DNEAT Calculation Progression

This calculation progression is to support schools within DNEAT in writing their own calculation policy. This progression is not to replace calculation policies which are the responsibility of each school.

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This calculation progression has been created by subjects leaders within DNEAT and a dedicated team of maths ambassadors listed below.

Name	School
Kalle Boyle *	The Bishop's C of E Primary Academy
Sharon Brett *	Cawston C of E Primary Academy
Becki Bunkle *	Dereham Church of England Junior Academy
Lee Frost	Swaffham C of E Junior School
Christina Maskell *	Nar Valley Federation
Andy Petersen	Hopton Church of England Primary Academy
Rebekah Smithee	St Michael's C of E Academy
Rebecca Tovell	Peterhouse C of E Primary Academy
Zoe Warren	Whitefriars C of E Primary Academy

* These ambassadors attended all twilight sessions working on the calculation progression.

With thanks also to Mathematics Advisers, Anna Hogg and Sarah Jay from Educator Solutions who have provided knowledge, support and guidance throughout the creation of this progression.

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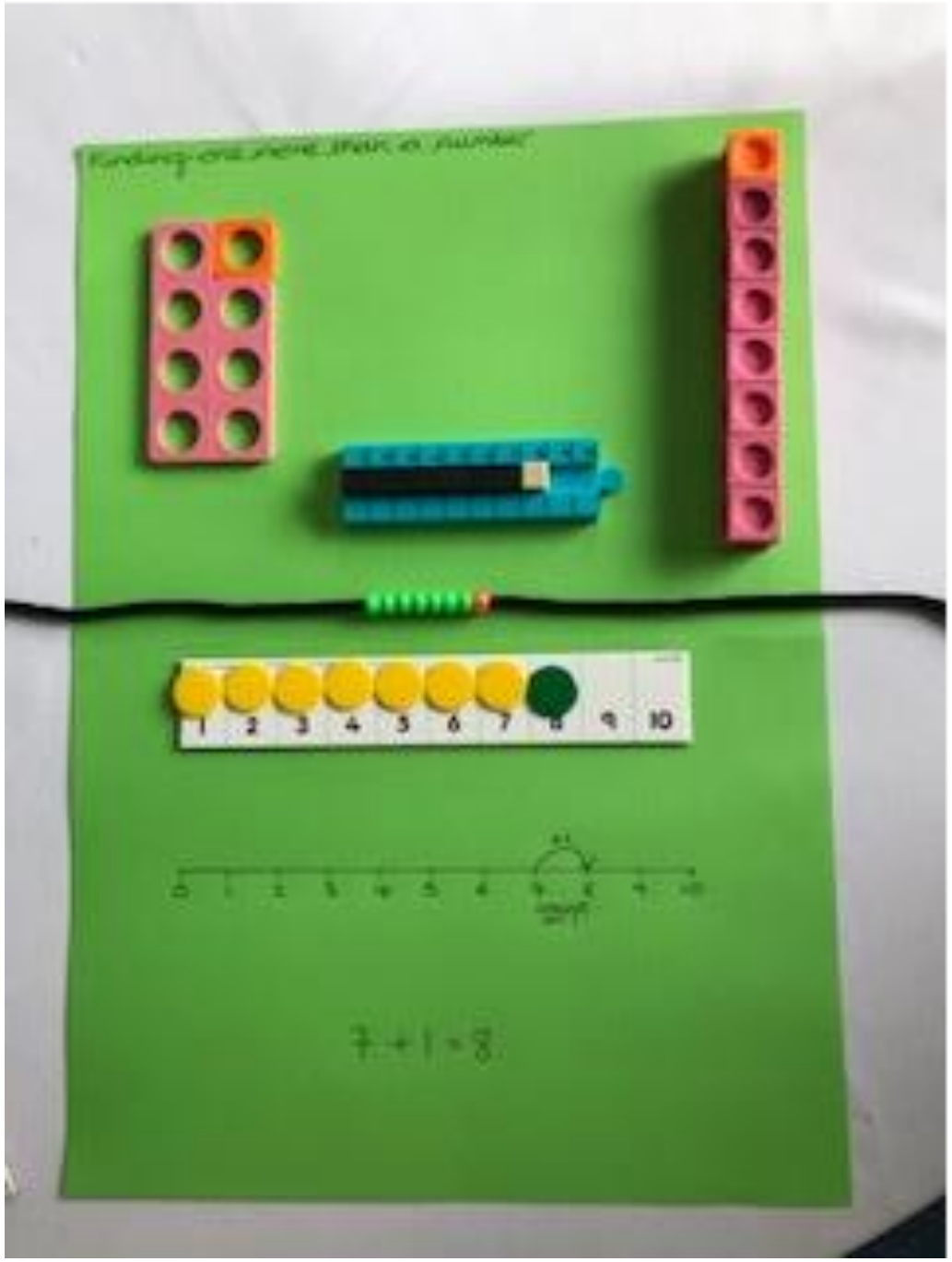
Addition

Educator Solutions



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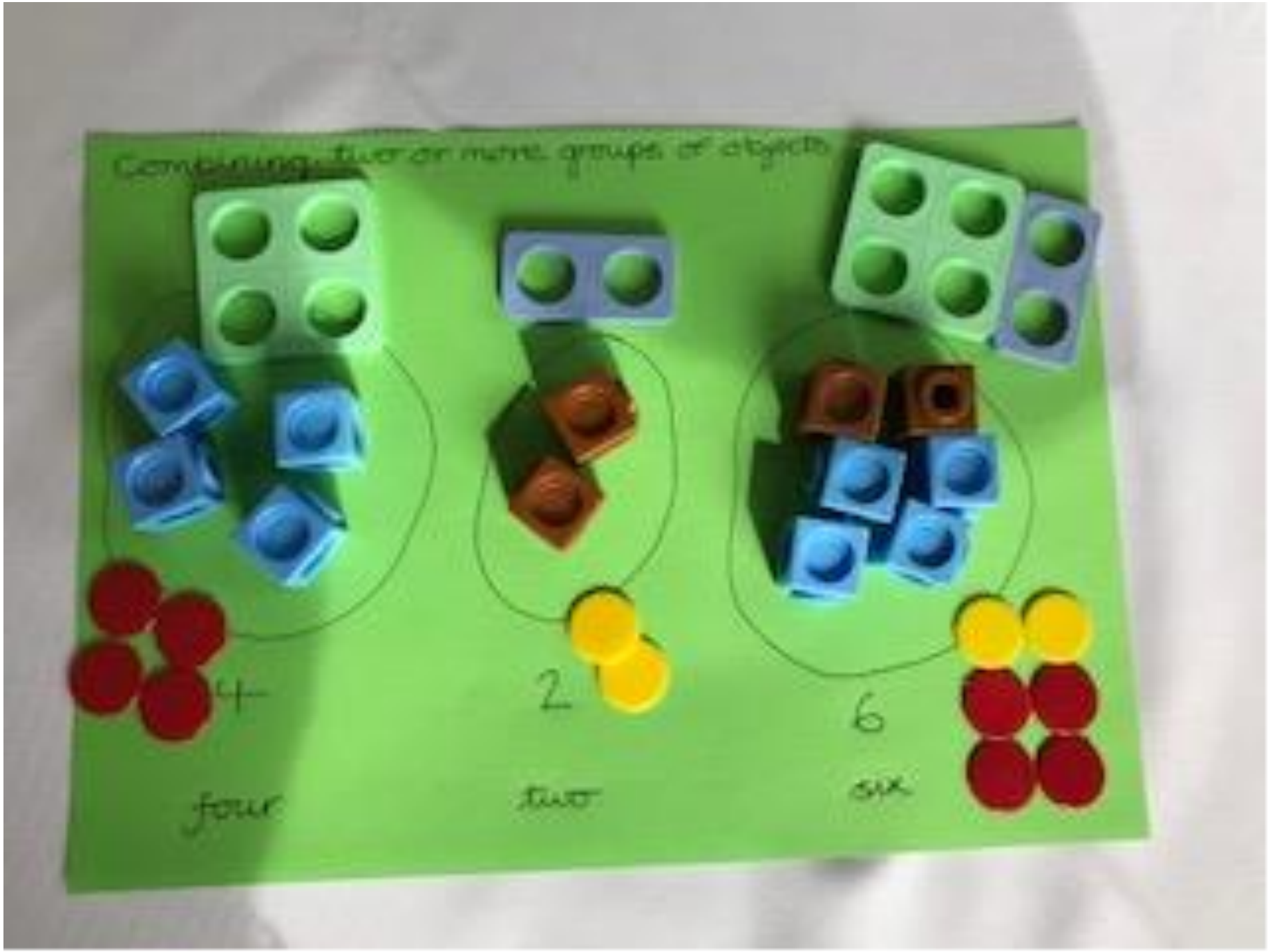

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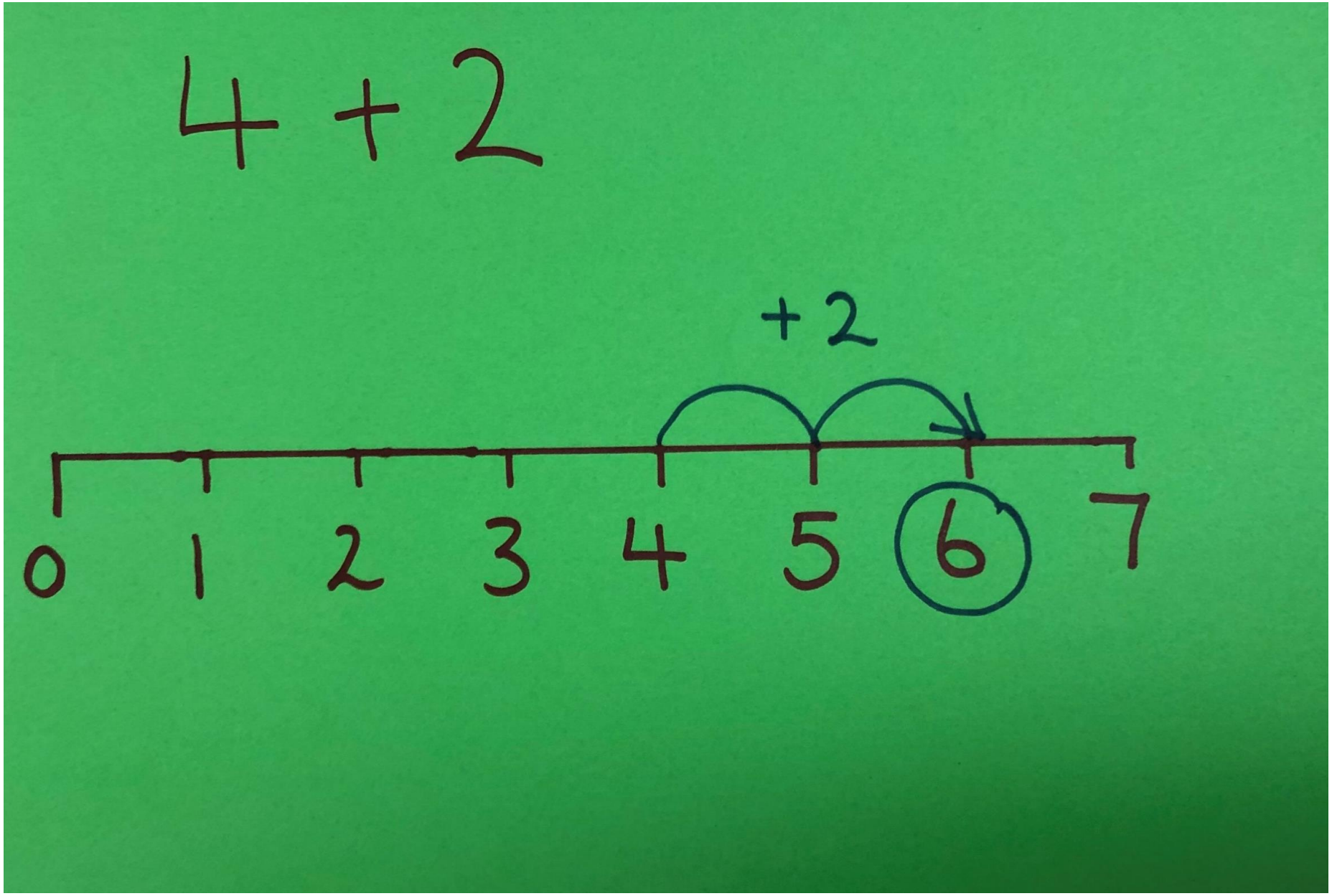

