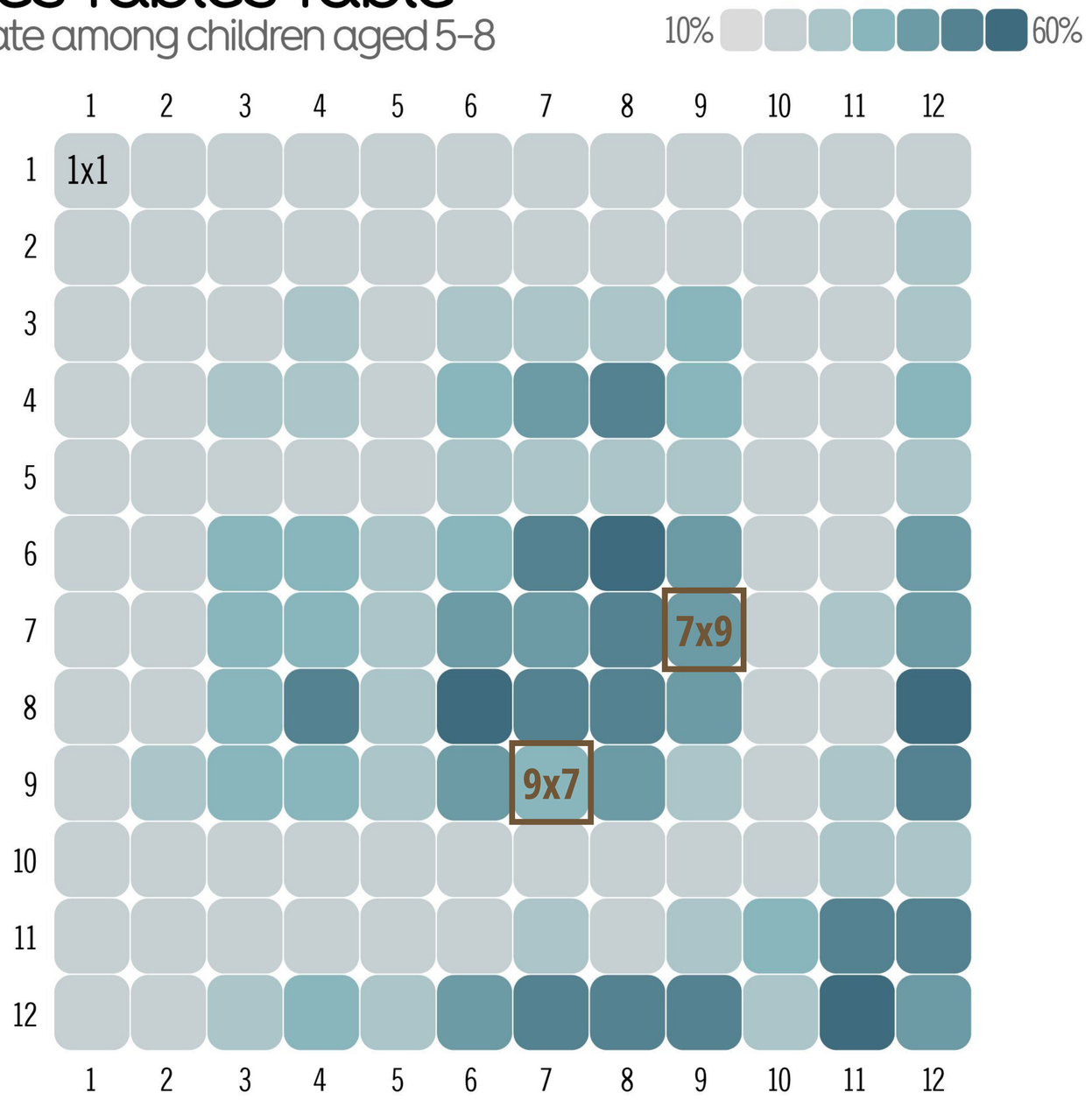


You can multiply in parts.

Christopher Danielson

Times Tables Table

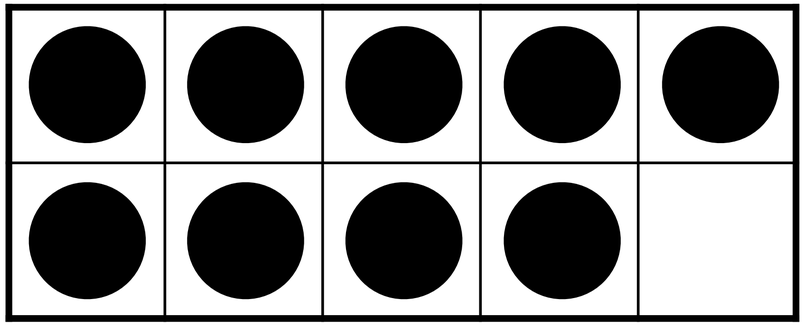
Error rate among children aged 5-8

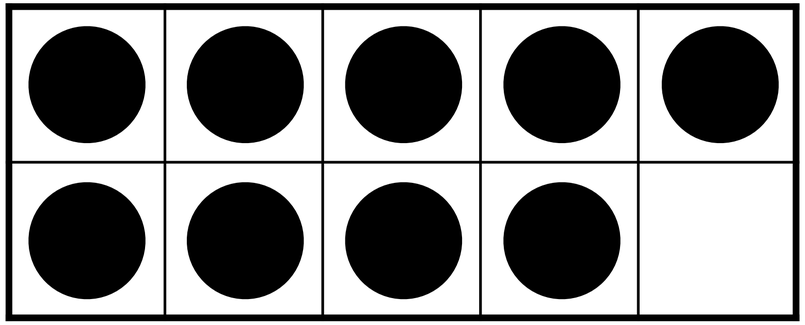


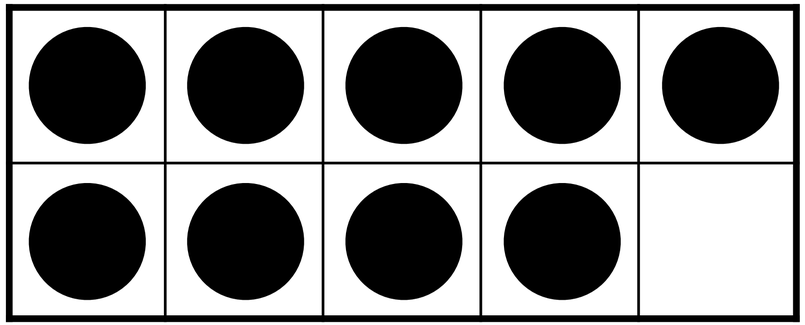
Information is Beautiful

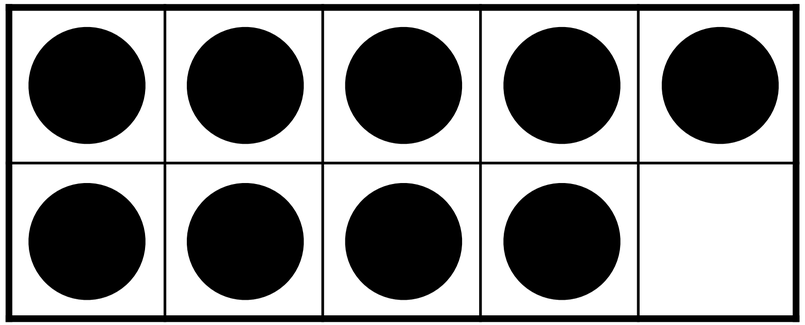
source: private study by Caddington School of 232 children