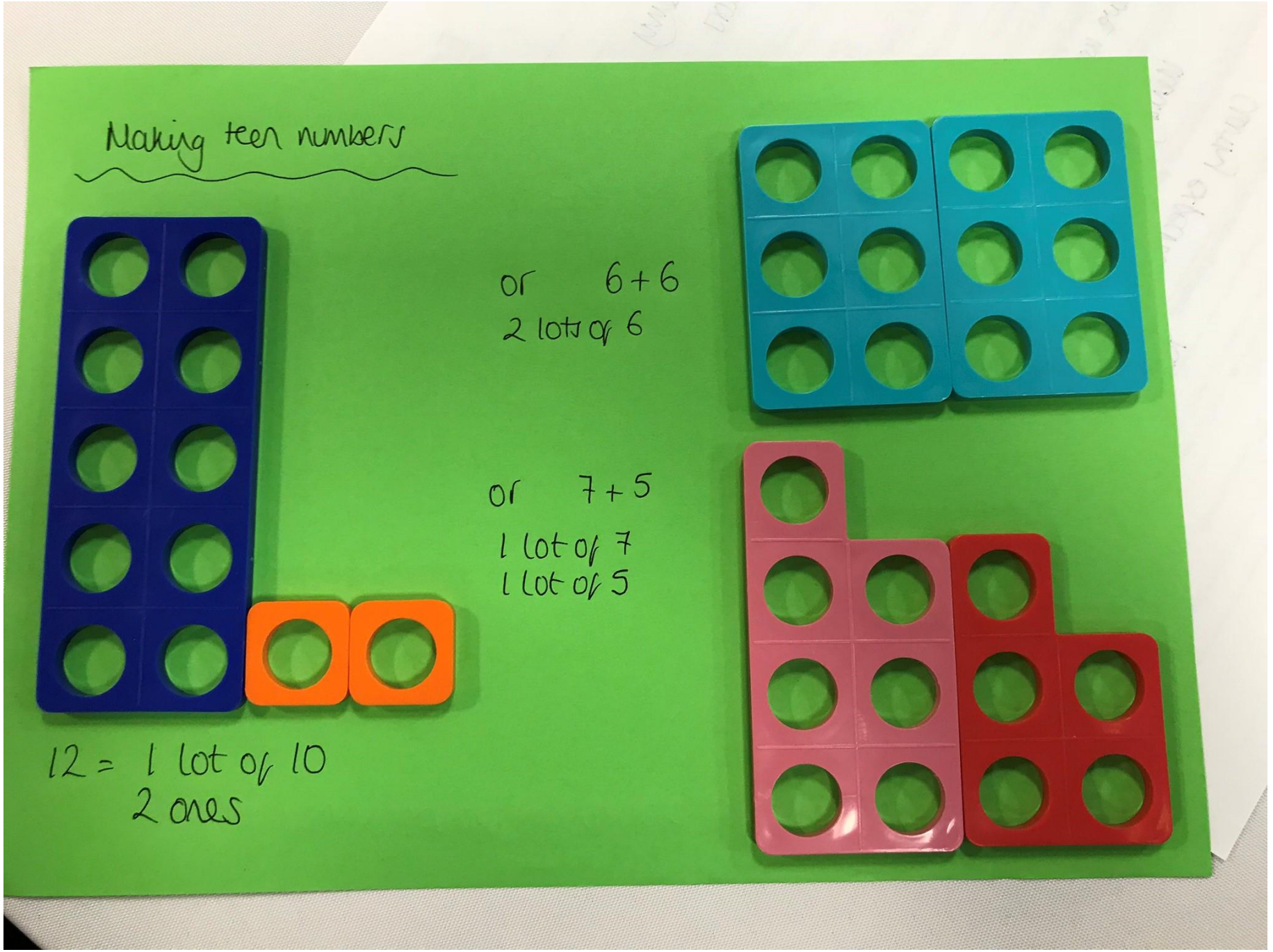

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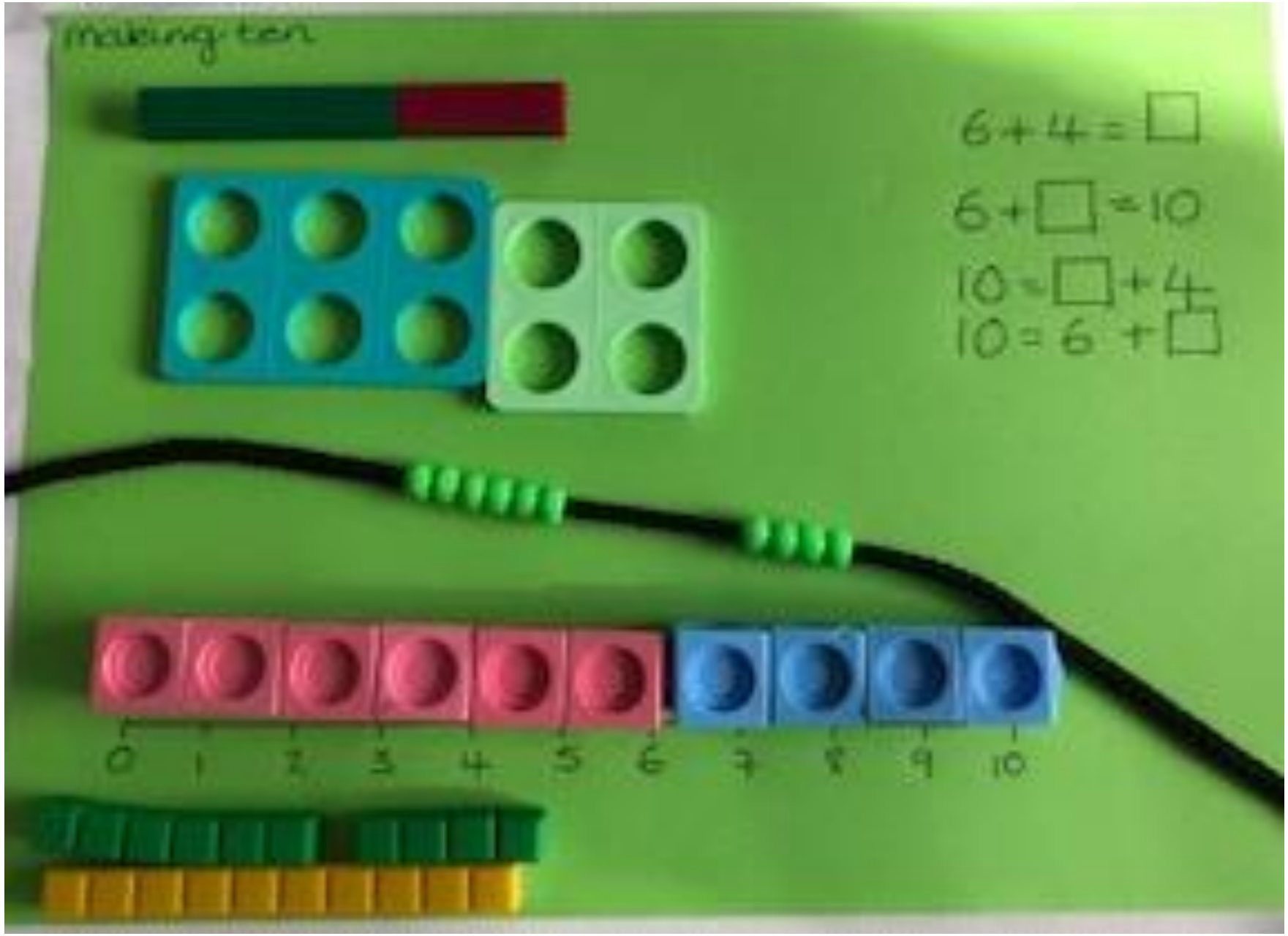

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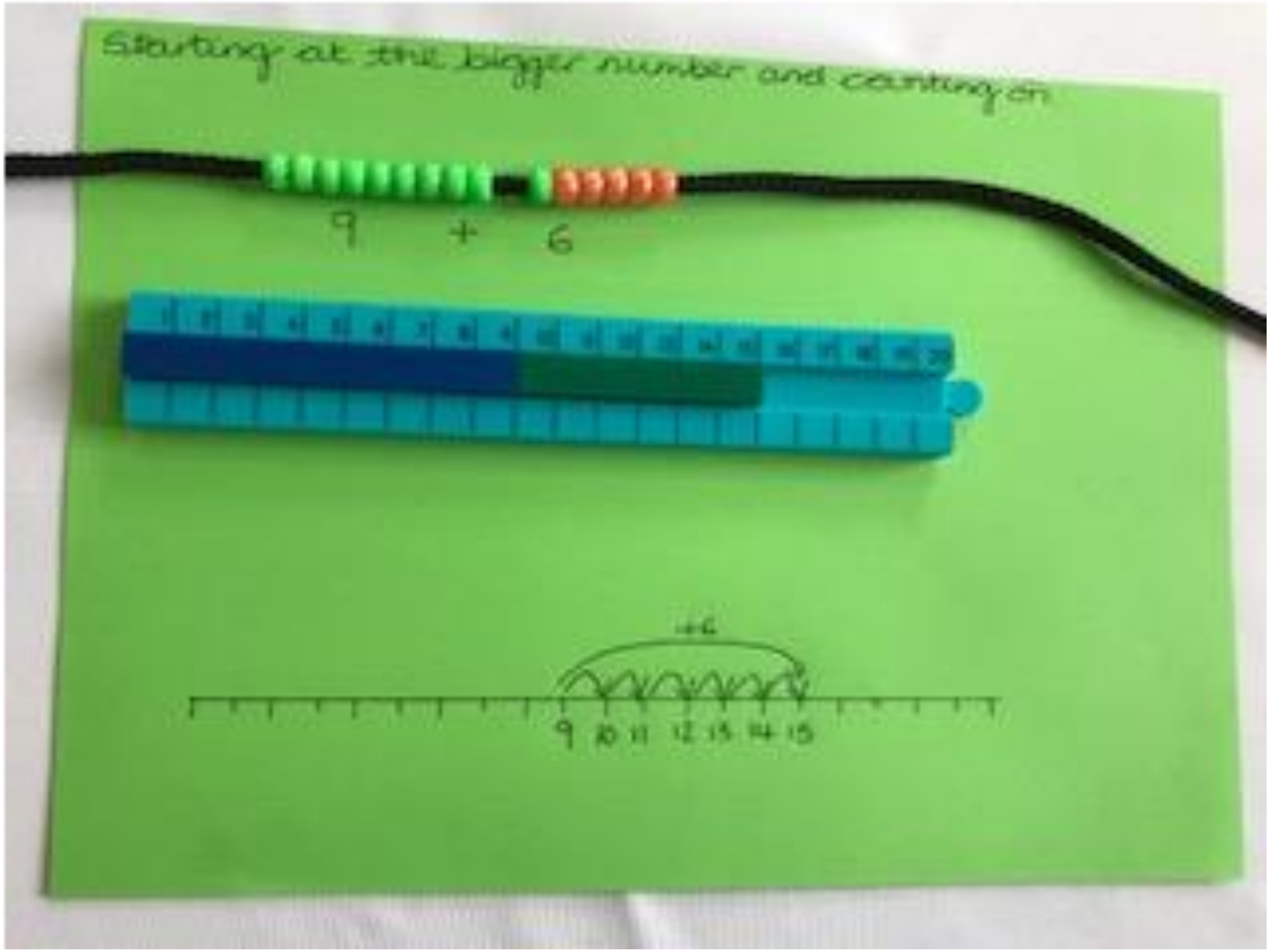

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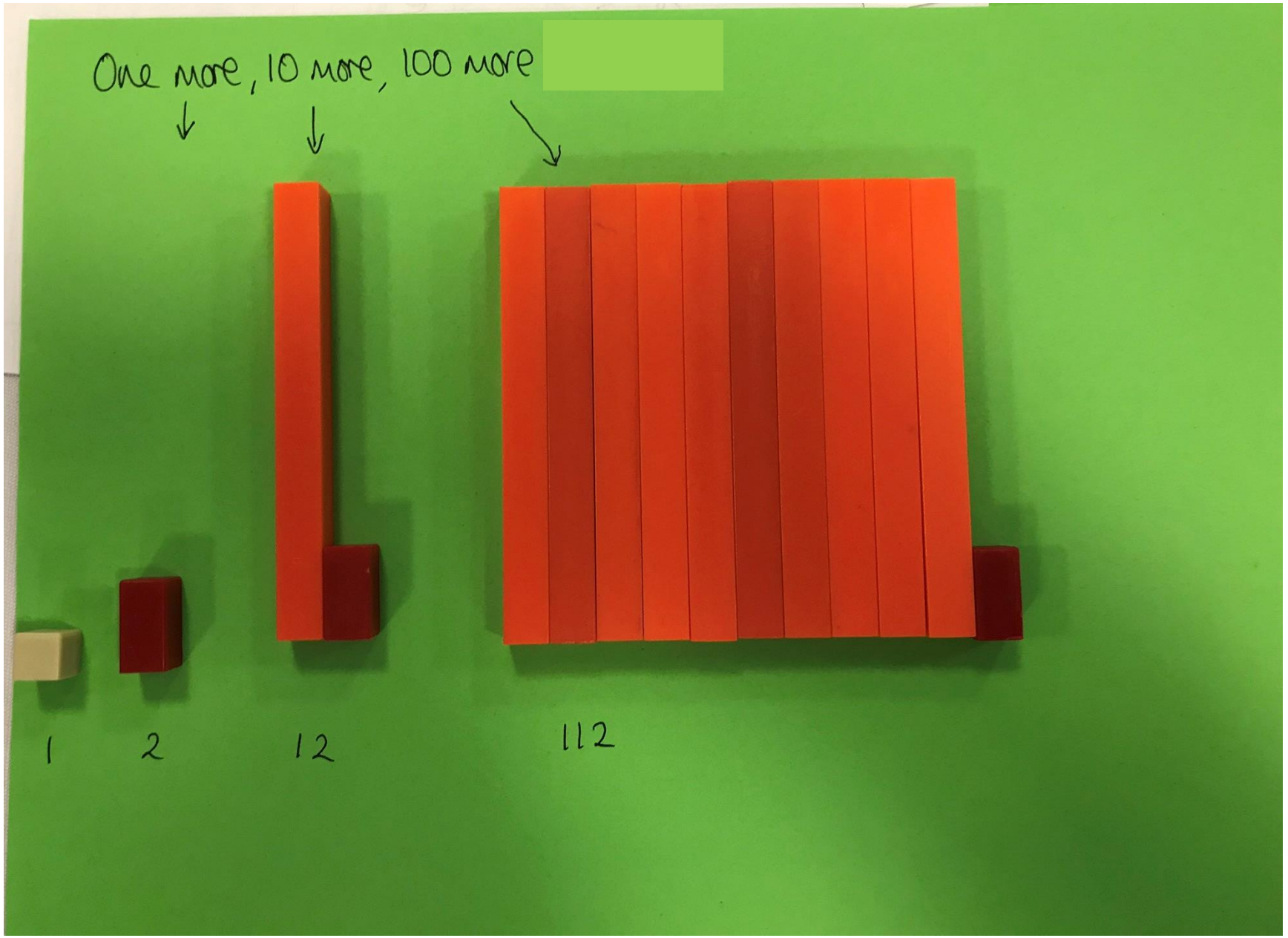

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Place value: partition numbers into tens and ones

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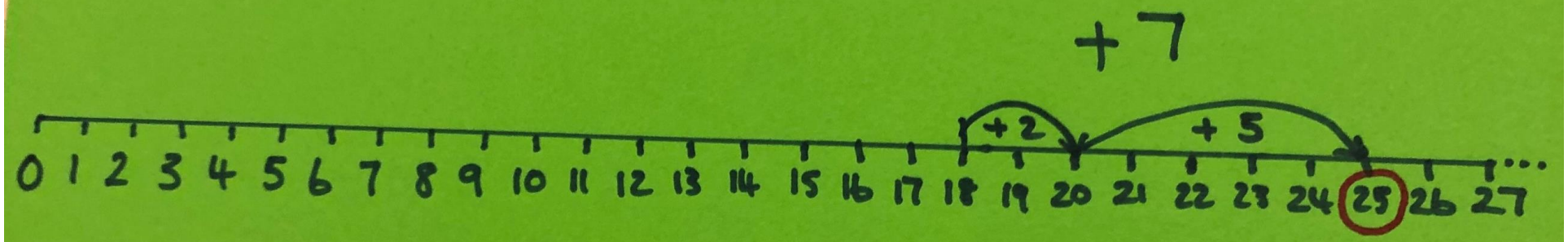
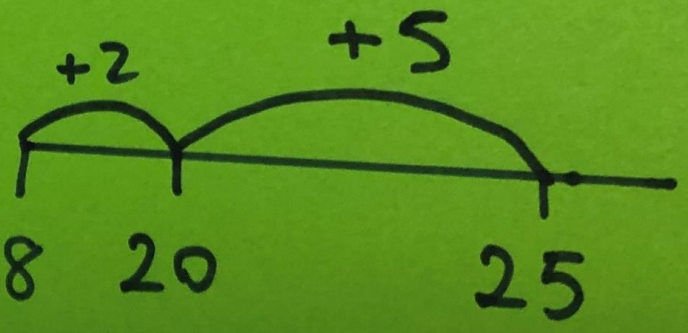
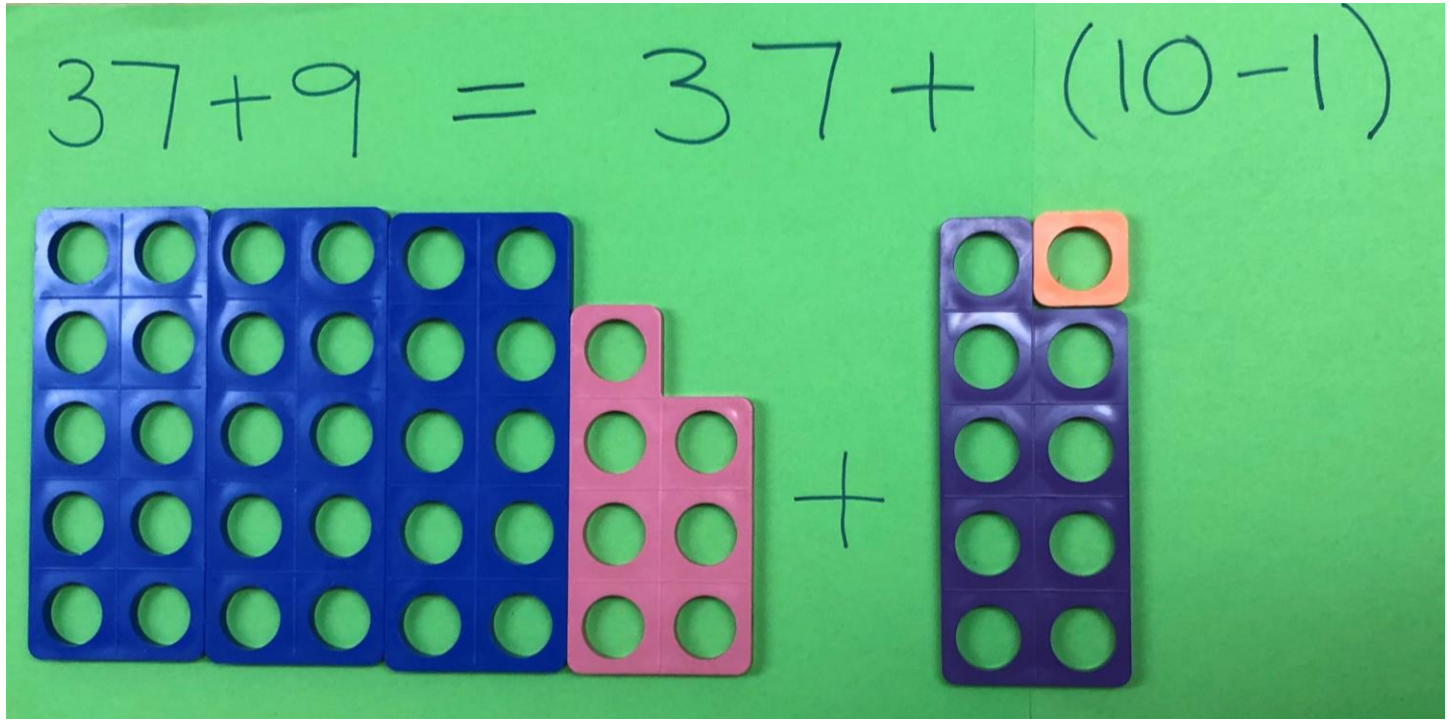
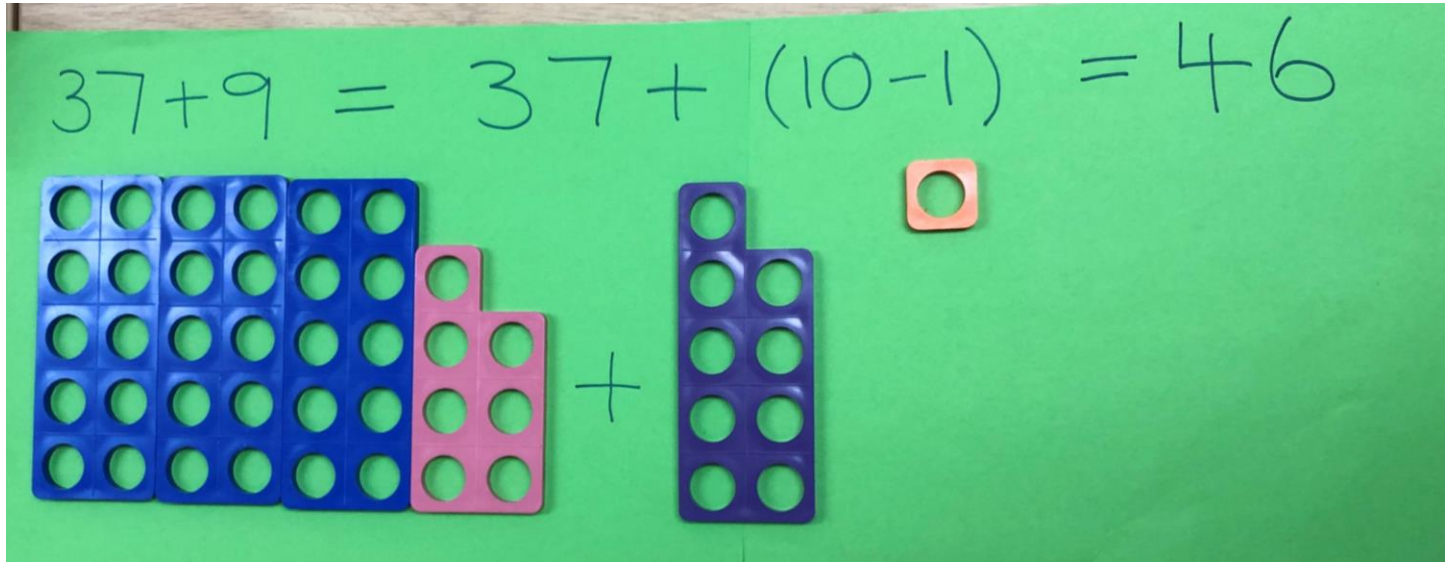
18+7=25