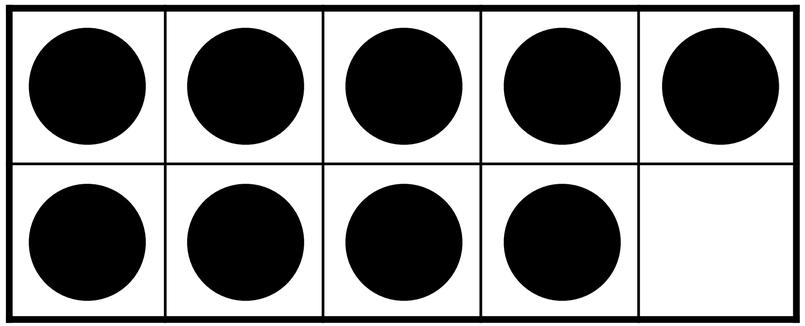

Conceptual Understanding
Strategic Reasoning
Automatic Recall

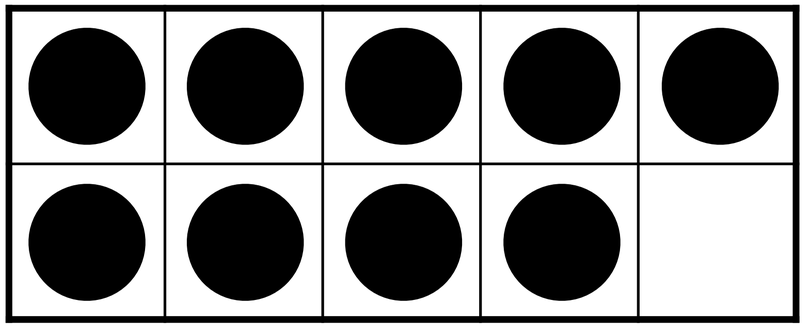


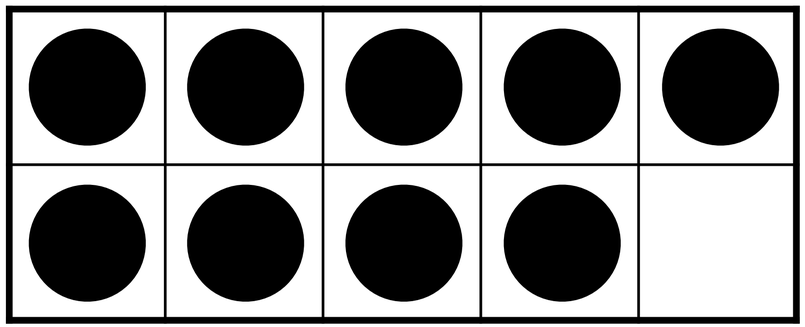


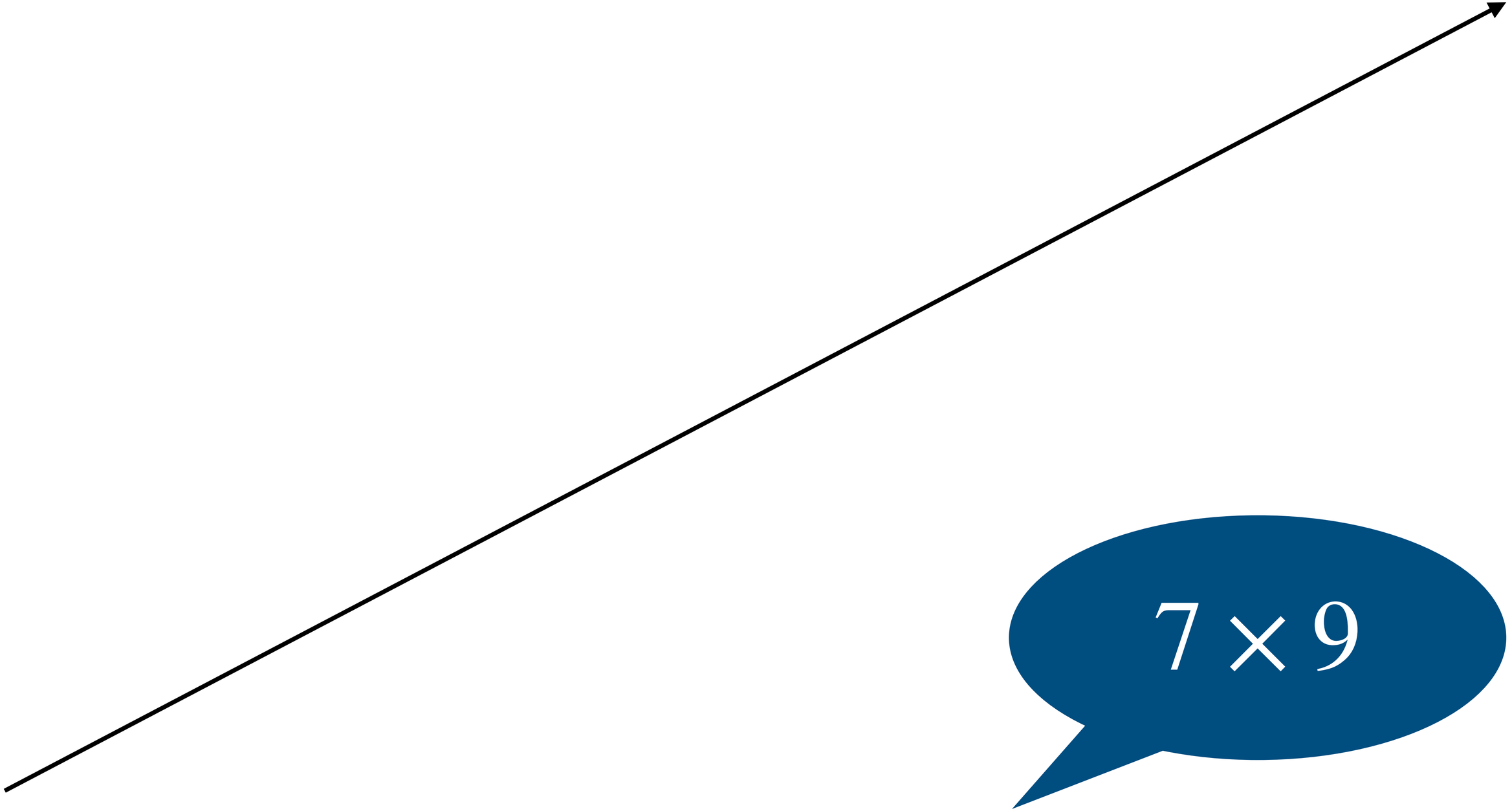


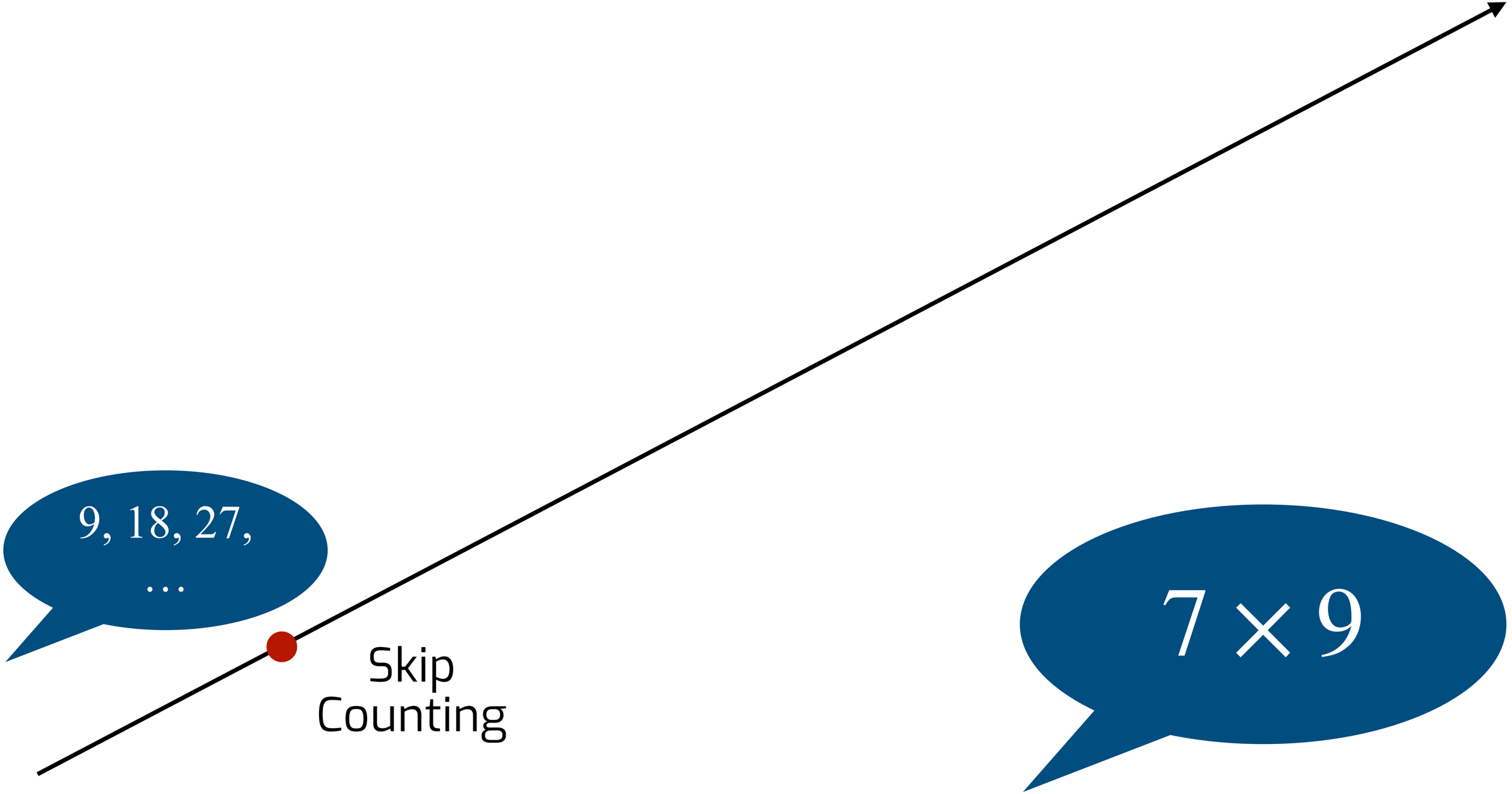


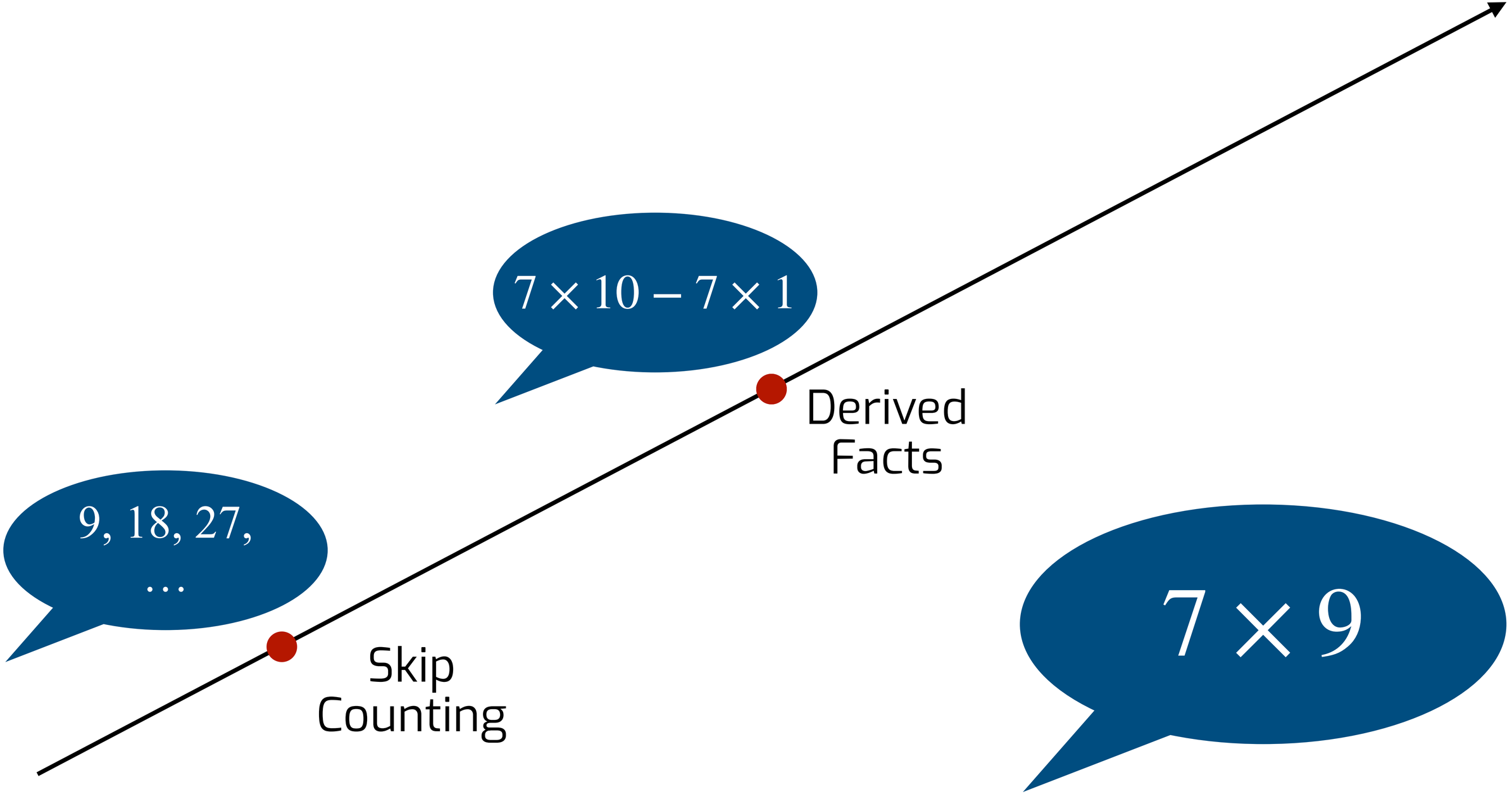


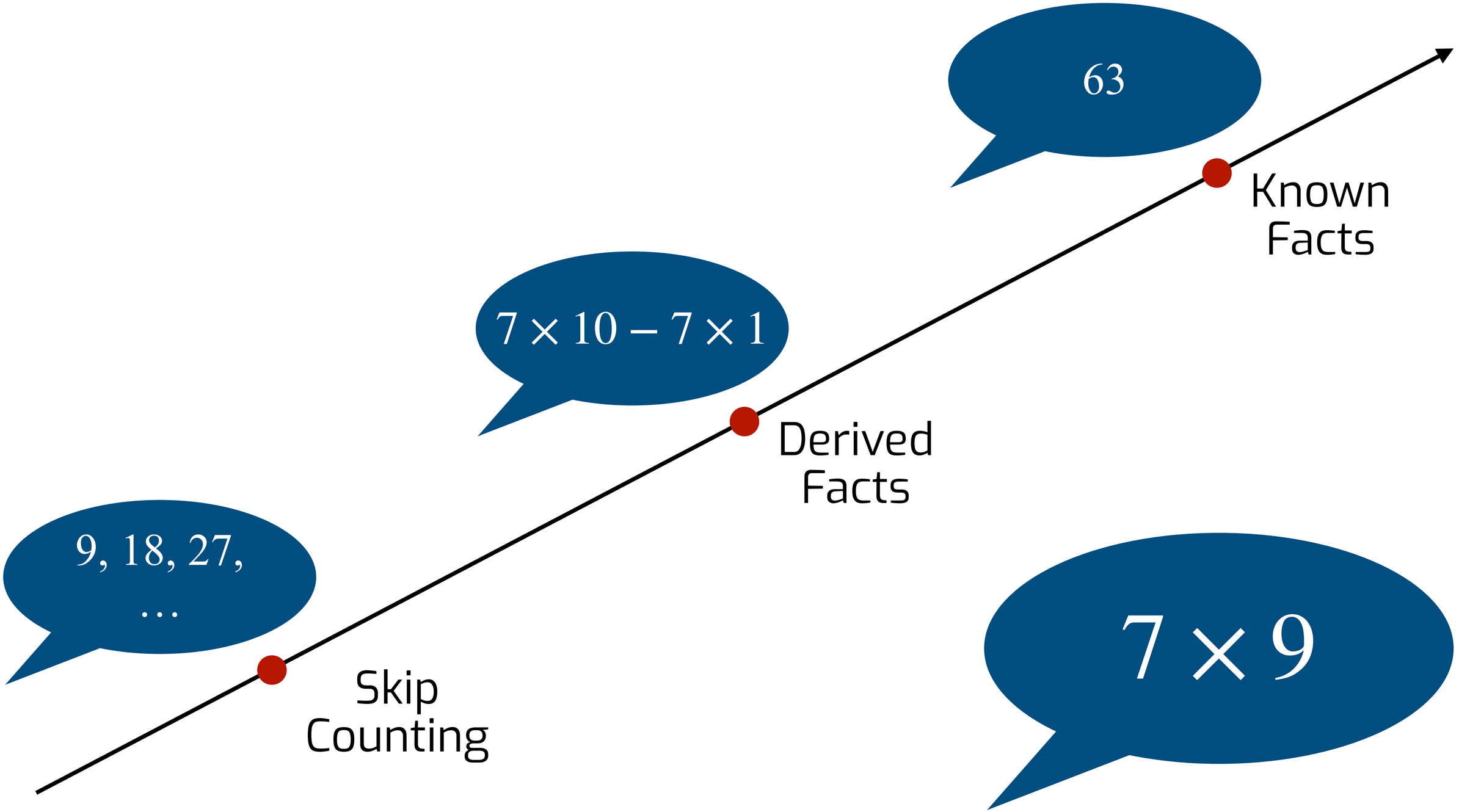


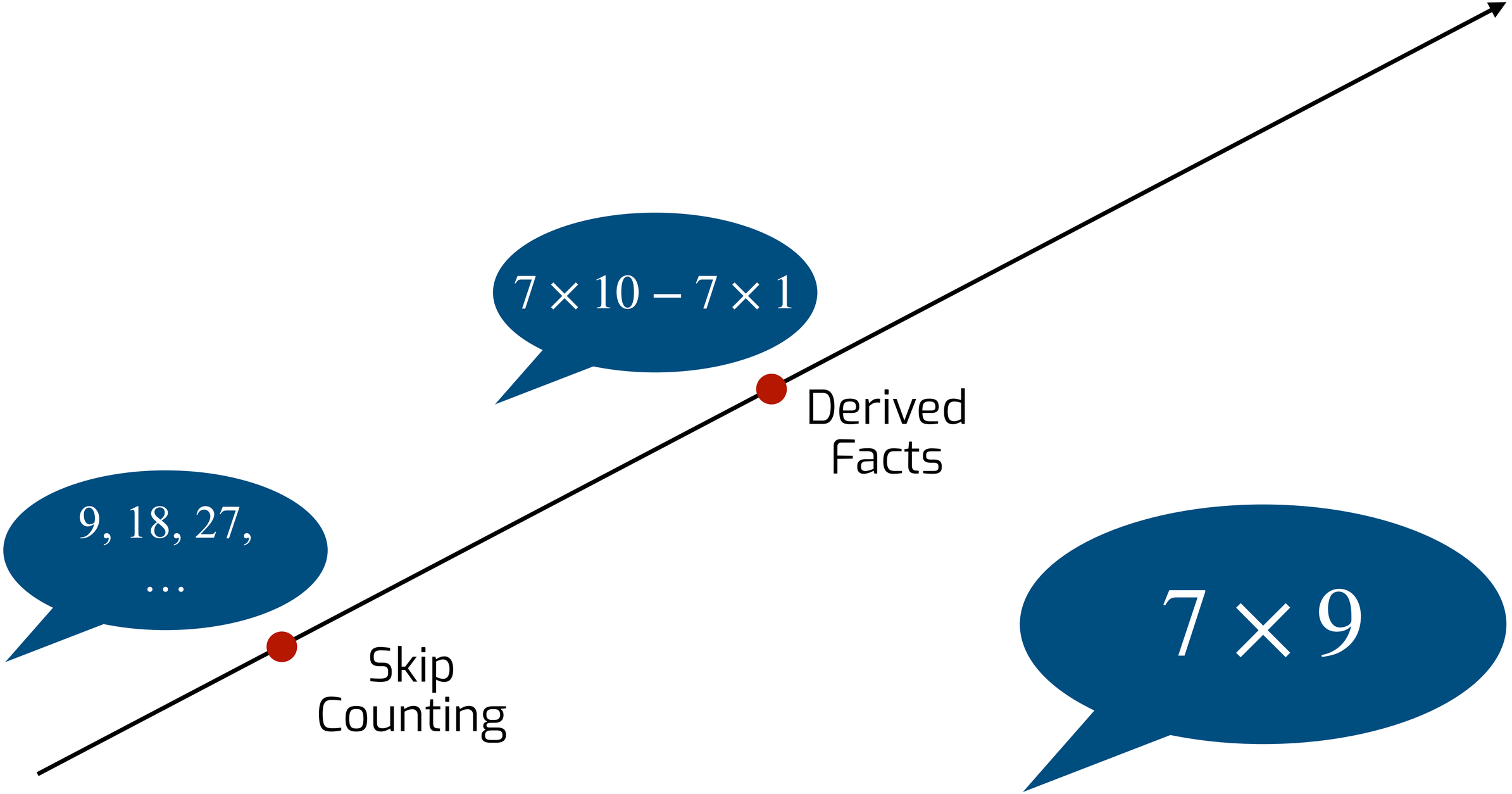



7×9


9, 18, 27,
…
Skip
Counting
7 × 9


9, 18, 27, …
Skip Counting
$7 \times 10 - 7 \times 1$
Derived Facts
7×9


63
Known Facts
$7 \times 10 - 7 \times 1$
Derived Facts
9, 18, 27, …
Skip Counting
7×9


9, 18, 27, …
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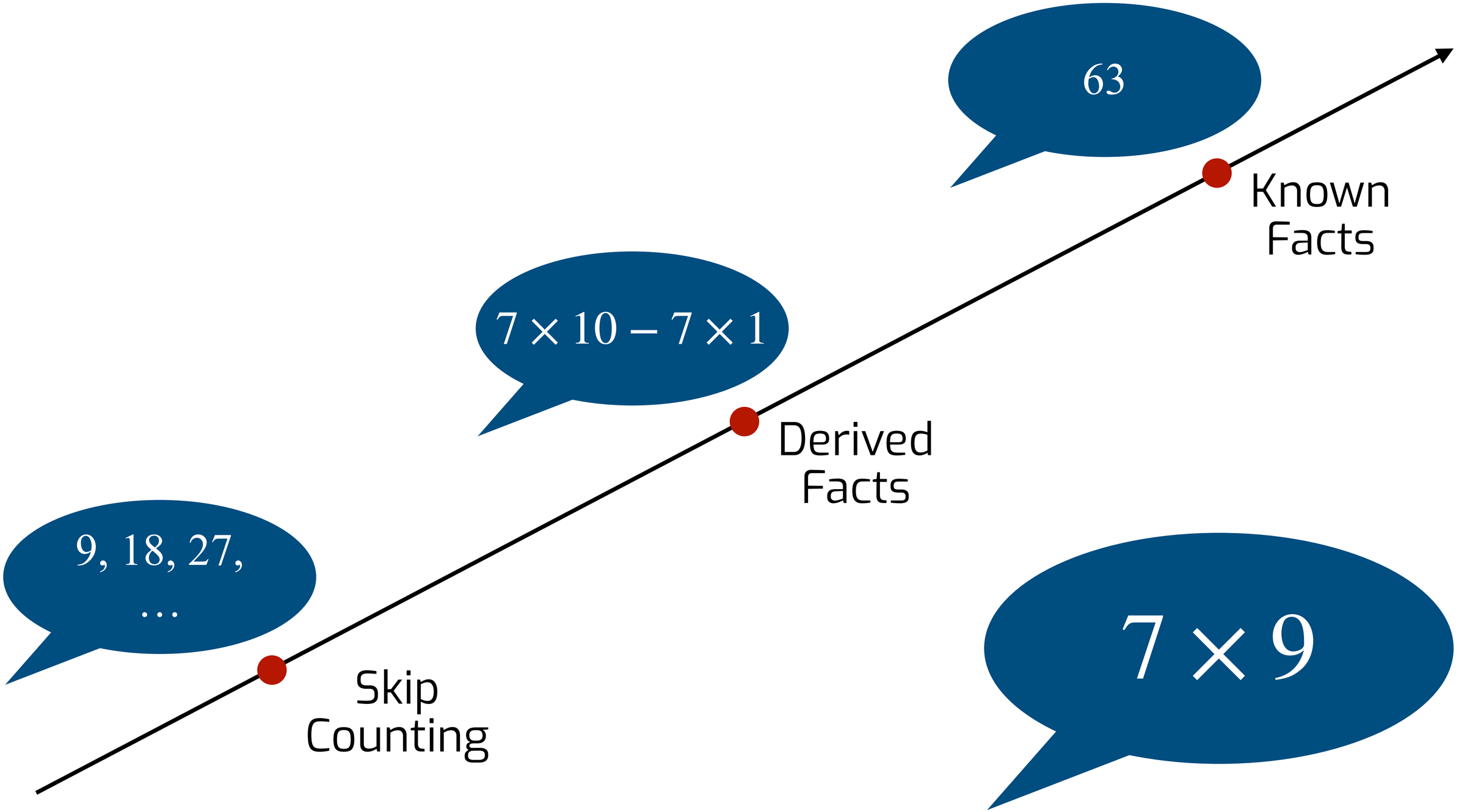
Derived Facts
7×9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Known Facts
$7 \times 10 - 7 \times 1$
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9, 18, 27, …
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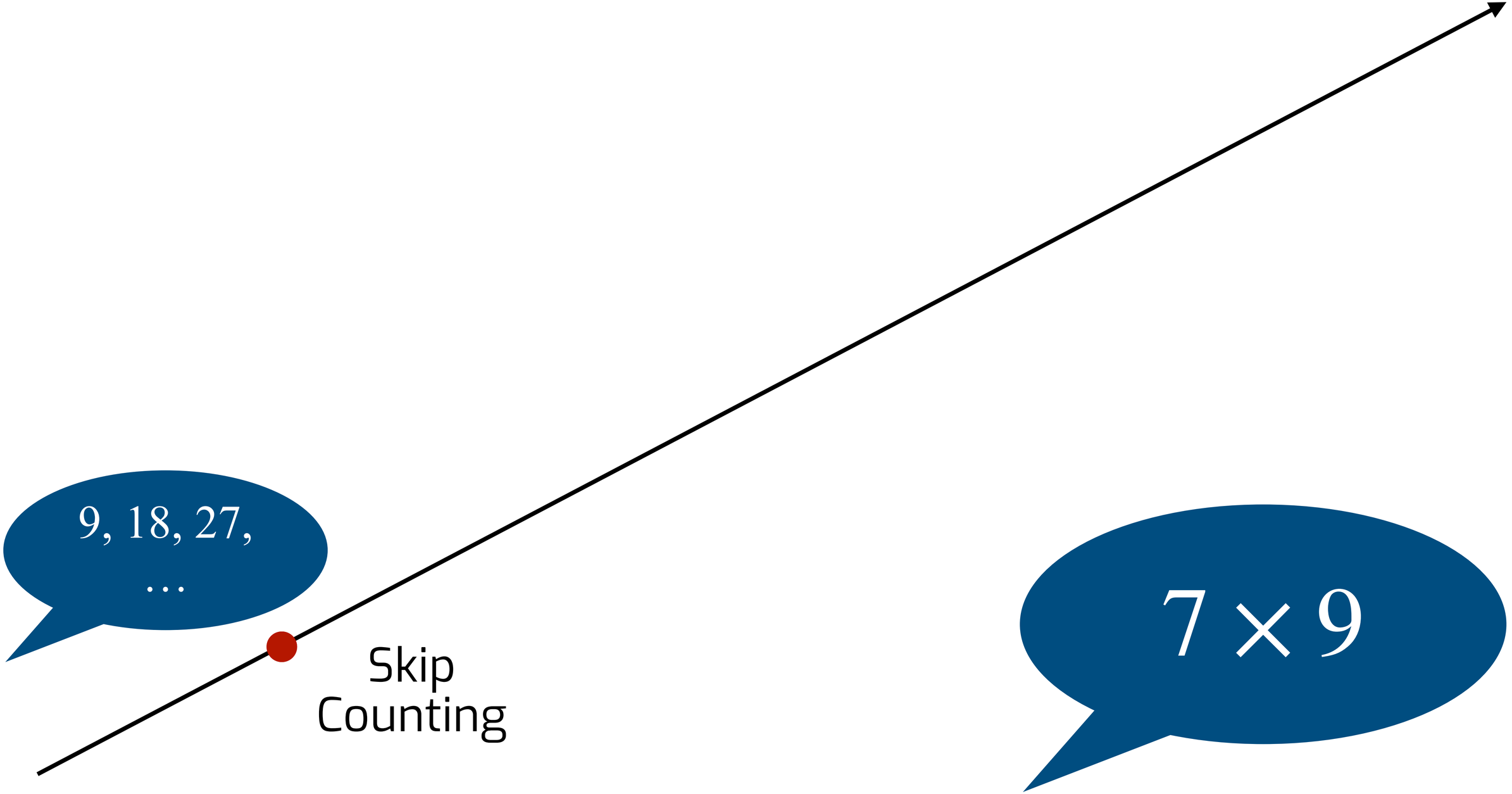