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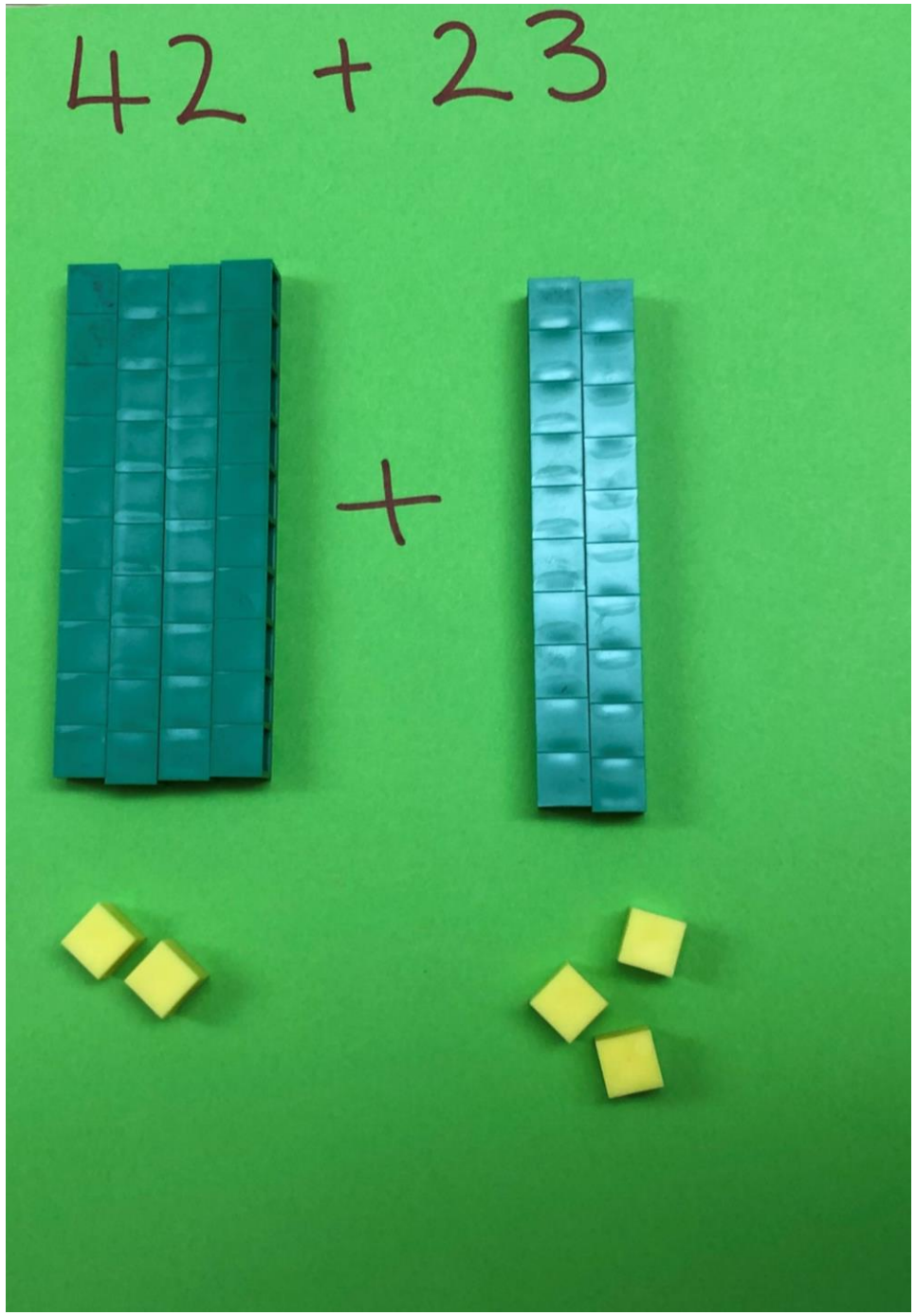

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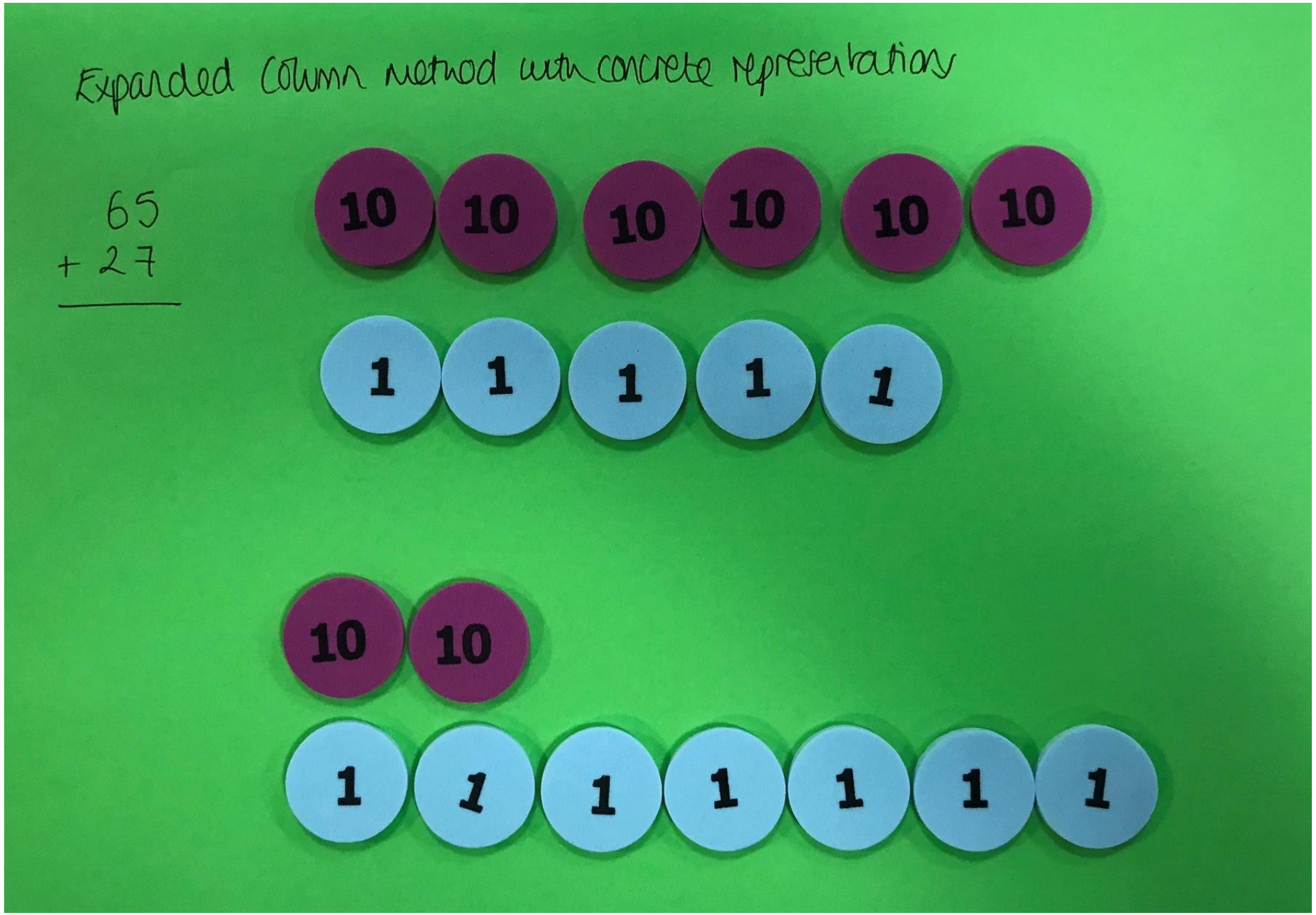

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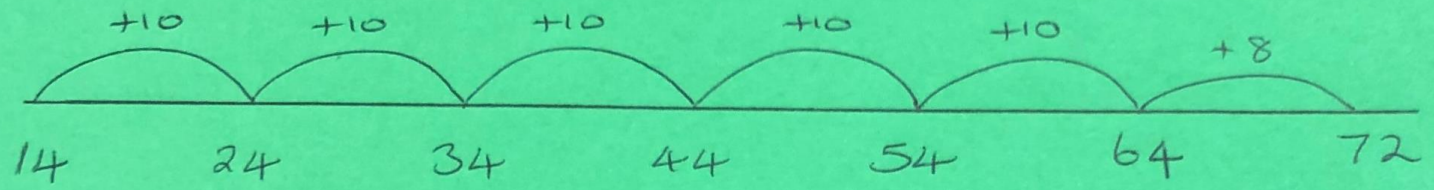
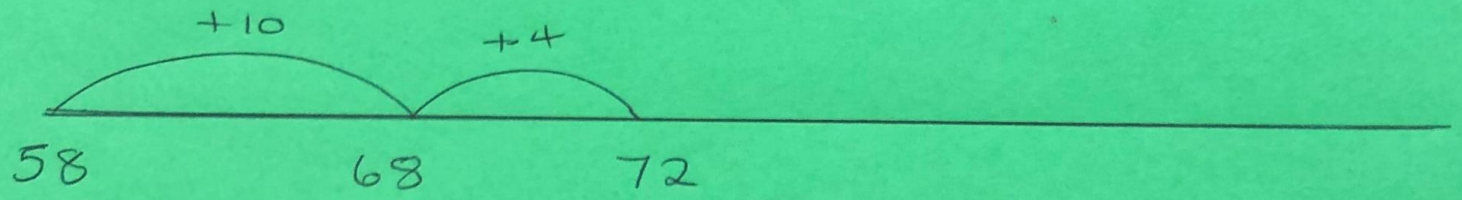
Efficient number line v inefficient

14 + 58 =





Which would you use?

And why?

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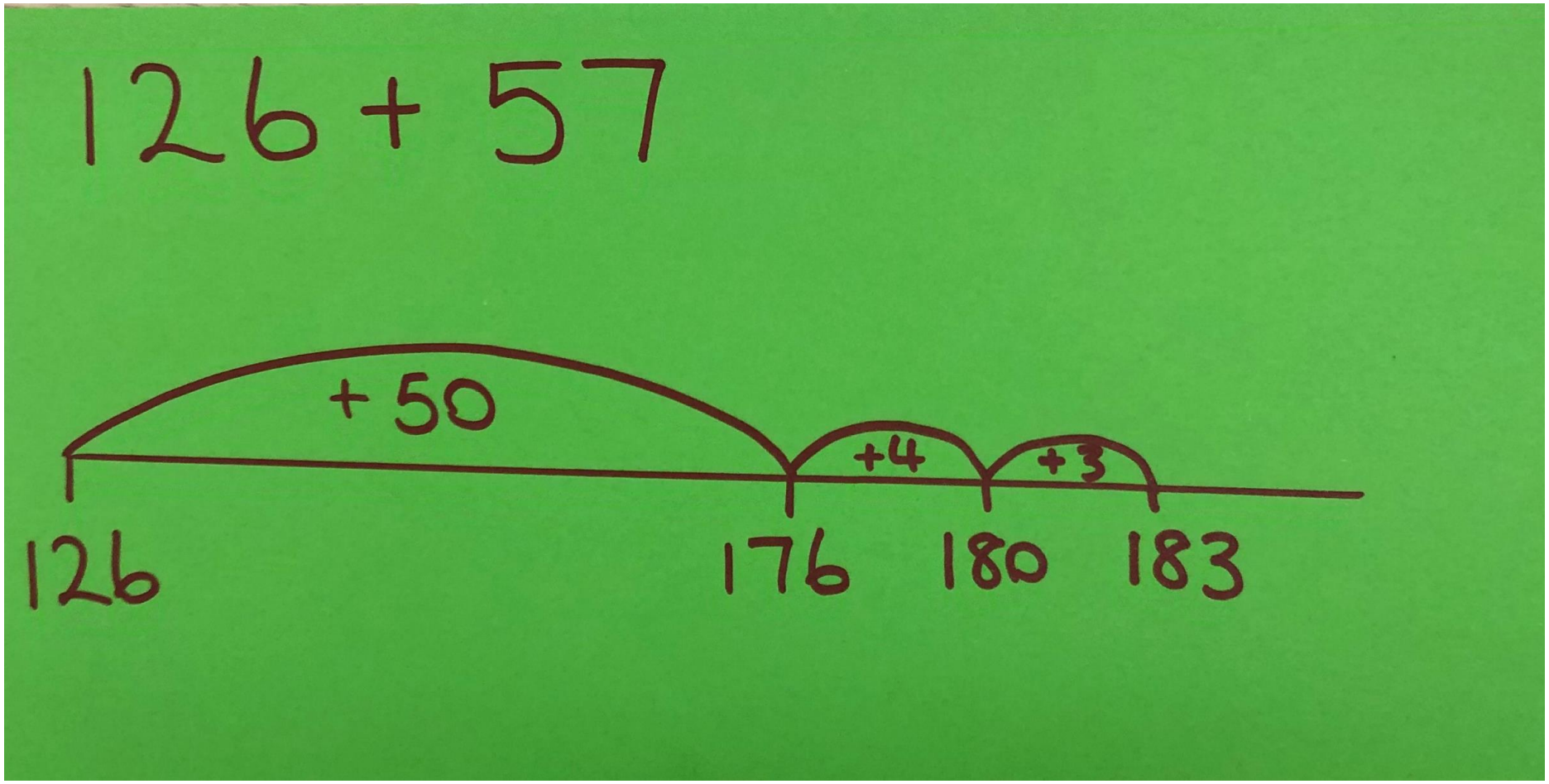