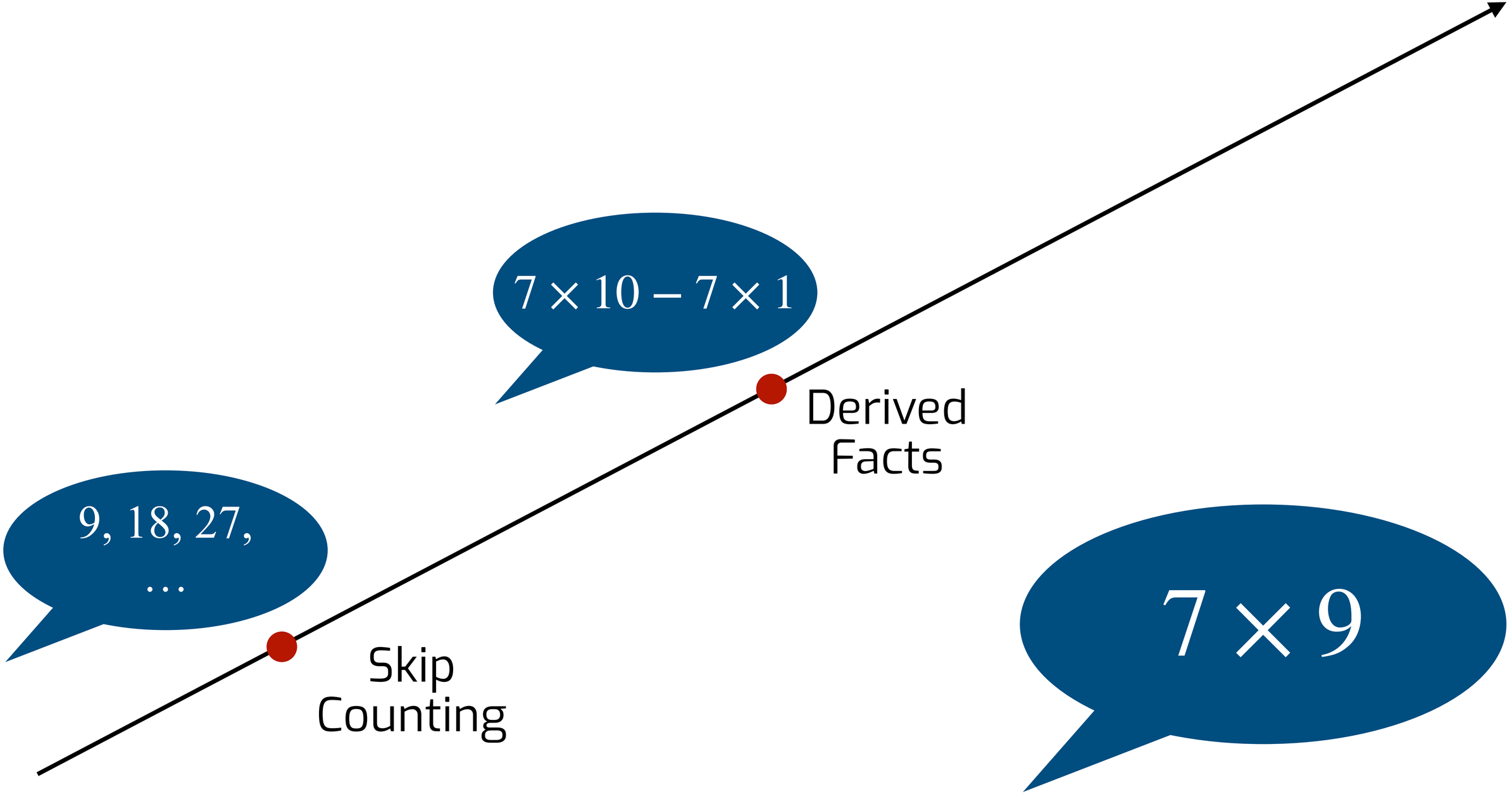

9, 18, 27,
…
Skip
Counting
7 × 9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Derived Facts
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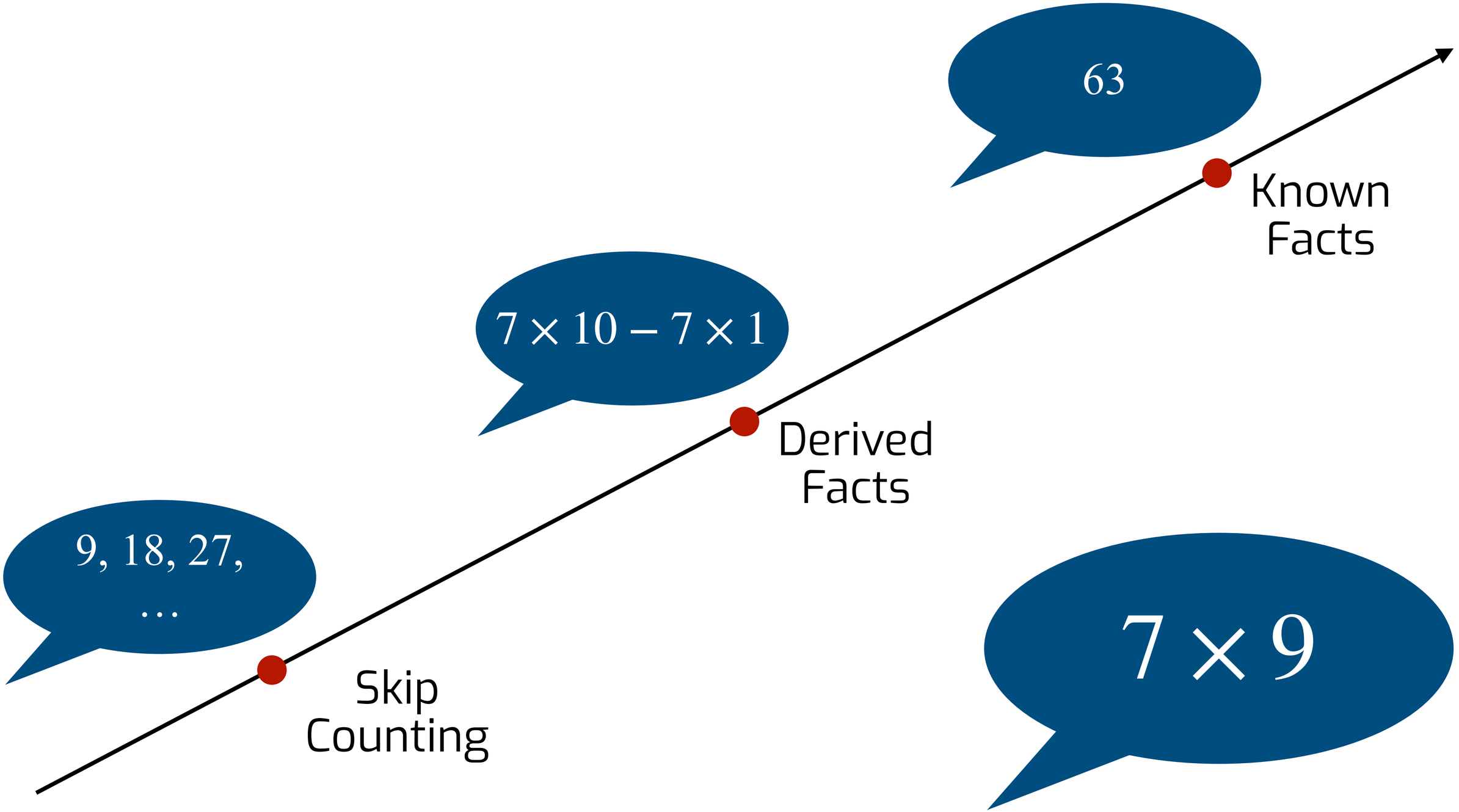
63
Known Facts
$7 \times 10 - 7 \times 1$
Derived Facts
9, 18, 27, …
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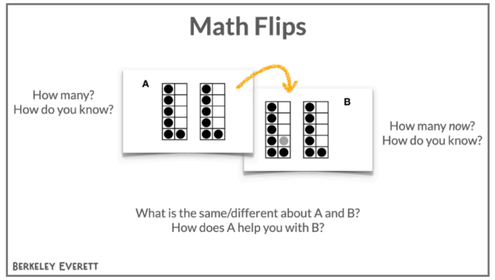
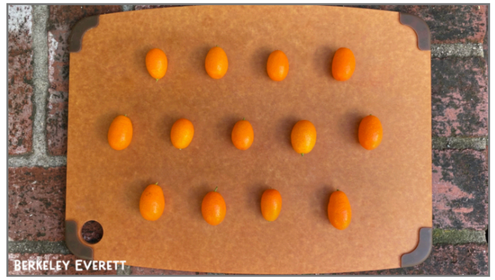
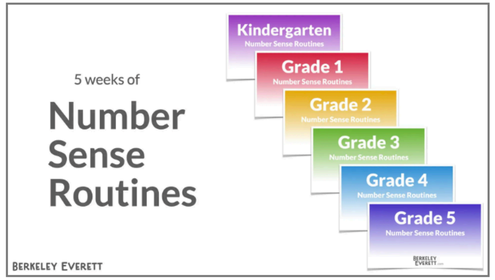
7×9



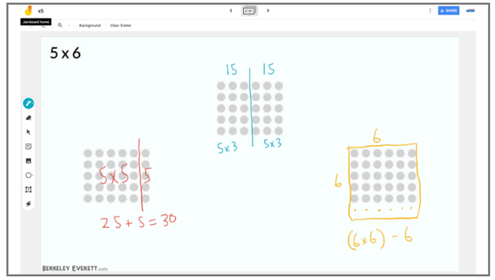
Math Flips: A new kind of flashcard



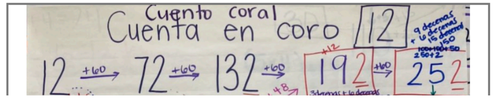
Images: Noticing, Wondering, and How Many?

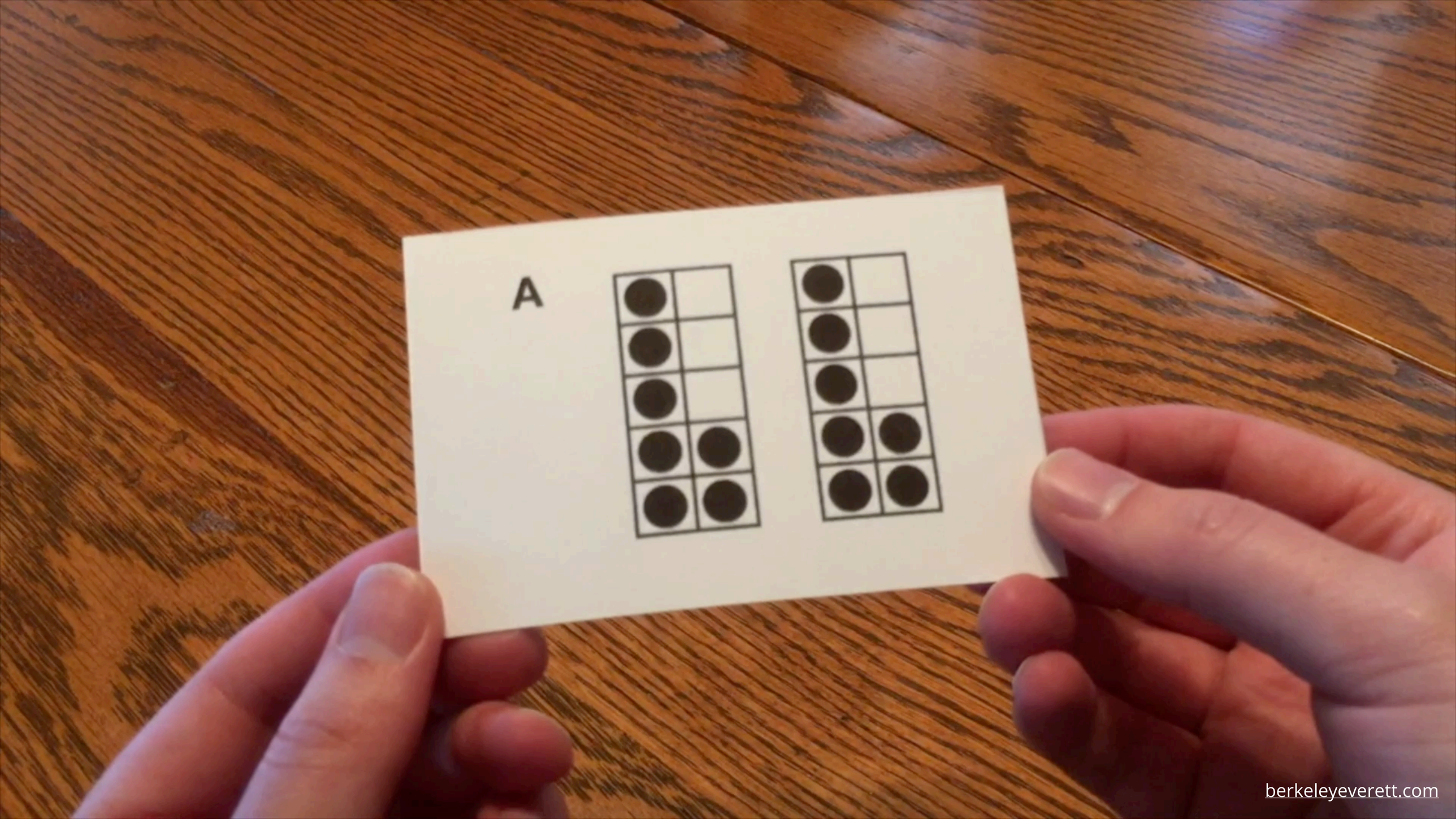


Number Sense Routines: 5 weeks for every grade



Arrays: All single-digit multiples as slides and PDFs





$$7 \times 9$$

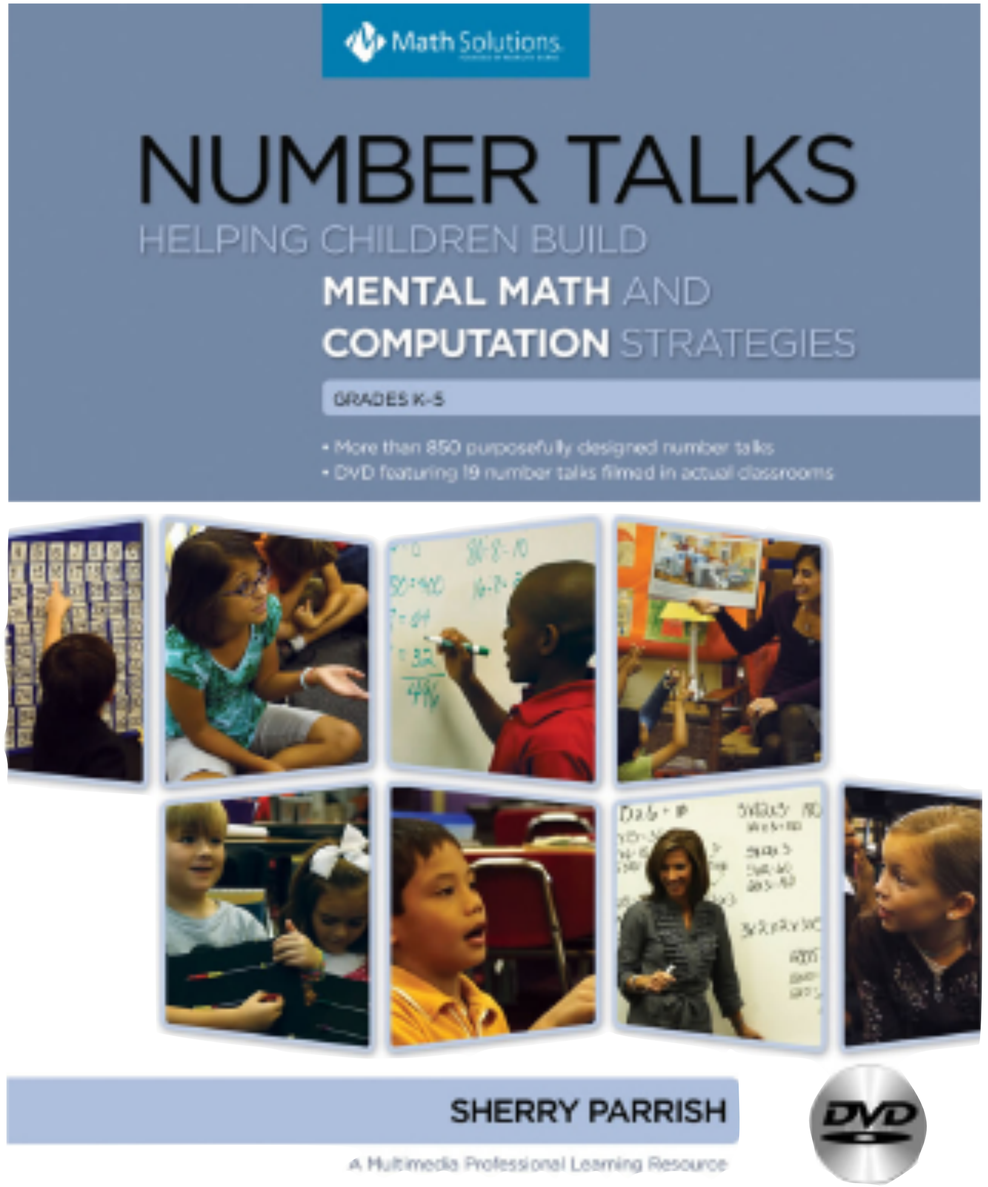
$$7 \times 19$$

$$7 \times 49$$

$$7 \times 99$$

$$7 \times 199$$

"Simply defined, number talks are five to fifteen minute classroom conversations around ***purposely crafted*** *computation problems that are solved mentally."*