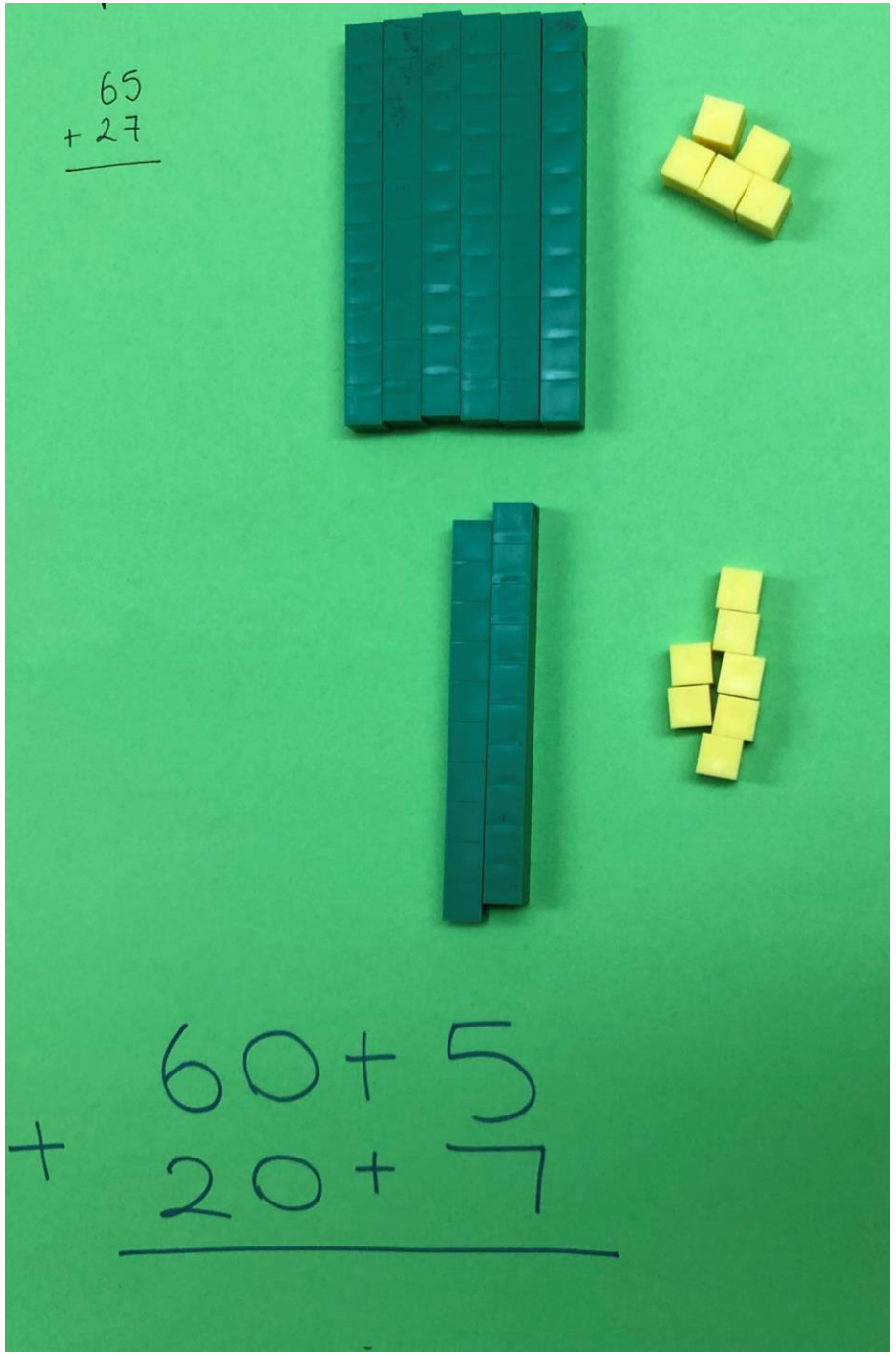

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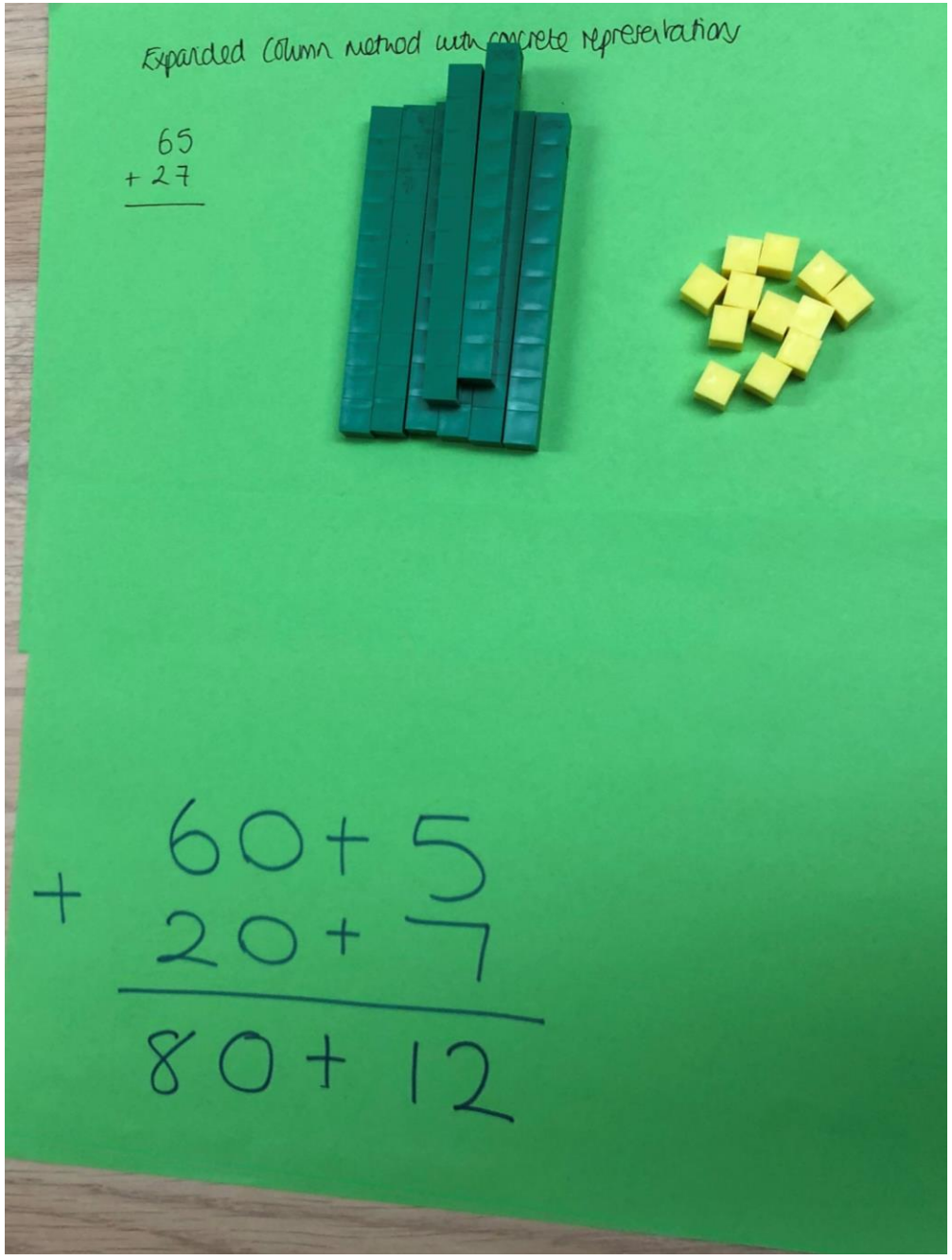

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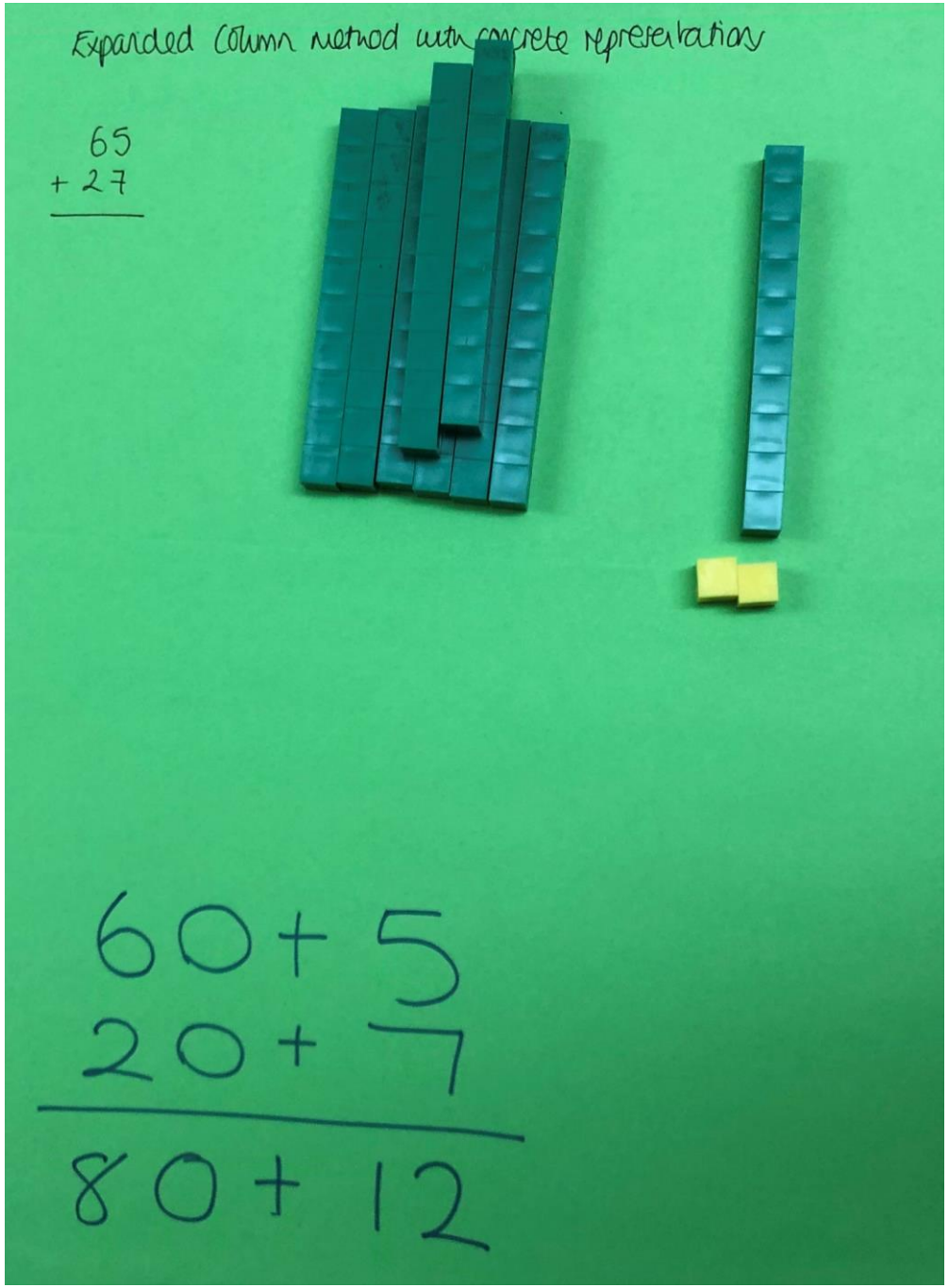

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Expanded column method with concrete representation

$$\begin{array}{r} 65 \\ +\ 27 \\ \hline \end{array}$$

= 92

$$\begin{array}{r} 60+5 \\ 20+7 \\ \hline 80+12 \end{array}$$

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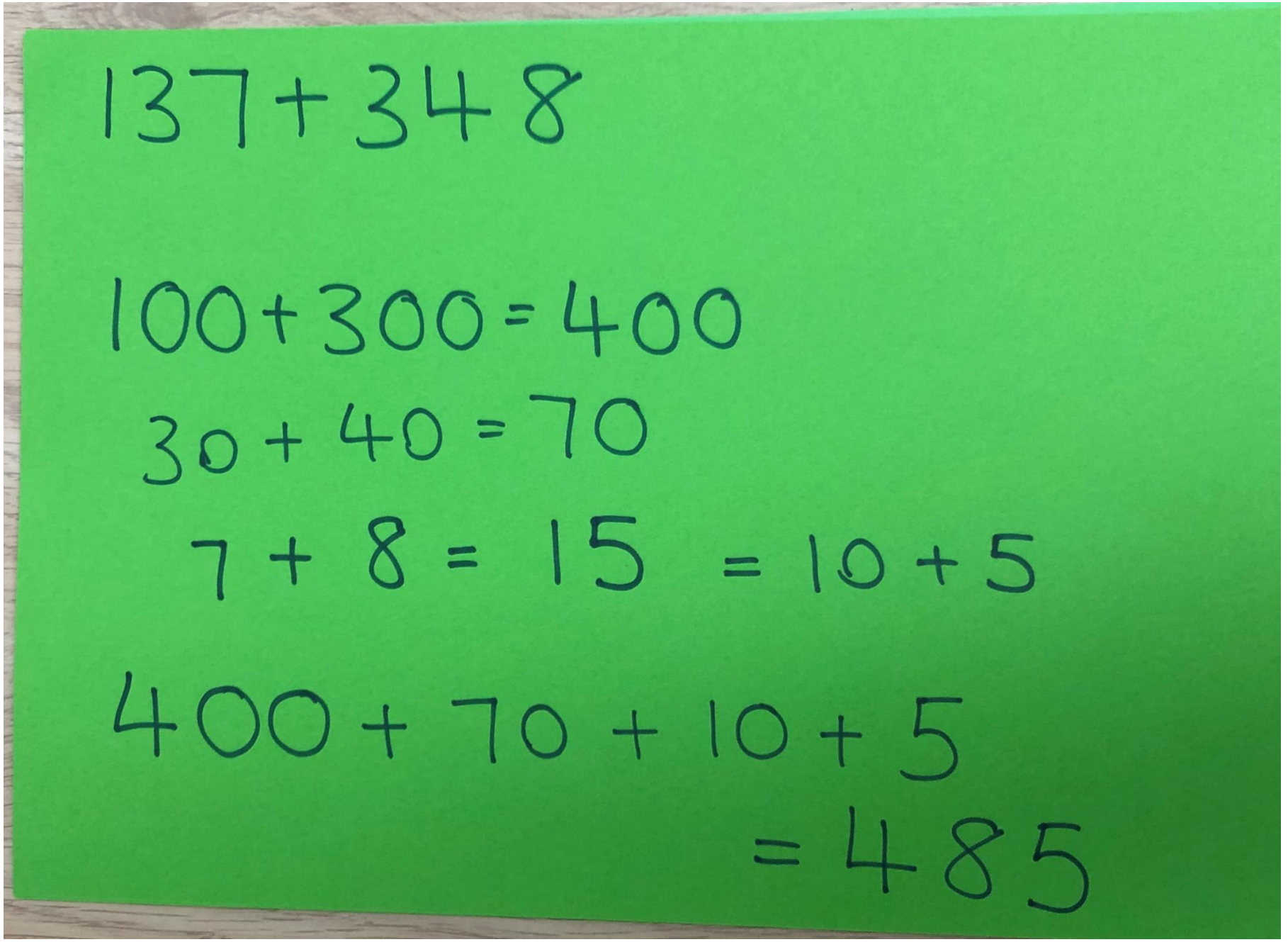

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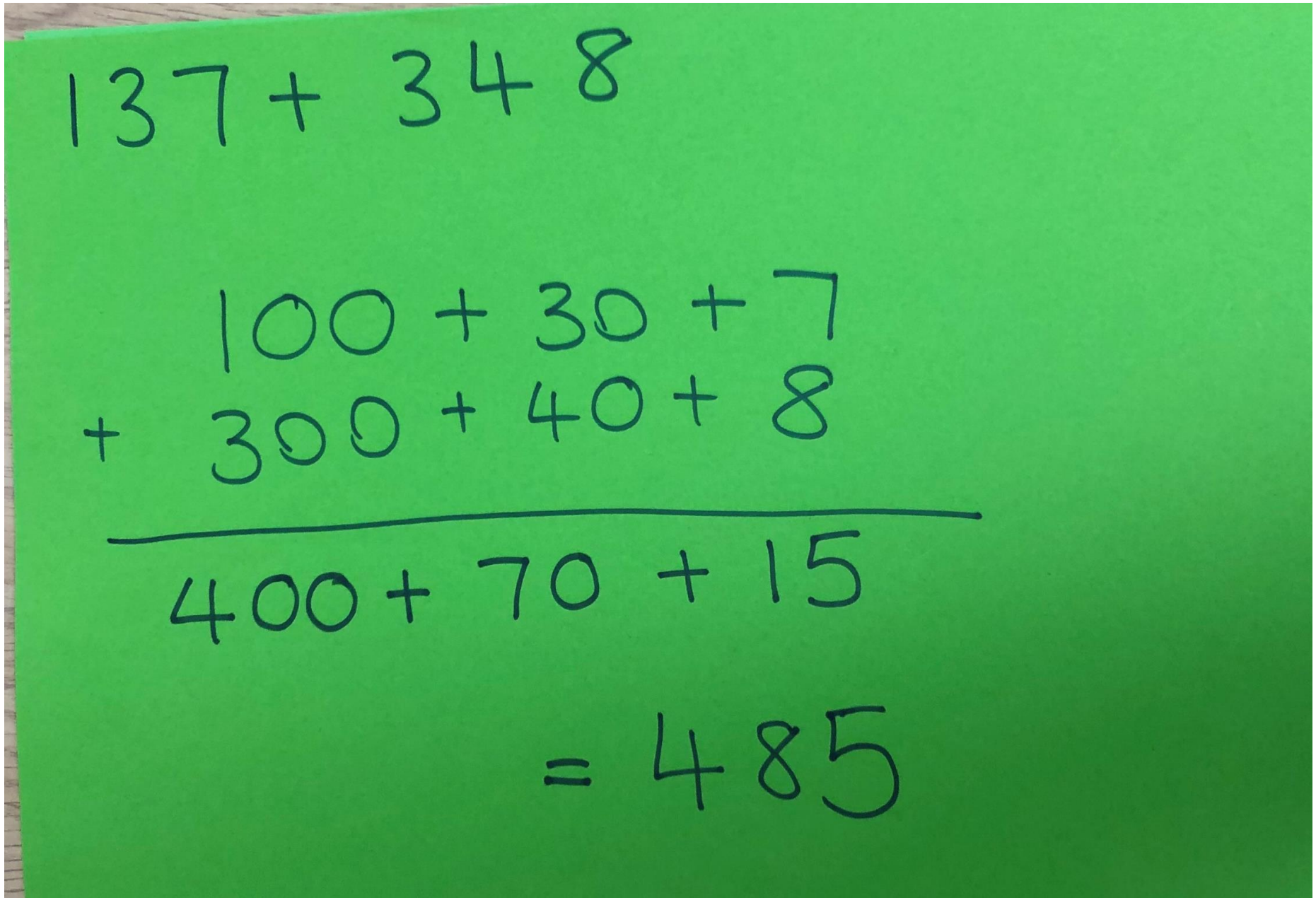