$$8 \times 6$$

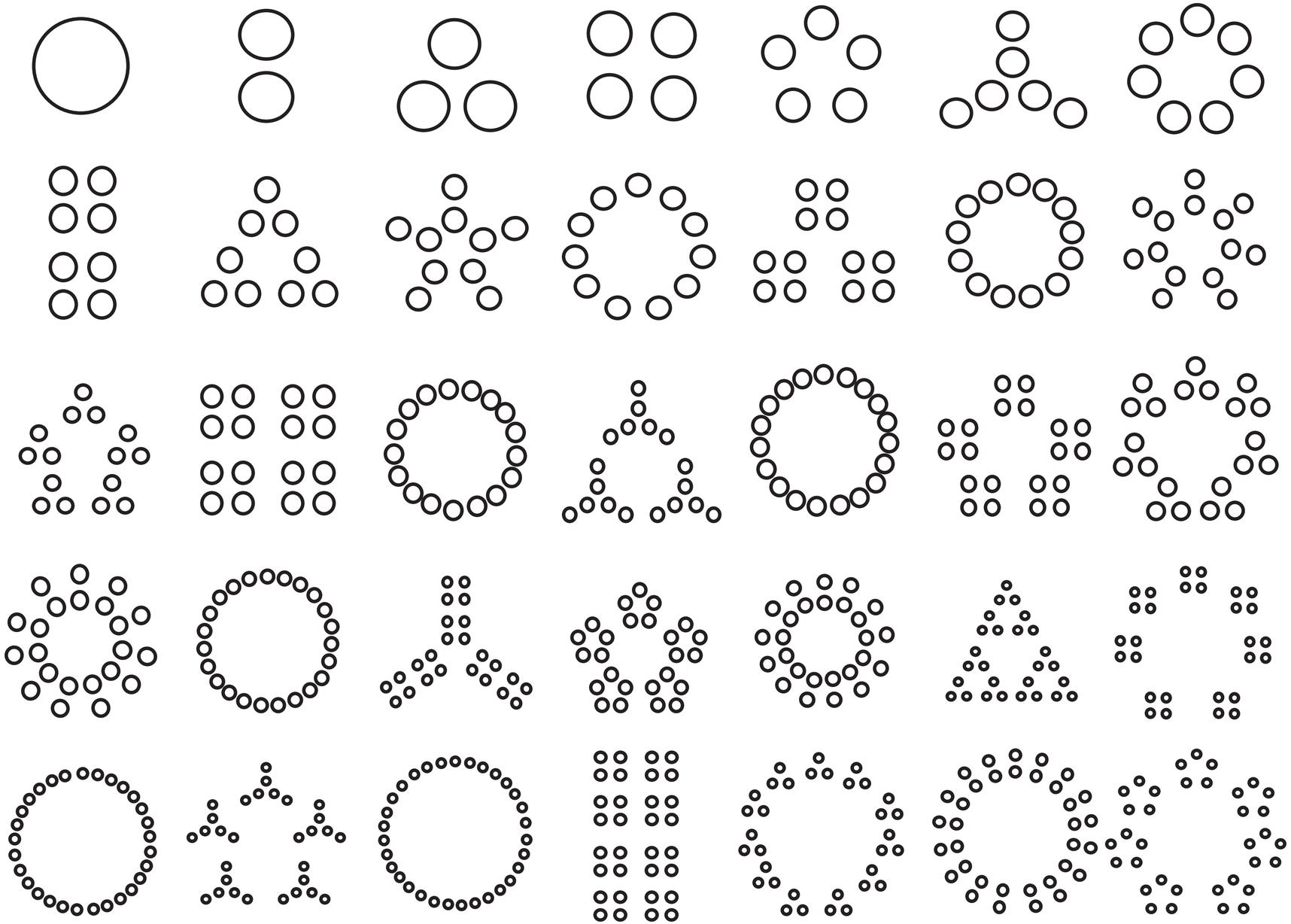
$$8 \times 60$$

$$8 \times 59$$

$$8 \times 0.1$$

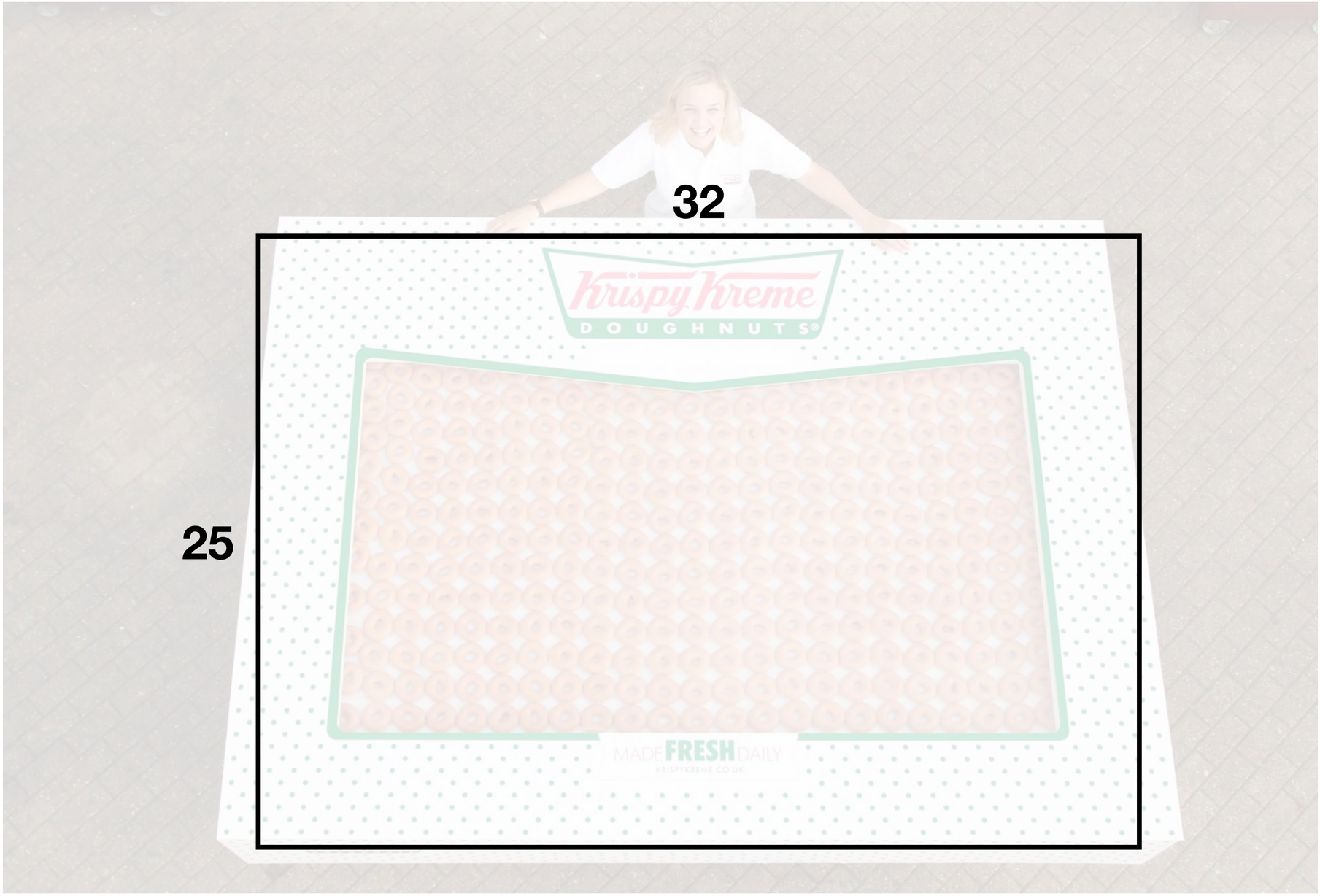
$$8 \times 6.1$$

$$8 \times 5.9$$



youcubed.org


Krispy Kreme
DOUGHNUTS®
MADE FRESH DAILY
KRISPYKREME.CO.UK


32
25
Krispy Kreme
DOUGHNUTS
MADE FRESH DAILY
KRISPYKREME.CO.UK

Partial Product Finder

by The Math Learning Center

Help

About

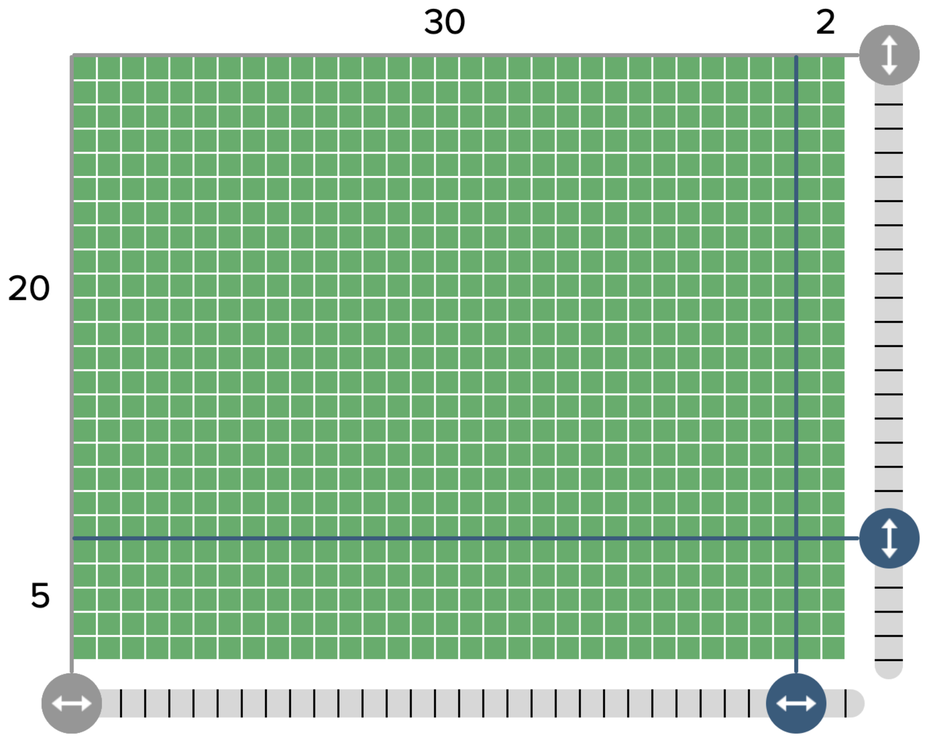
25 × 32

MAKE

Maximum size: 50 x 50

ANSWER

Go back to beta version



(20 × 30) + (20 × 2) + (5 × 30) + (5 × 2) = **(25 x 32)**

600 + 40 + 150 + 10 = **800**

Student #1

25
+25
+25
+25 → 100

+25
+25
+25
+25 → 100

+25
+25
+25
+25 → 100

+25
+25
+25
+25 → 100

+25
+25
+25
+25 → 100

+25
+25
+25
+25 → 100

+25
+25
+25
+25 → 100

800

Student #2

32 x 25

30 2

x 25 x 25

750 + 50 = 800

Student #3

32
x 25
160
+ 640
800

Student #4

	30	2
20	600	40
5	150	10

600 + 150 + 40 + 10 = 750 + 50 = 800

Student #5

32
+32
64
+32
96
+32
128
+32
160
+32
192
+32
224
+32
256
+32
288
+32
320
+32
352
+32
384
+32
416
+32
448
+32
480
+32
512
+32
544
+32
576
+32
608
+32
640
+32
672
+32
704
+32
736
+32
768
+32
800