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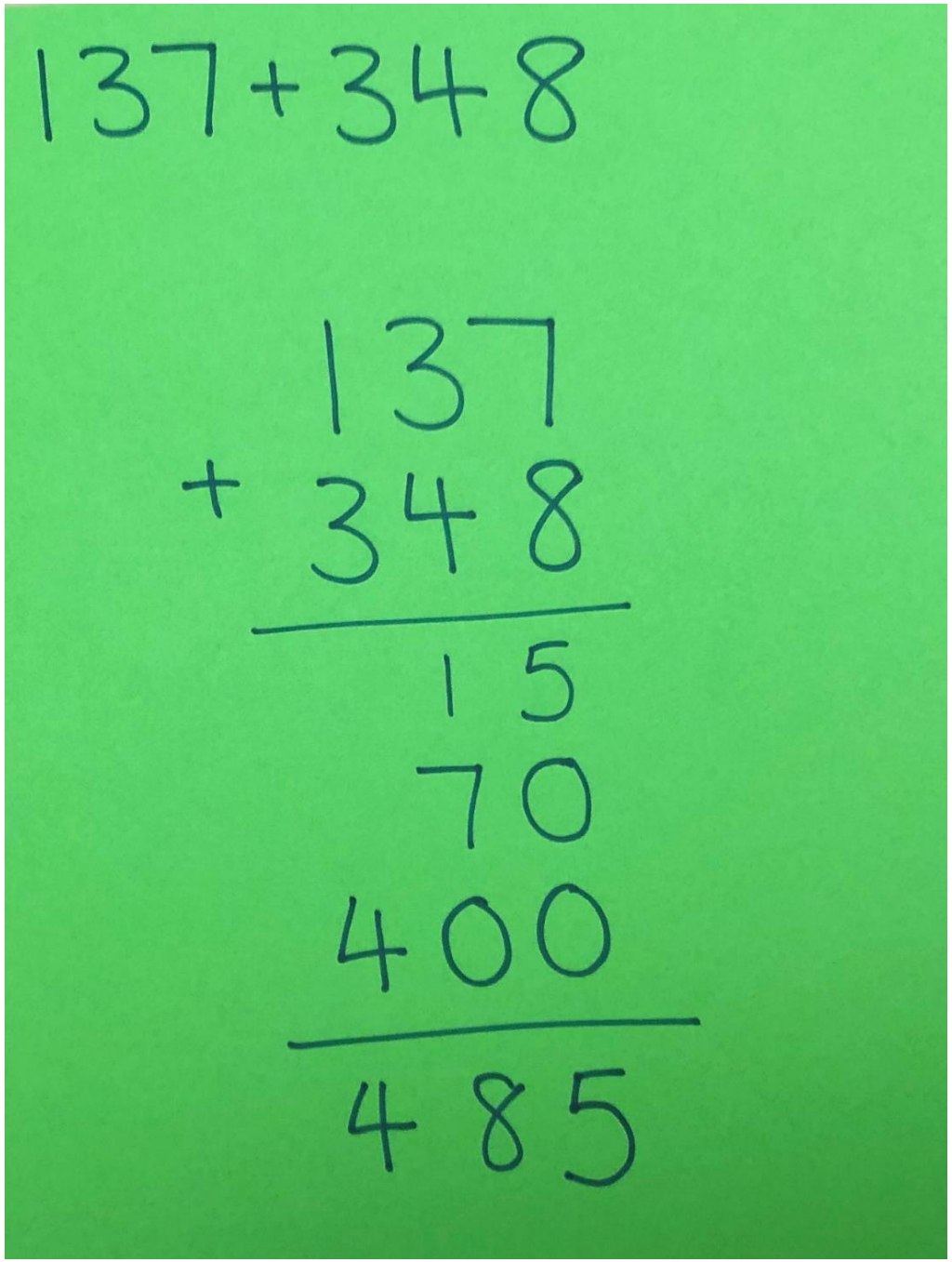
137 + 348



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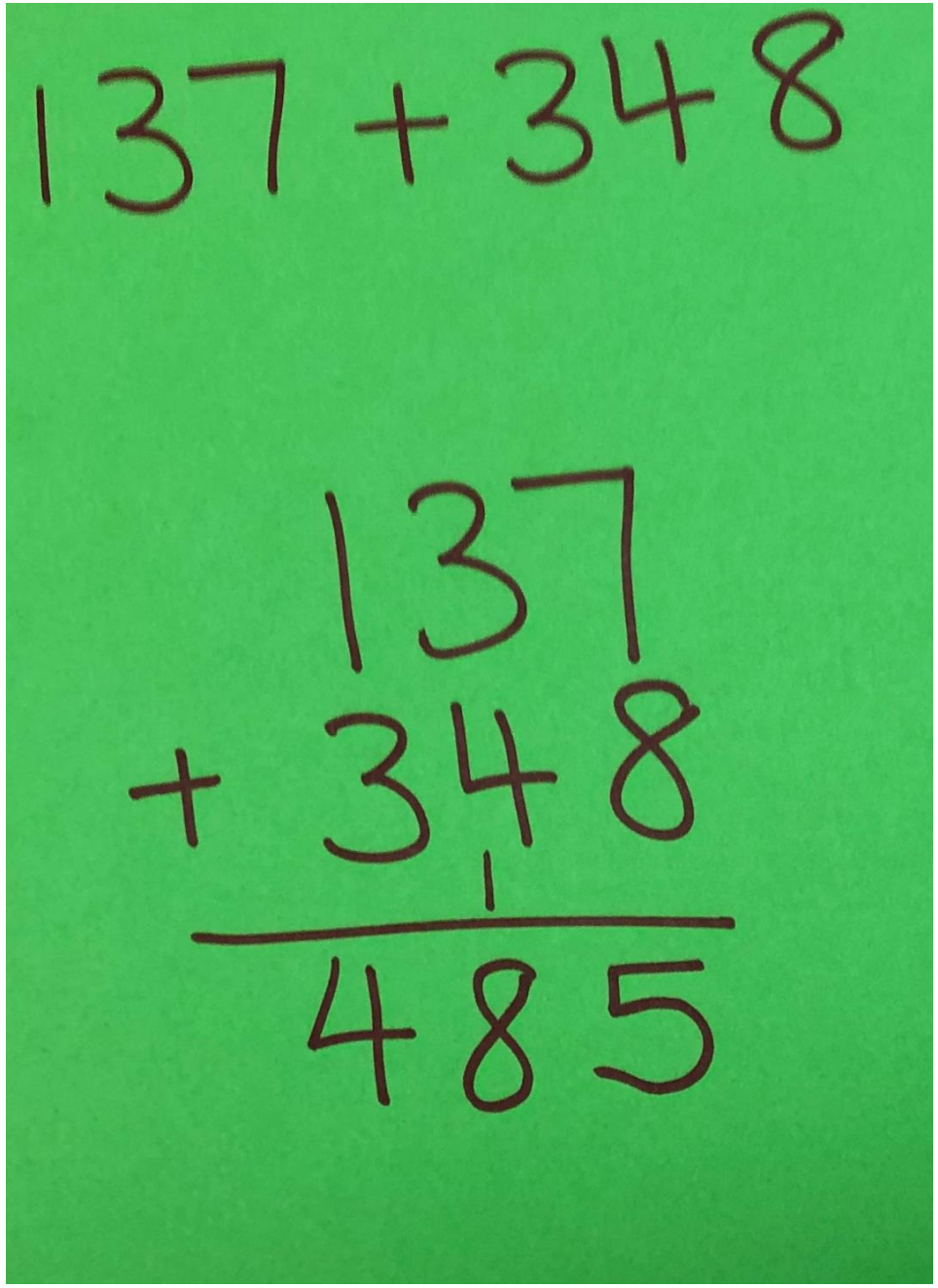

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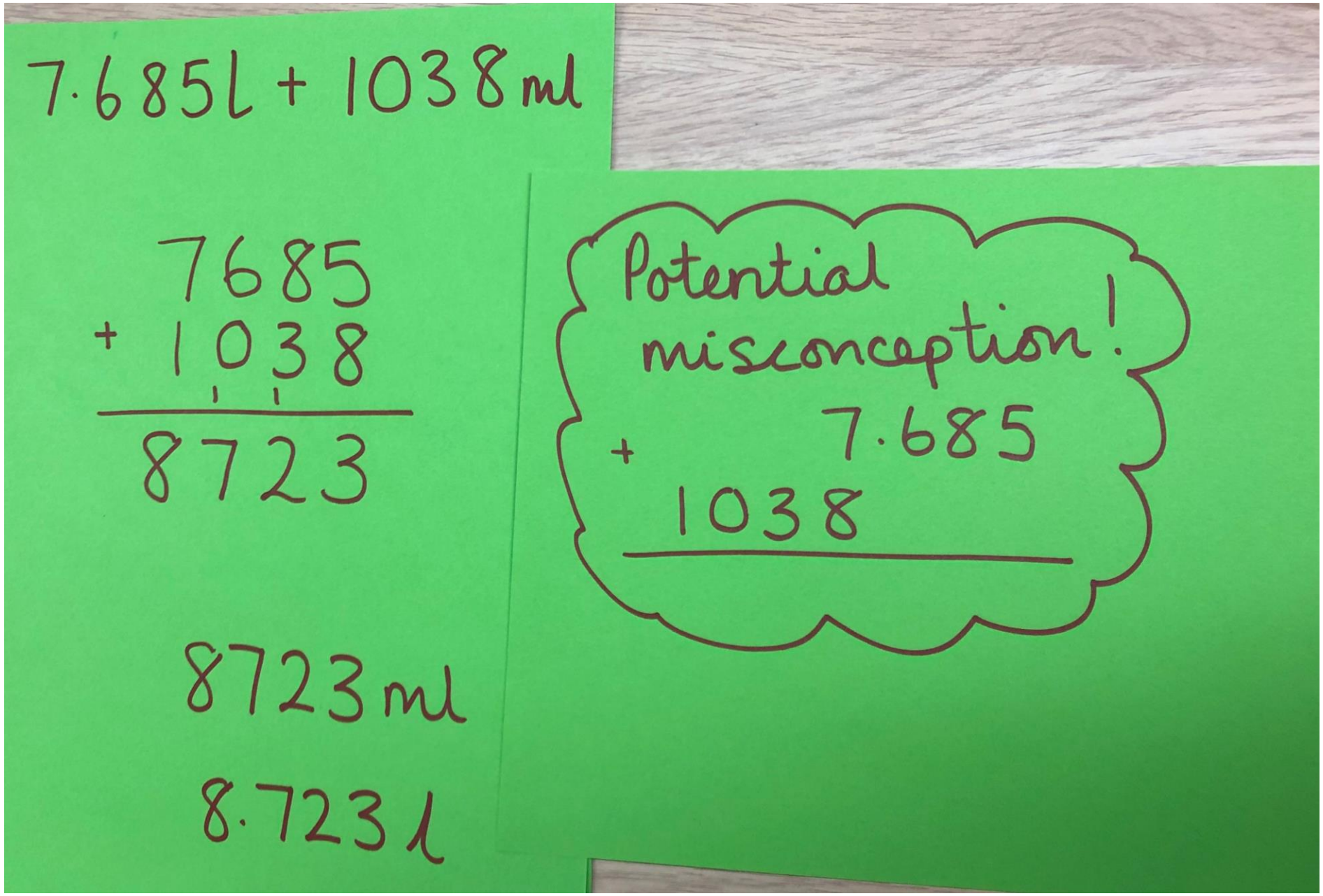

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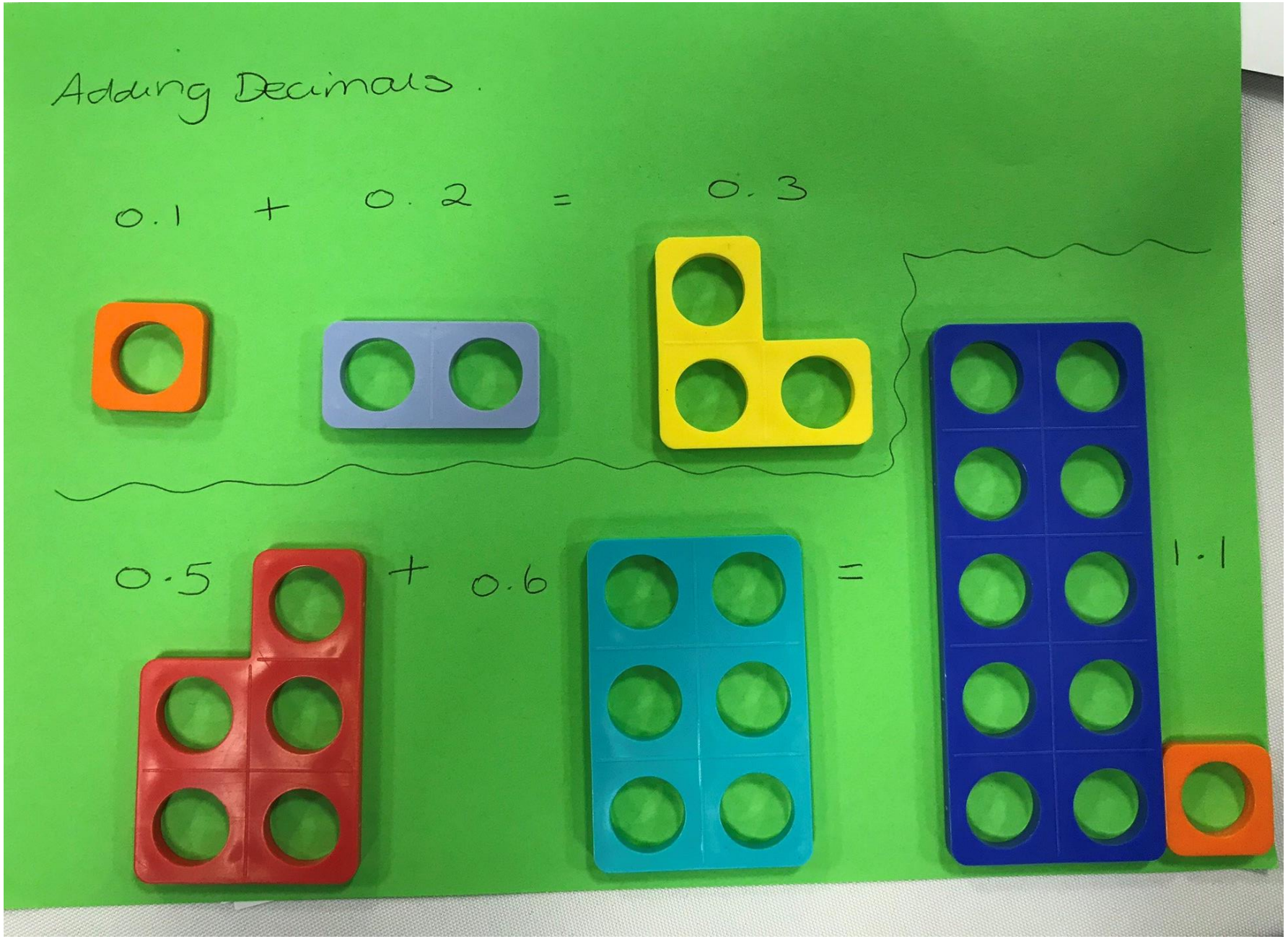

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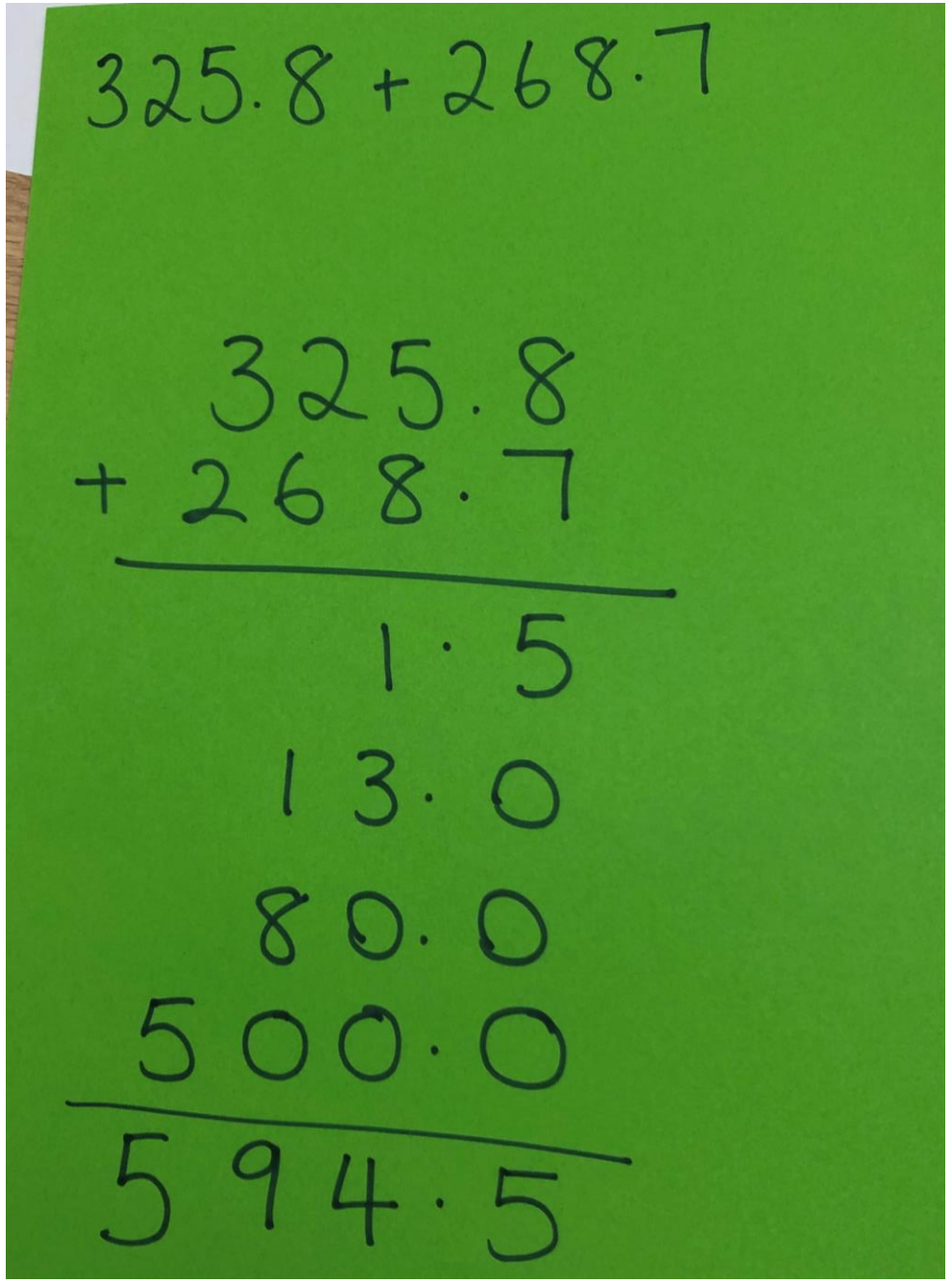

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147.28 + 259.76

$$\begin{array}{r} 147.28 \\ +\ 259.76 \\ \hline 407.04 \end{array}$$

1/3 + 1/3 + 1/3 = 1 whole

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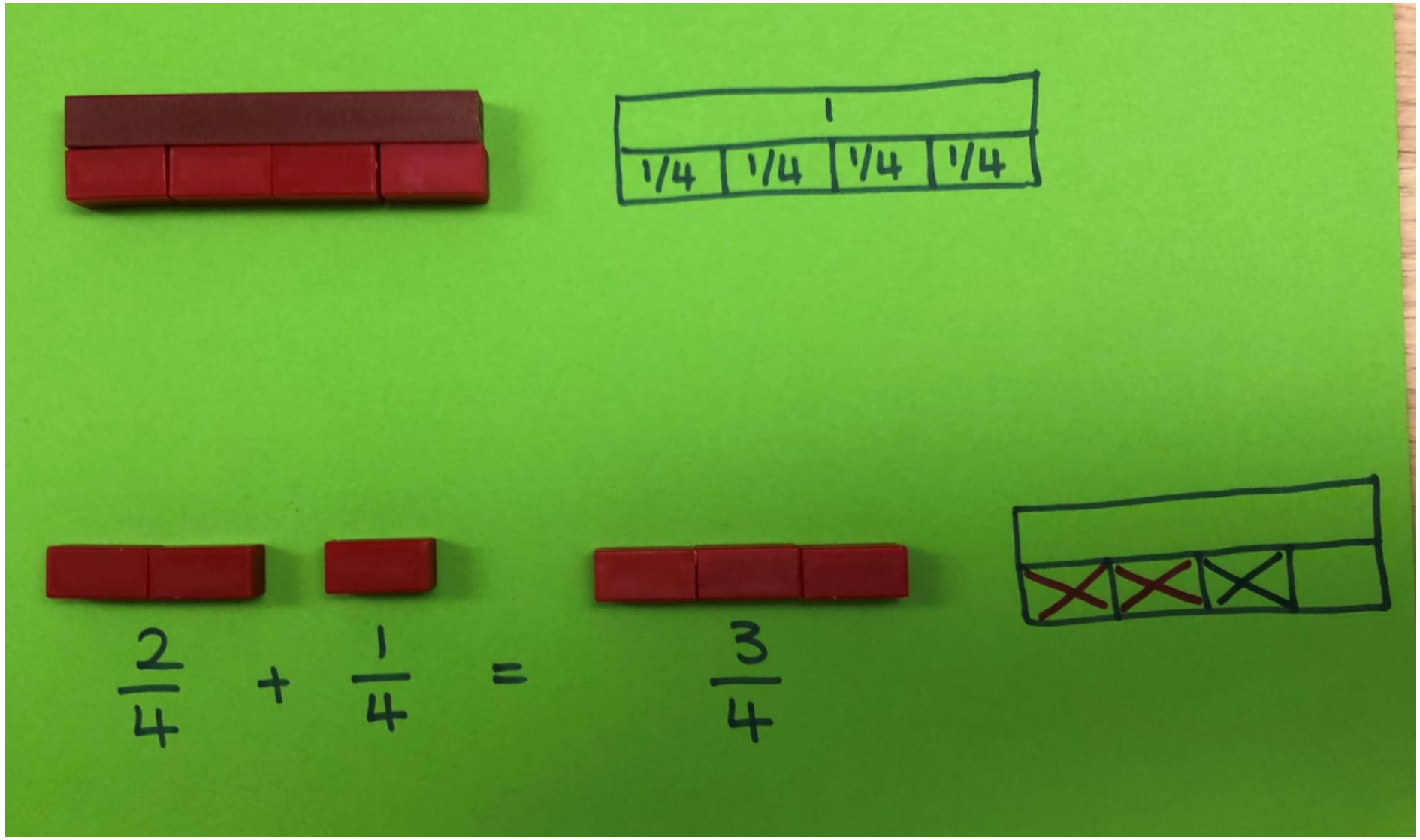
Educator Solutions



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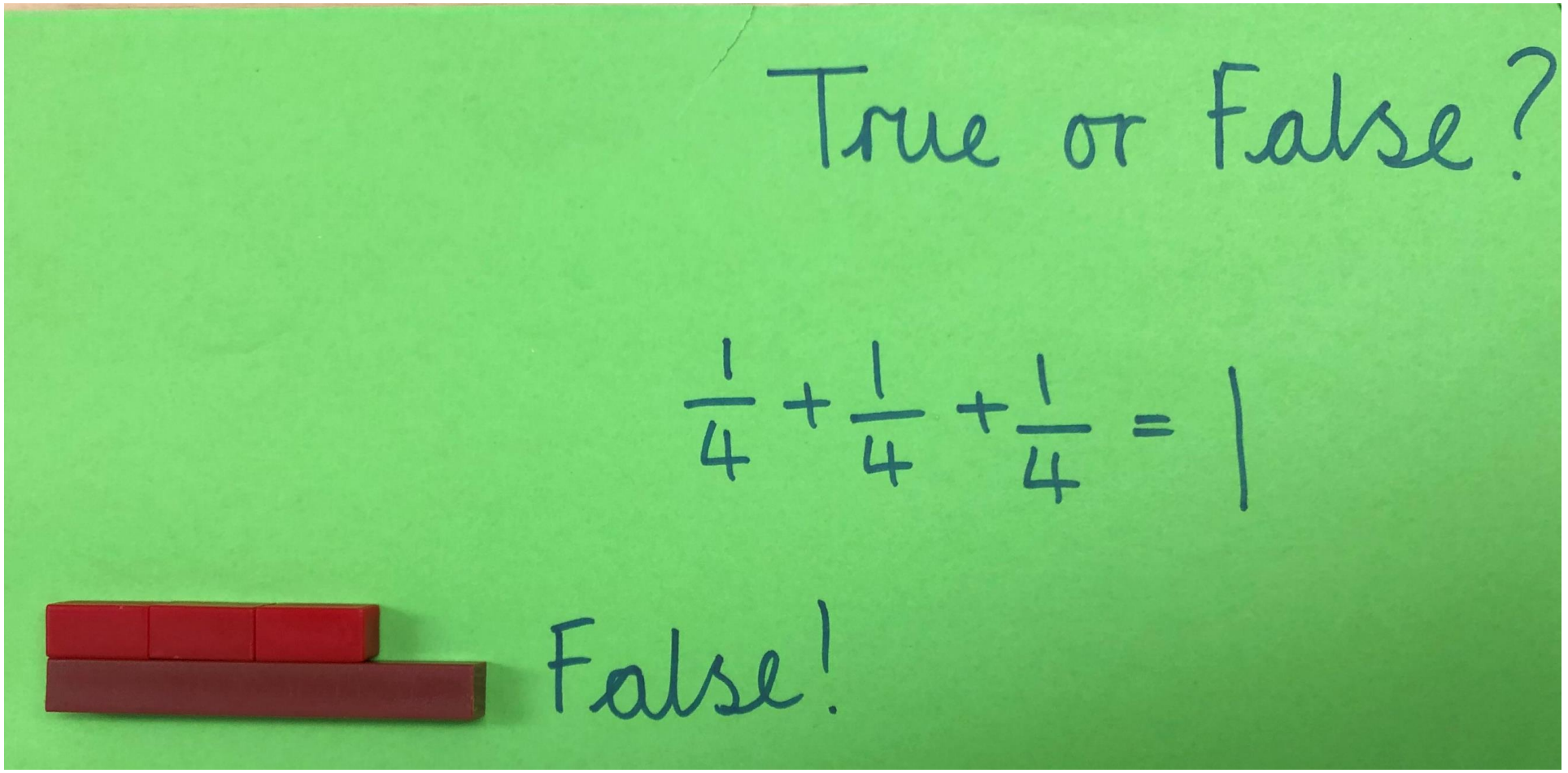
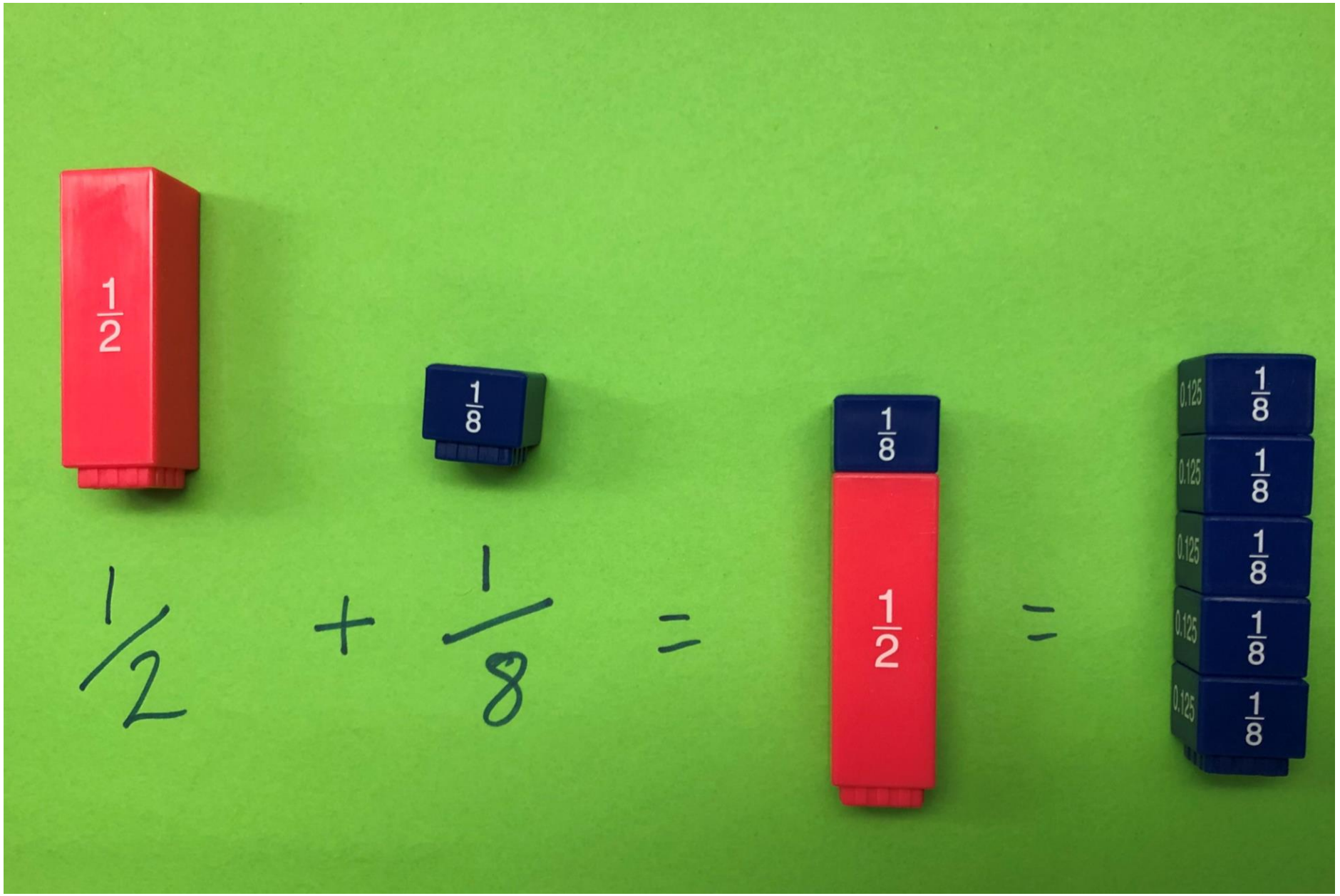


Educator Solutions

$$\frac{1}{2} + \frac{1}{4} = \frac{3}{4}$$



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Educator Solutions

1/3 + ¼ = 4/12 + 3/12 = 7/12

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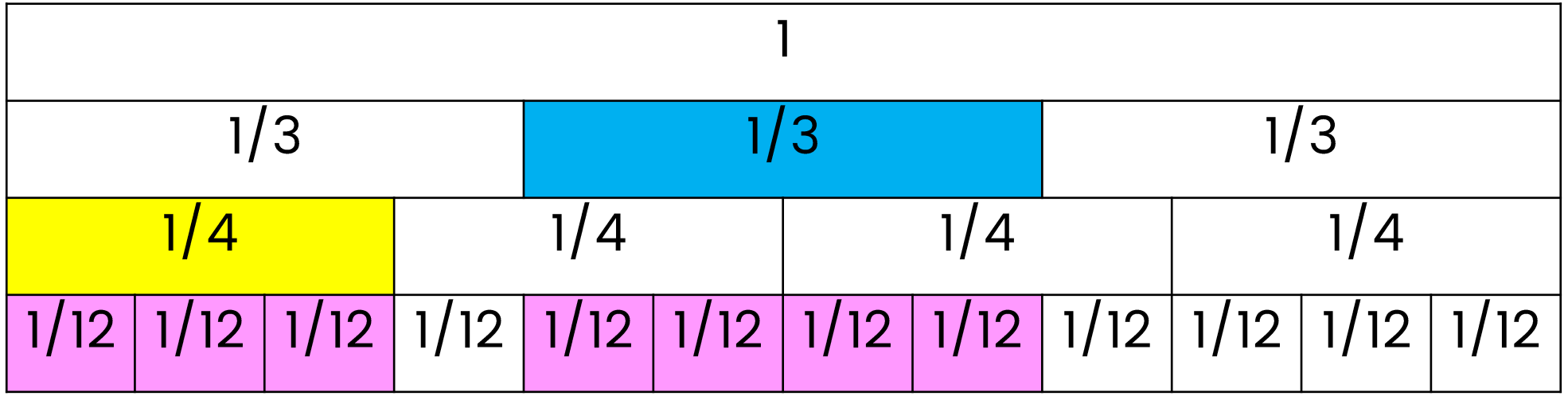
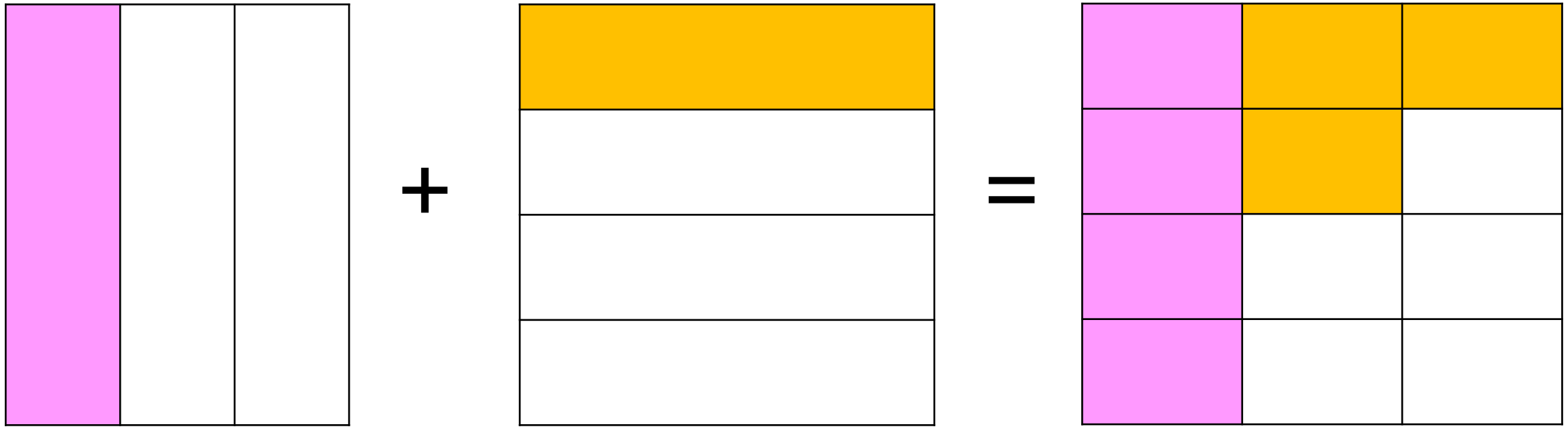