Student #6

32 x 25
= 16 x 50
= 8 x 100
= 800

Student #7

	10	10	10	2
25	250	250	250	50

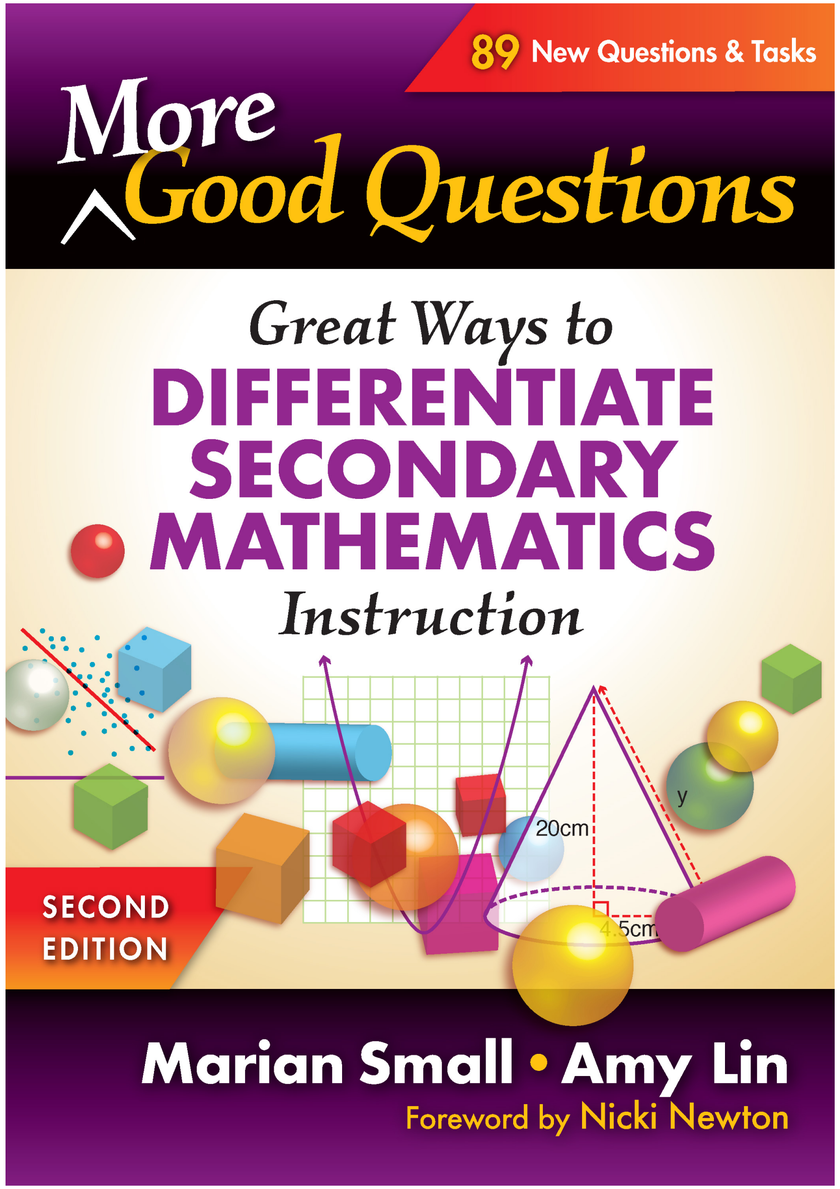
250 + 250 + 250 + 50 = 500 + 300 = 800

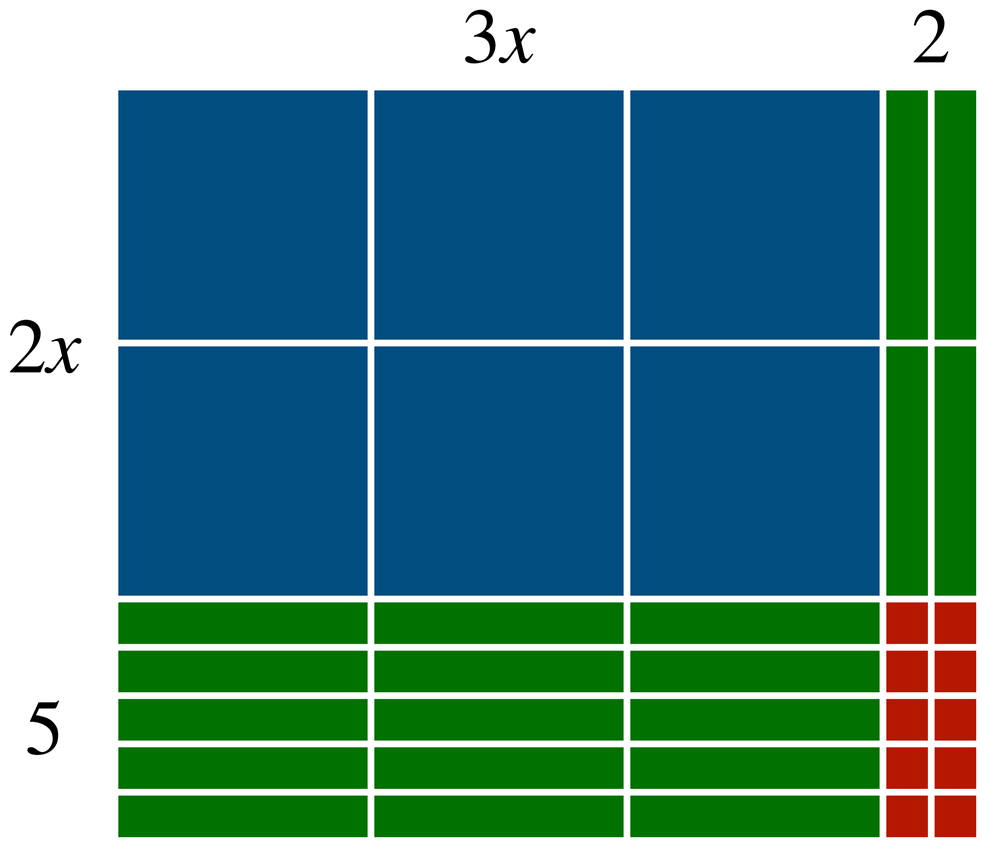
Student #8

	4	4	8	16
25	100	100	200	400

200 + 200 + 400 = 400 + 400 = 800

*"The operations of addition, subtraction, multiplication, and division hold the **same fundamental meanings** no matter the domain in which they are applied."*

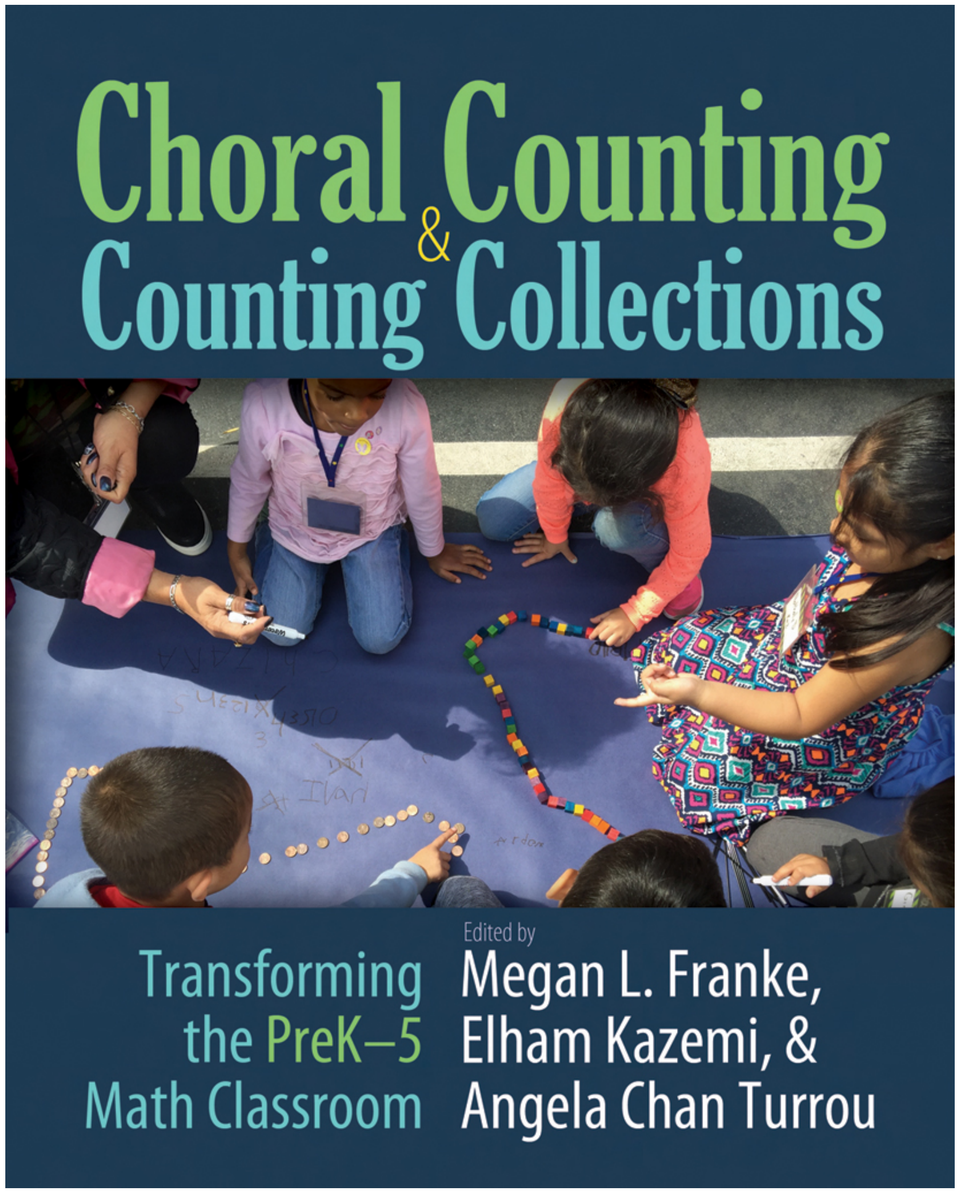


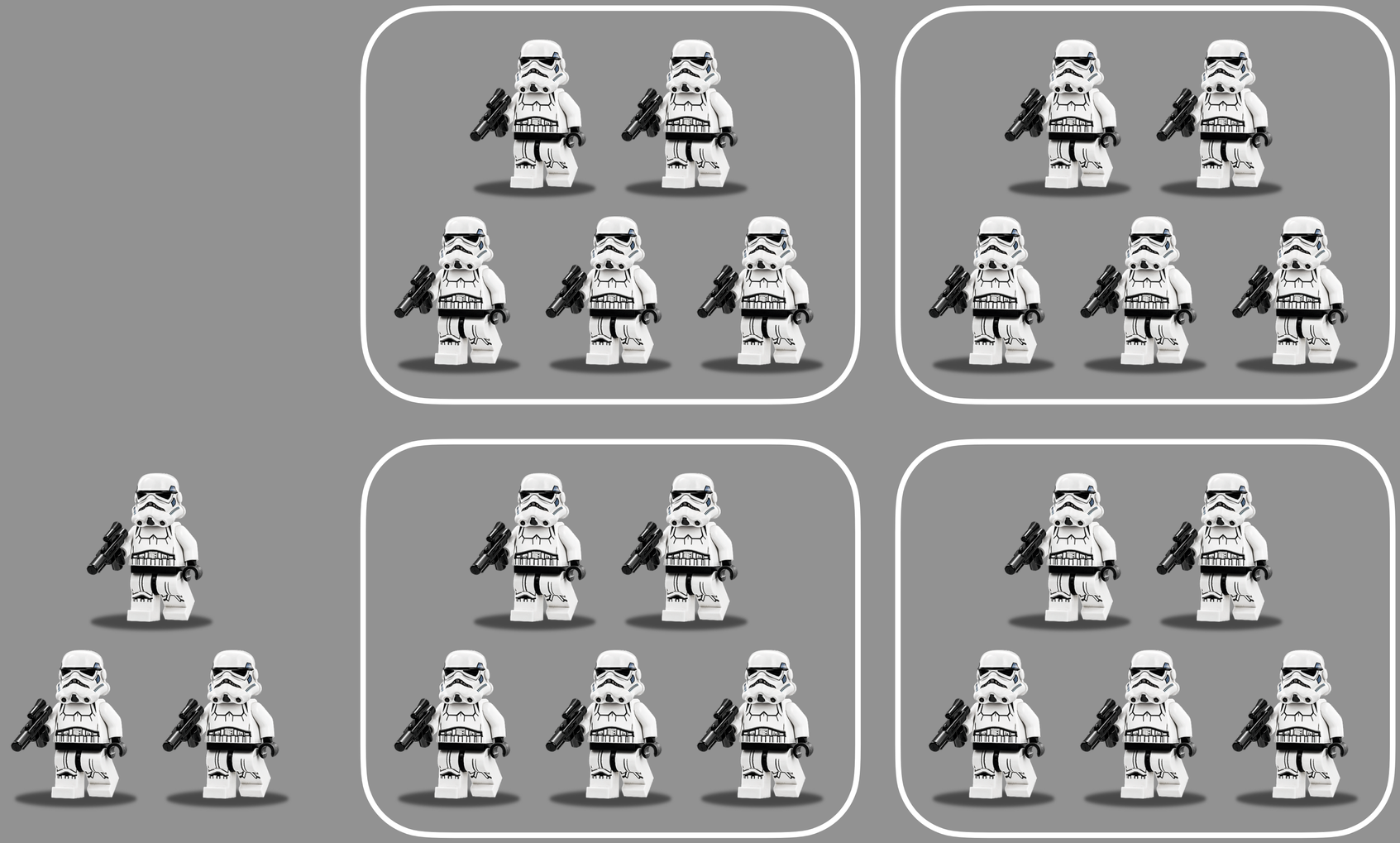


$$(2x)(3x) + (2x)(2) + (5)(3x) + (5)(2) = (2x + 5)(3x + 2)$$

$$6x^2 + 6x + 15x + 10 = 6x^2 + 21x + 10$$

*"Today, **you and your partner** are going to **count a collection**, figure out **how many** you have in your collection, and **show me a picture** of how you counted."*





$$3 + 4 \times 5$$

$$3 + 4 \times 5$$

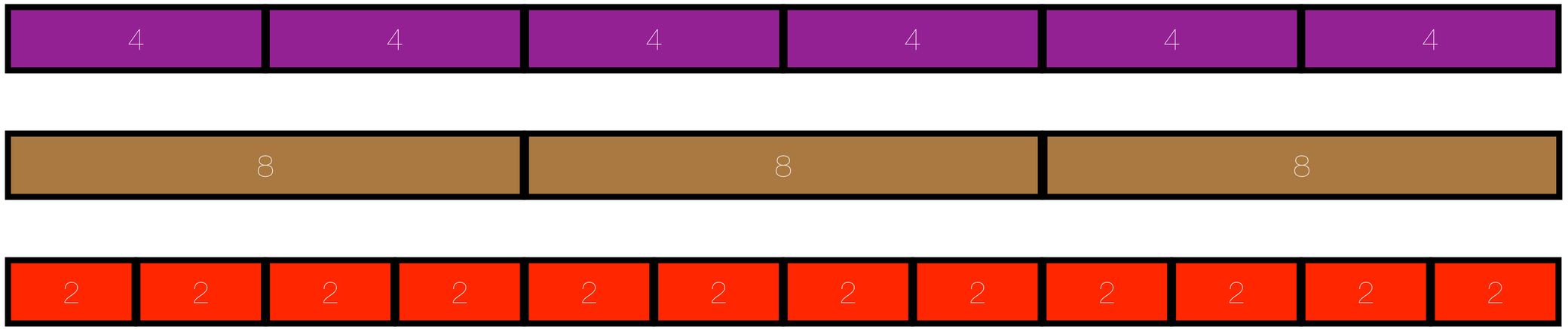
$$5 + 3 \times 6$$

$$4 \times 6 - 1$$

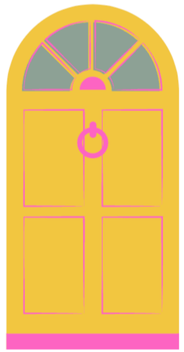
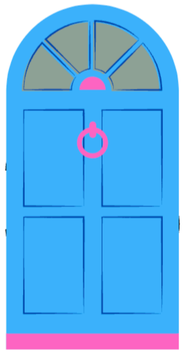
Cathy Marks Krpan

12

24



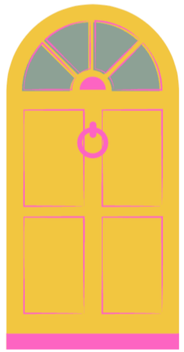
How many possible solutions can you think of?

3 x  = 6 x 

OPEN A DOOR

What must be behind the yellow door?

$$3 \times \square = 6 \times 3.5$$

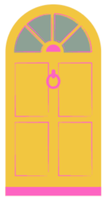


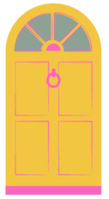
OPEN A DOOR

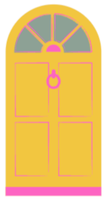
Which side would you rather solve? How might this help you with other problems?

$$3 \times 7 = 6 \times 3.5$$

OPEN PRACTICE

4 x  = 8 x 4.5

24 x 1.5 = 12 x 

 x 6 = 5.5 x 12

REVEAL

$4 \times 9 = 8 \times 4.5$

$24 \times 1.5 = 12 \times 3$

$11 \times 6 = 5.5 \times 12$

Menu

# of Packs	# of Sticks
1	12
2	24
4	48
8	96
10	120
9	108

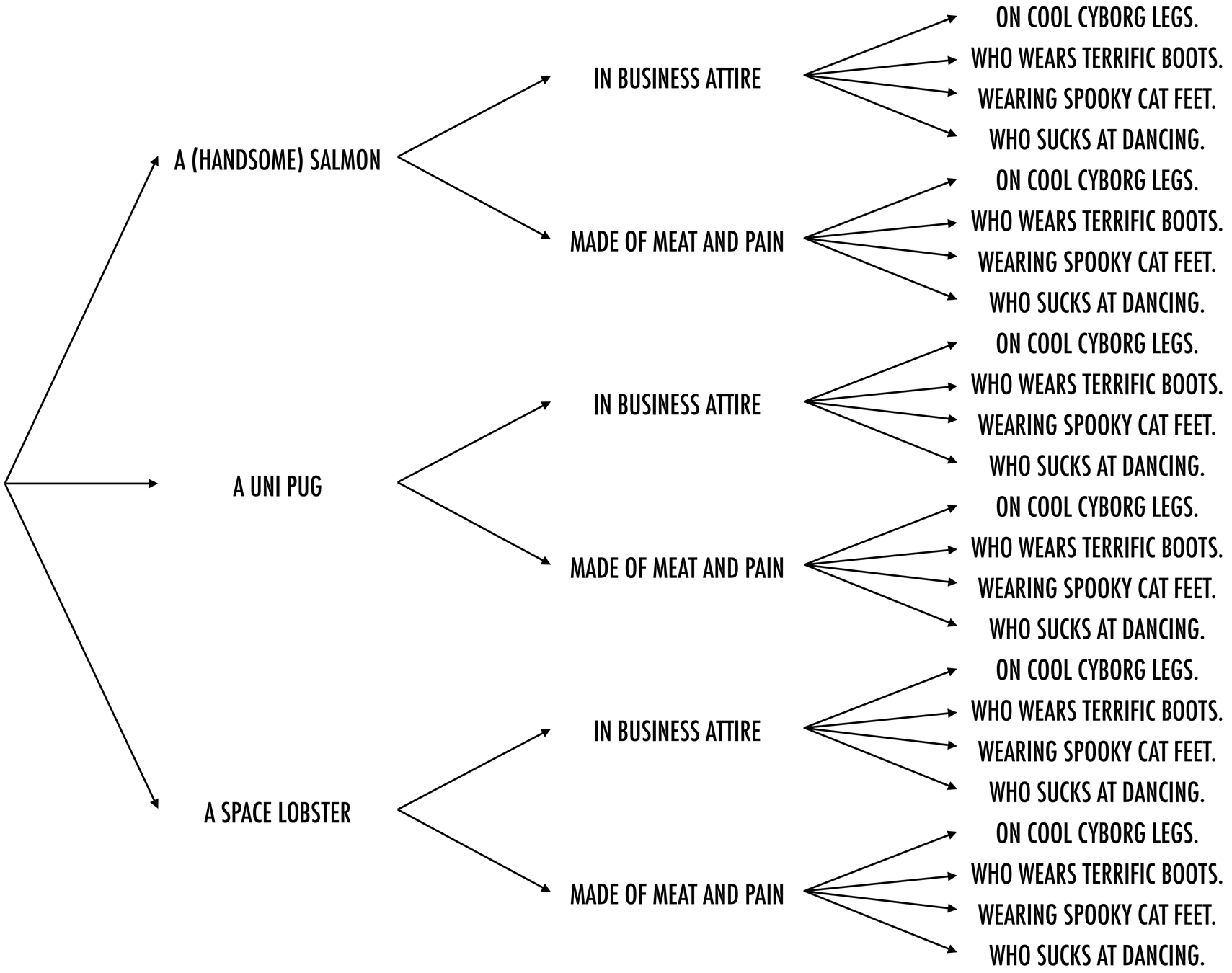

chrishunter.ca

A (HANDSOME) SALMON
A UNI PUG
A SPACE LOBSTER

IN BUSINESS ATTIRE
MADE OF MEAT AND PAIN

ON COOL CYBORG LEGS.
WHO WEARS TERRIFIC BOOTS.
WEARING SPOOKY CAT FEET.
WHO SUCKS AT DANCING.


A SALMON
A UNI PUG
A SPACE LOBSTER
IN BUSINESS ATTIRE
MADE OF MEAT AND PAIN
WHO WEARS TERRIFIC BOOTS
WEARING SPOOKY CAT FEET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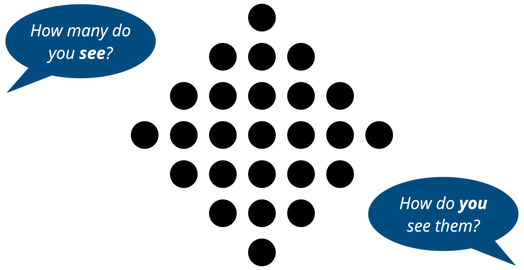
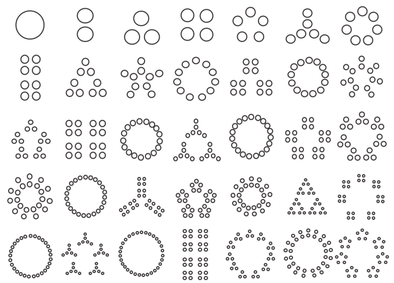
MADE OF MEAT AND PAIN
ON COOL CYBORG LEGS.
WHO WEARS TERRIFIC BOOTS.
WEARING SPOOKY CAT FEET.
WHO SUCKS AT DANCING.

Meanings

- Repeated Addition
- Equal Groups or Sets
- Array
- Area of a Rectangle
- Comparison
- Rate
- Combinations





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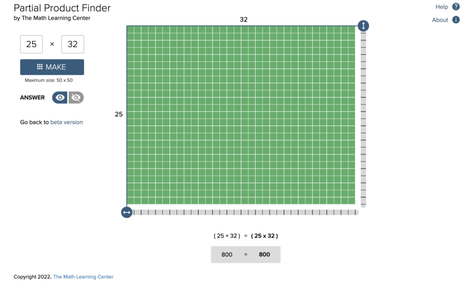

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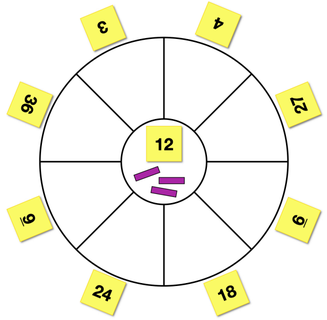

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