Educator Solutions

1/3 + 1/4 = 7/12



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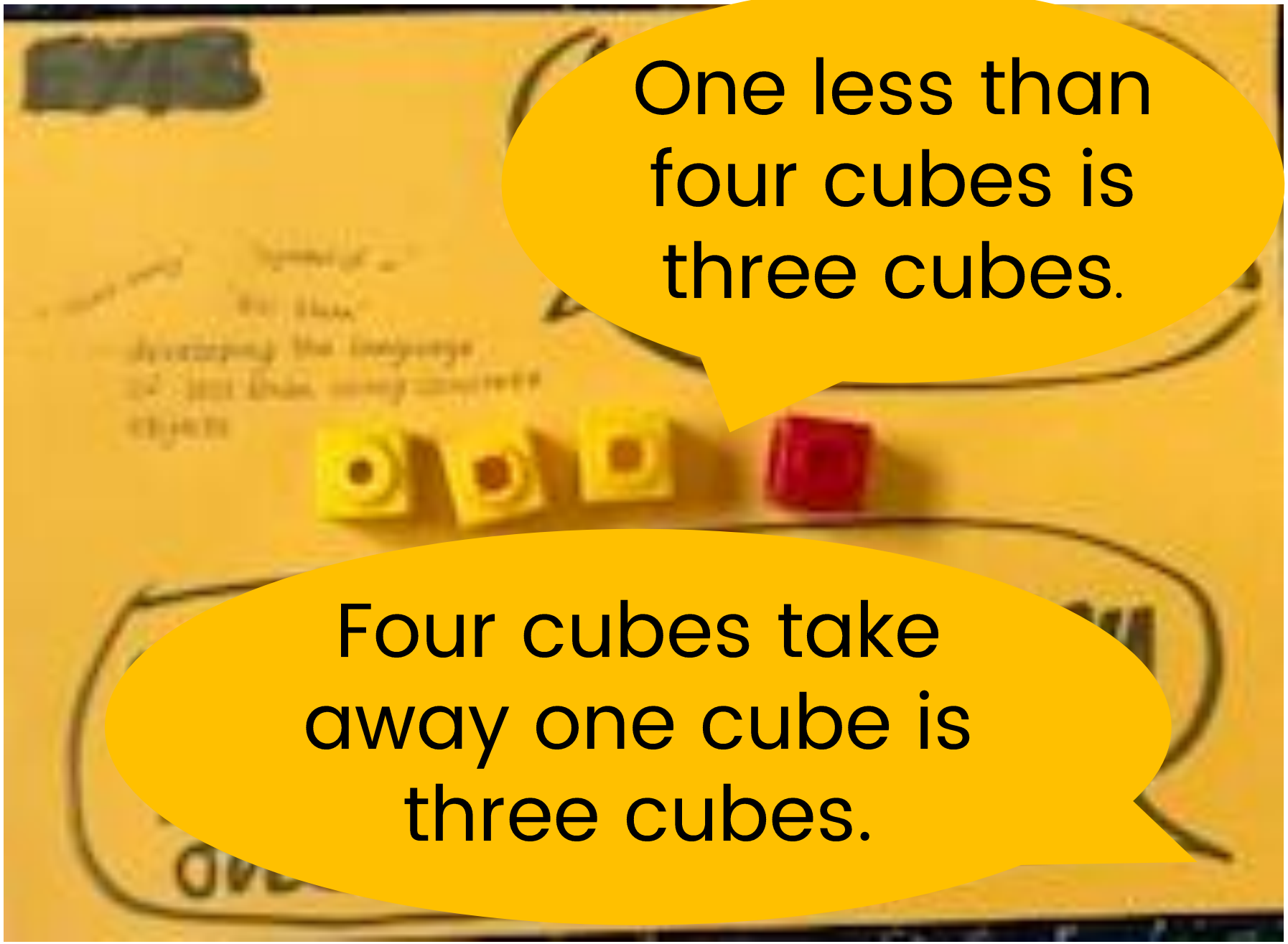
Subtraction

Educator Solutions



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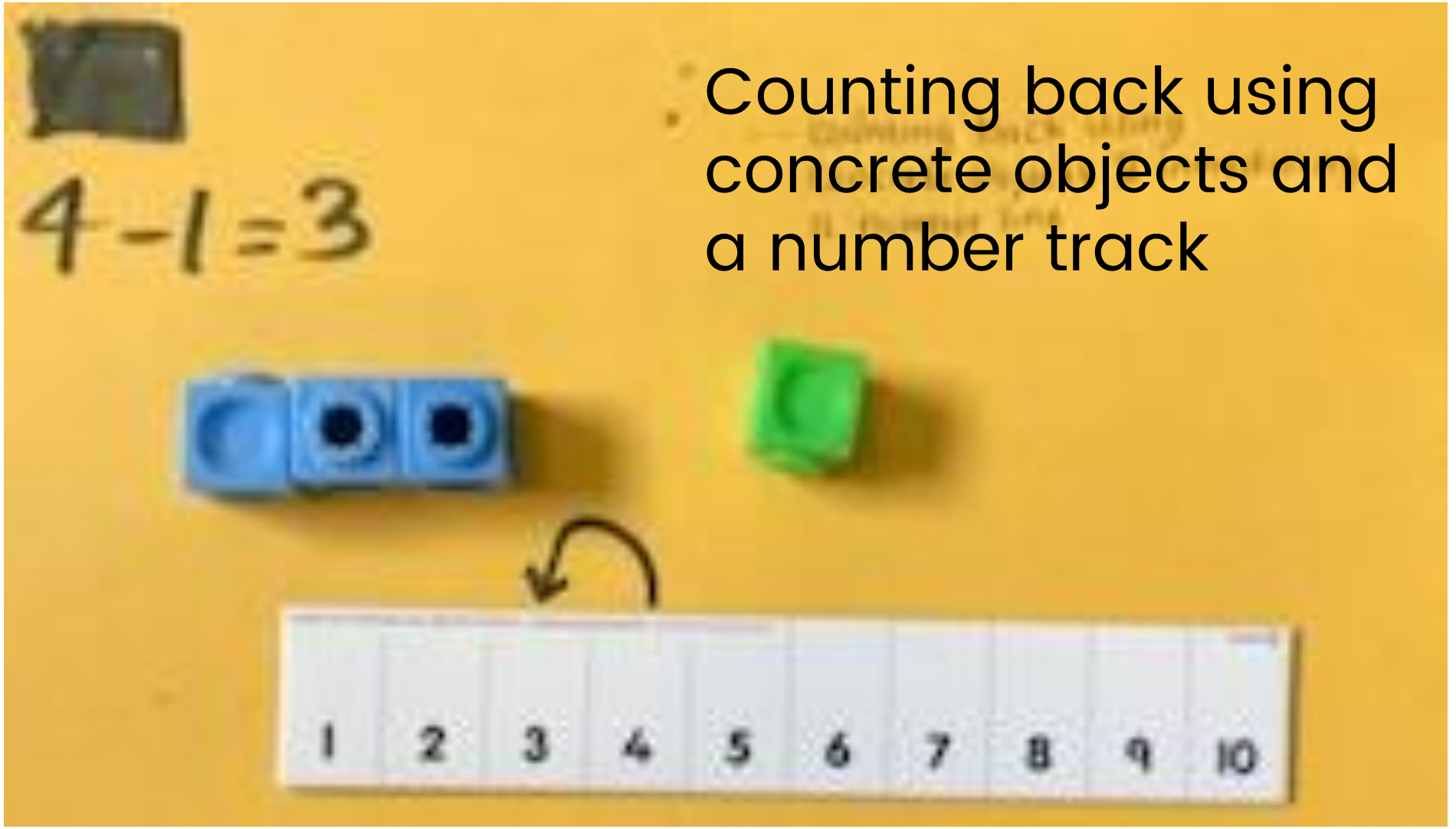
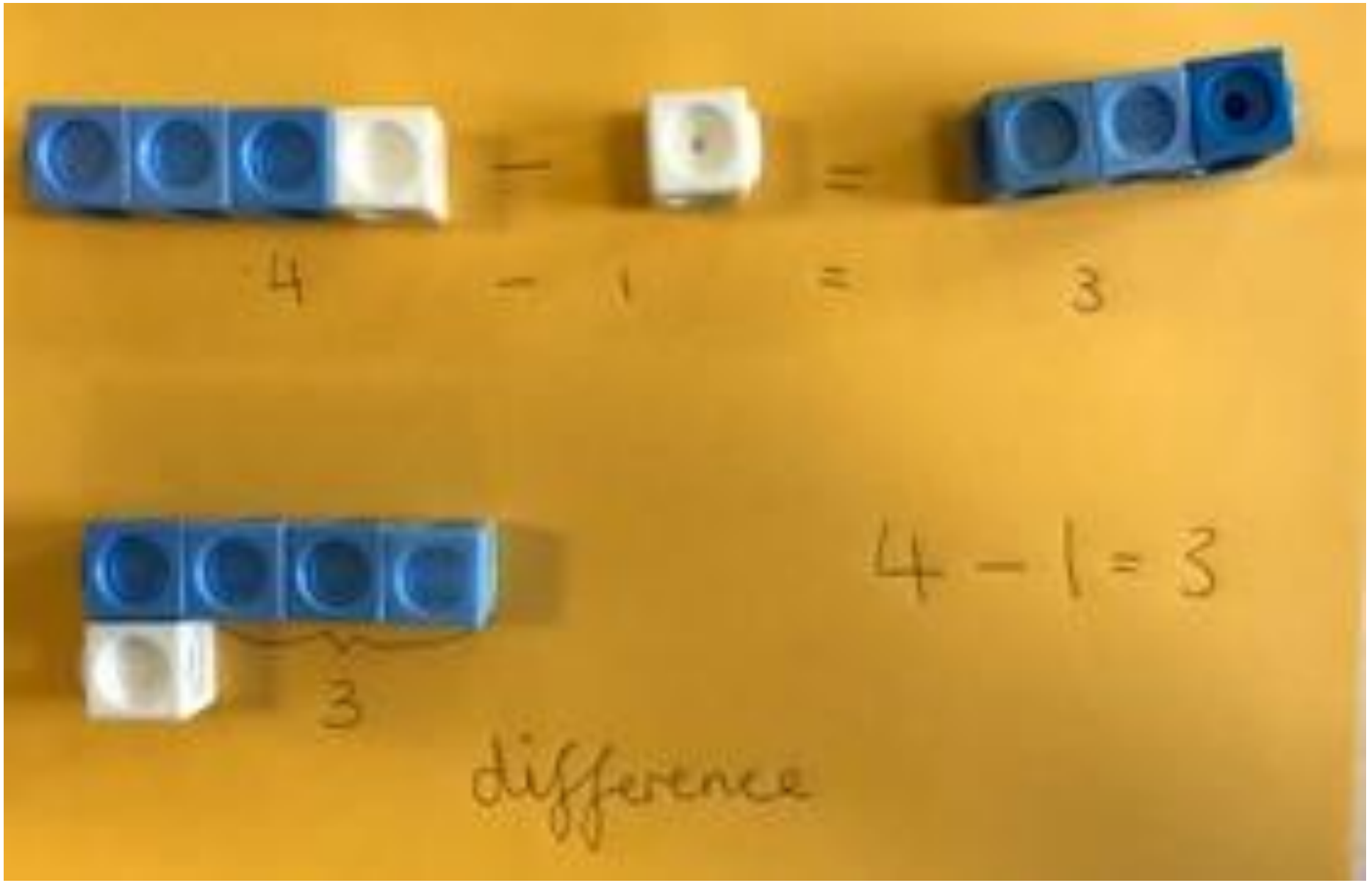
Counting back using concrete objects and a number track



Educator Solutions



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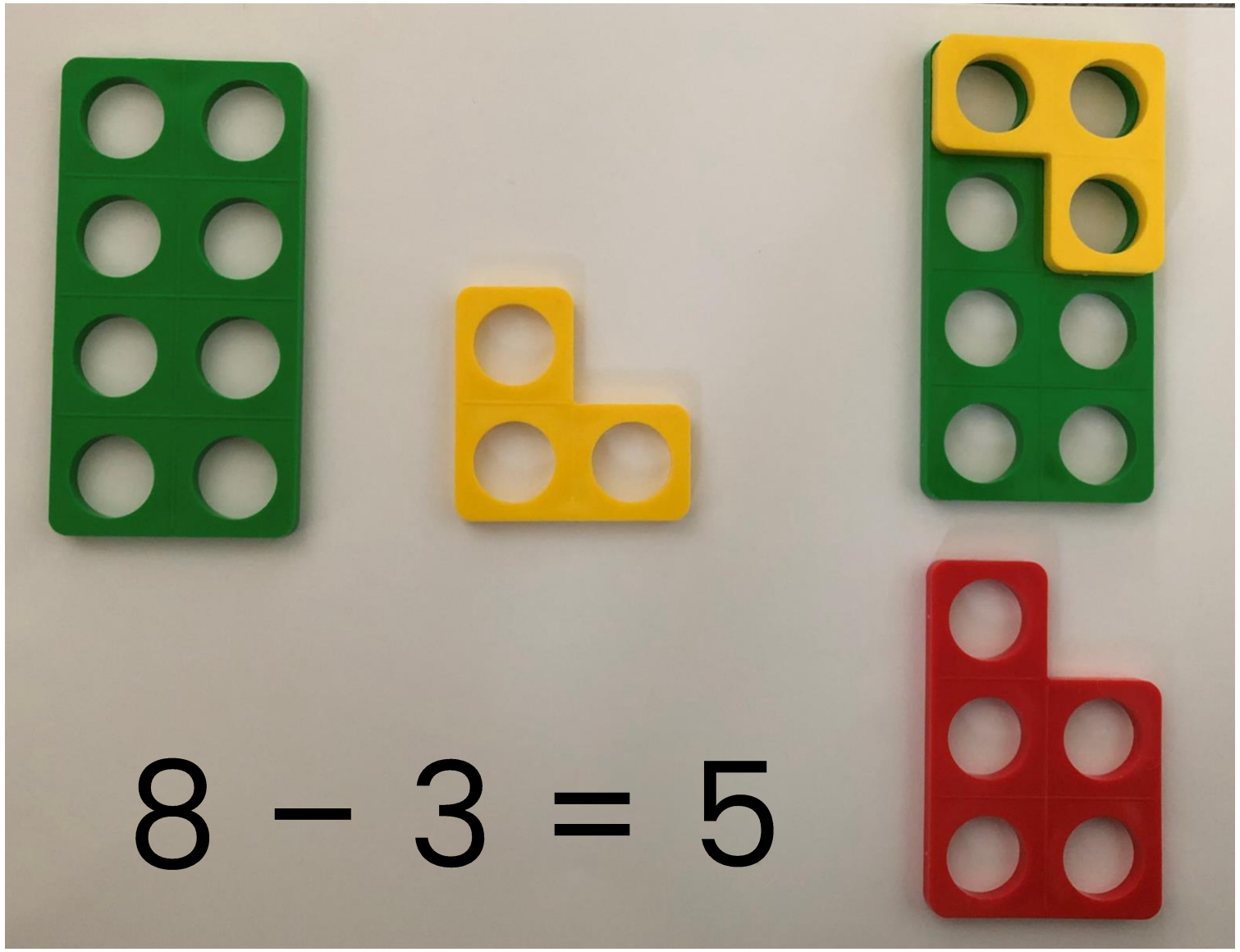

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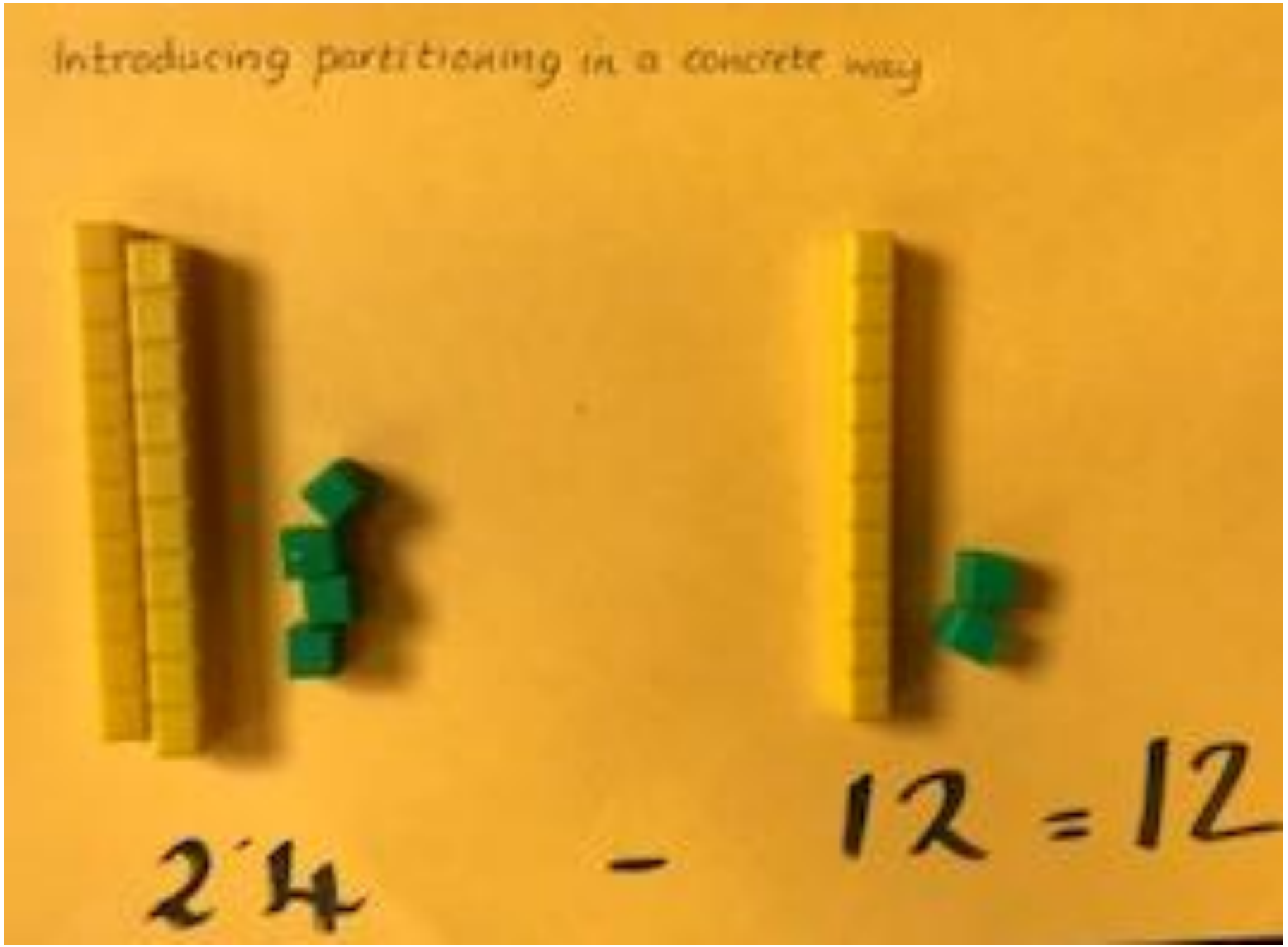

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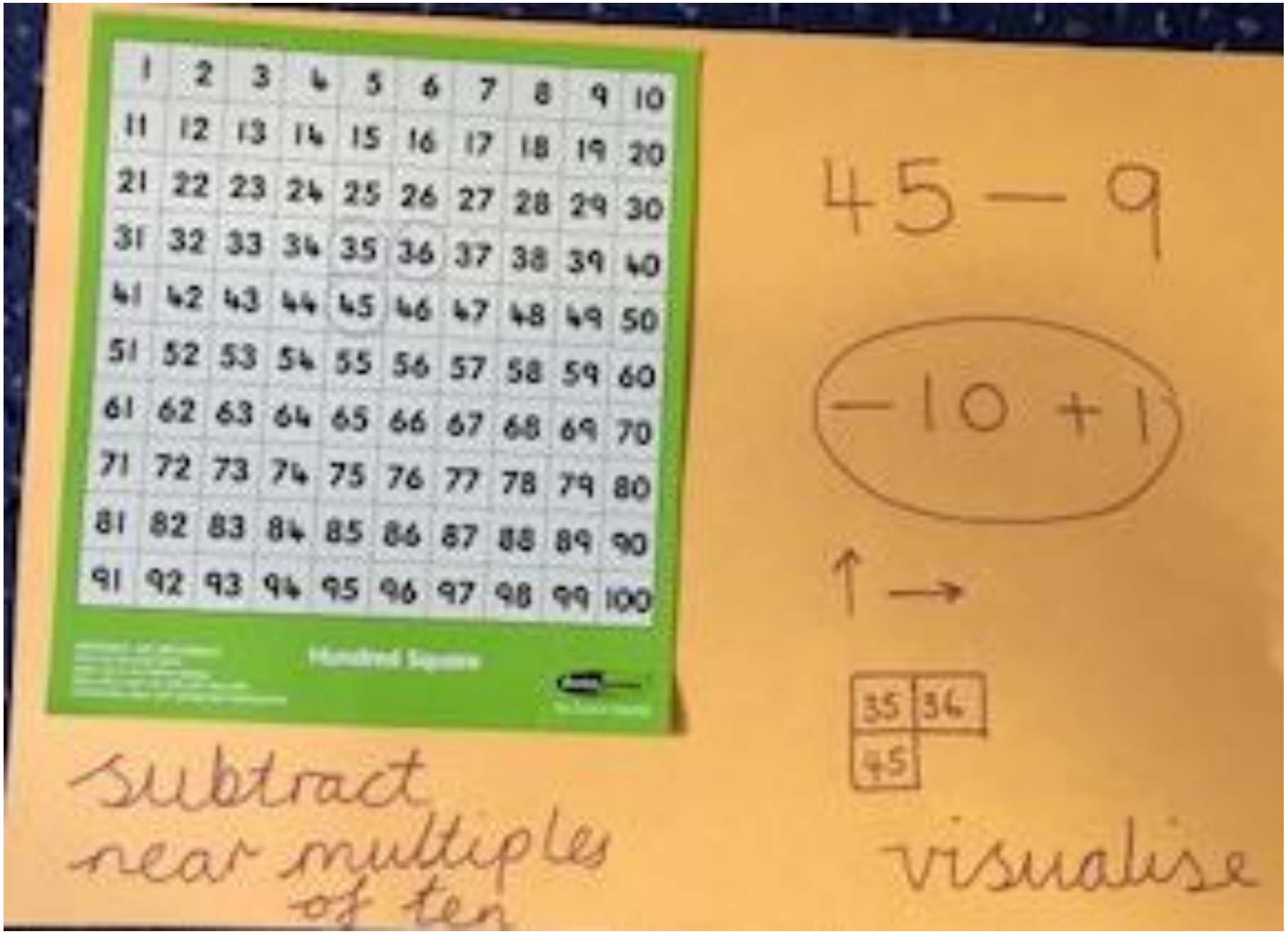

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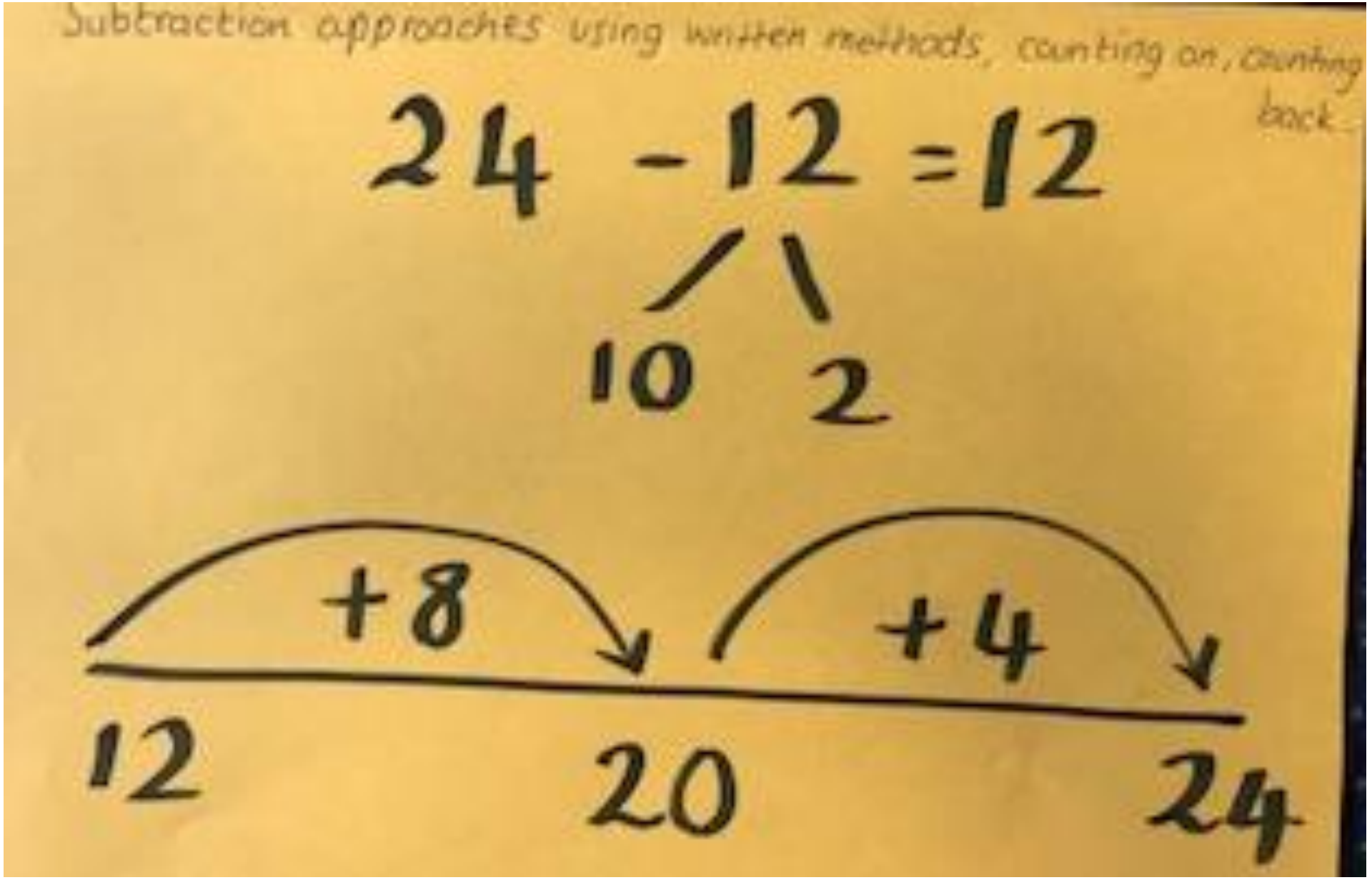

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30 – 14 = 16

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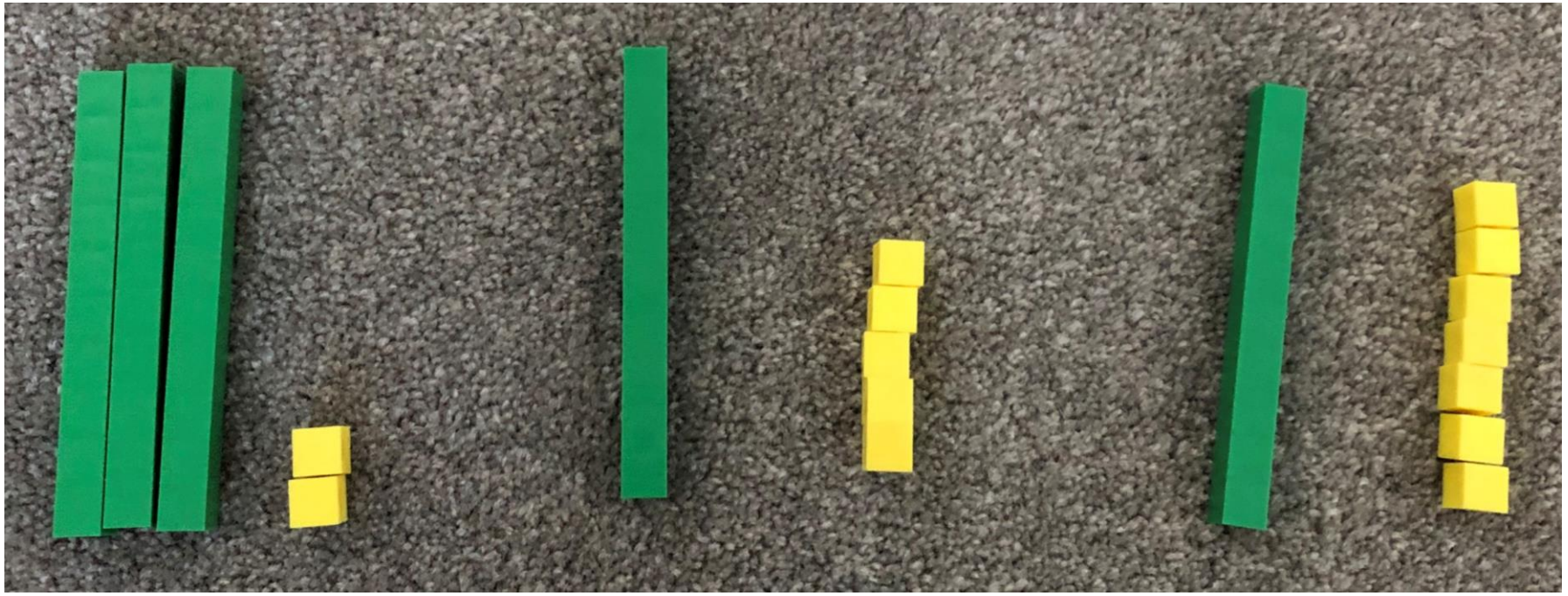
32 – 15 = 17



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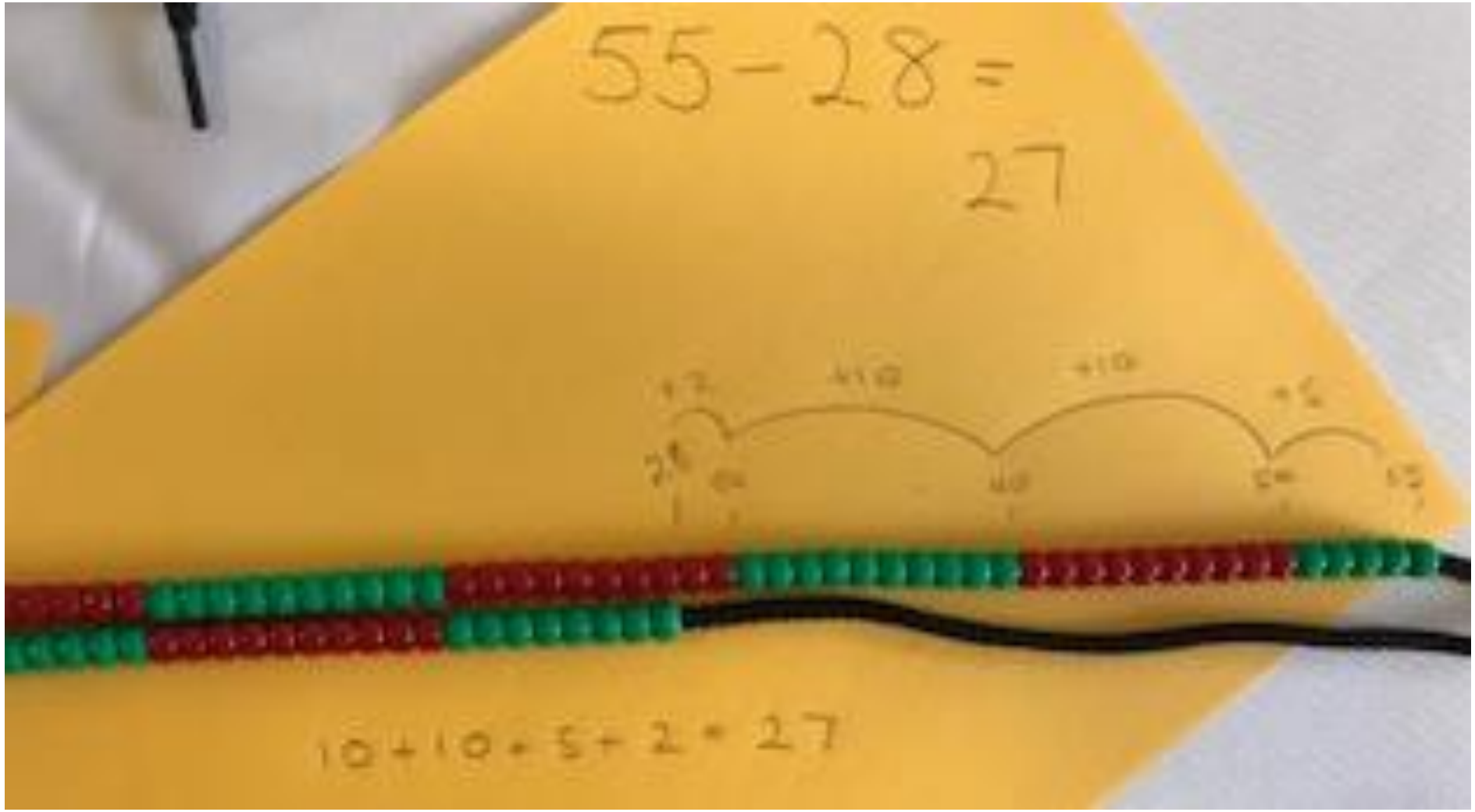
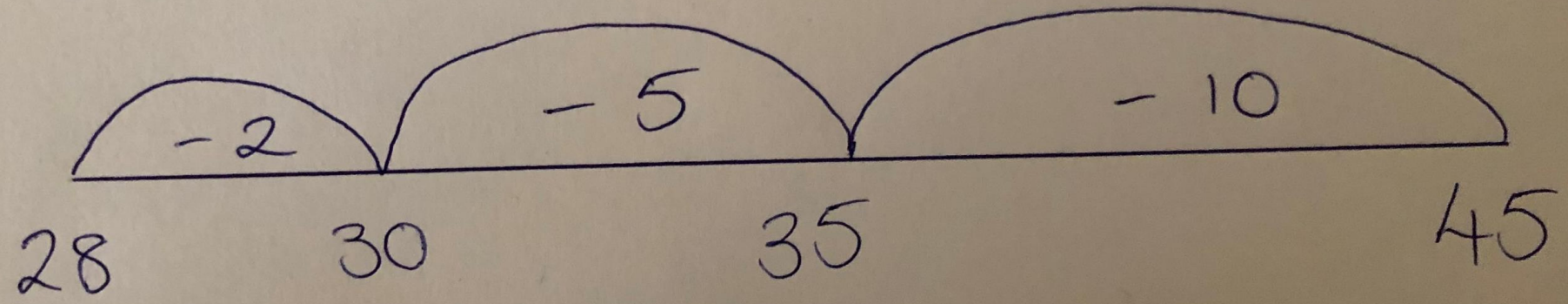
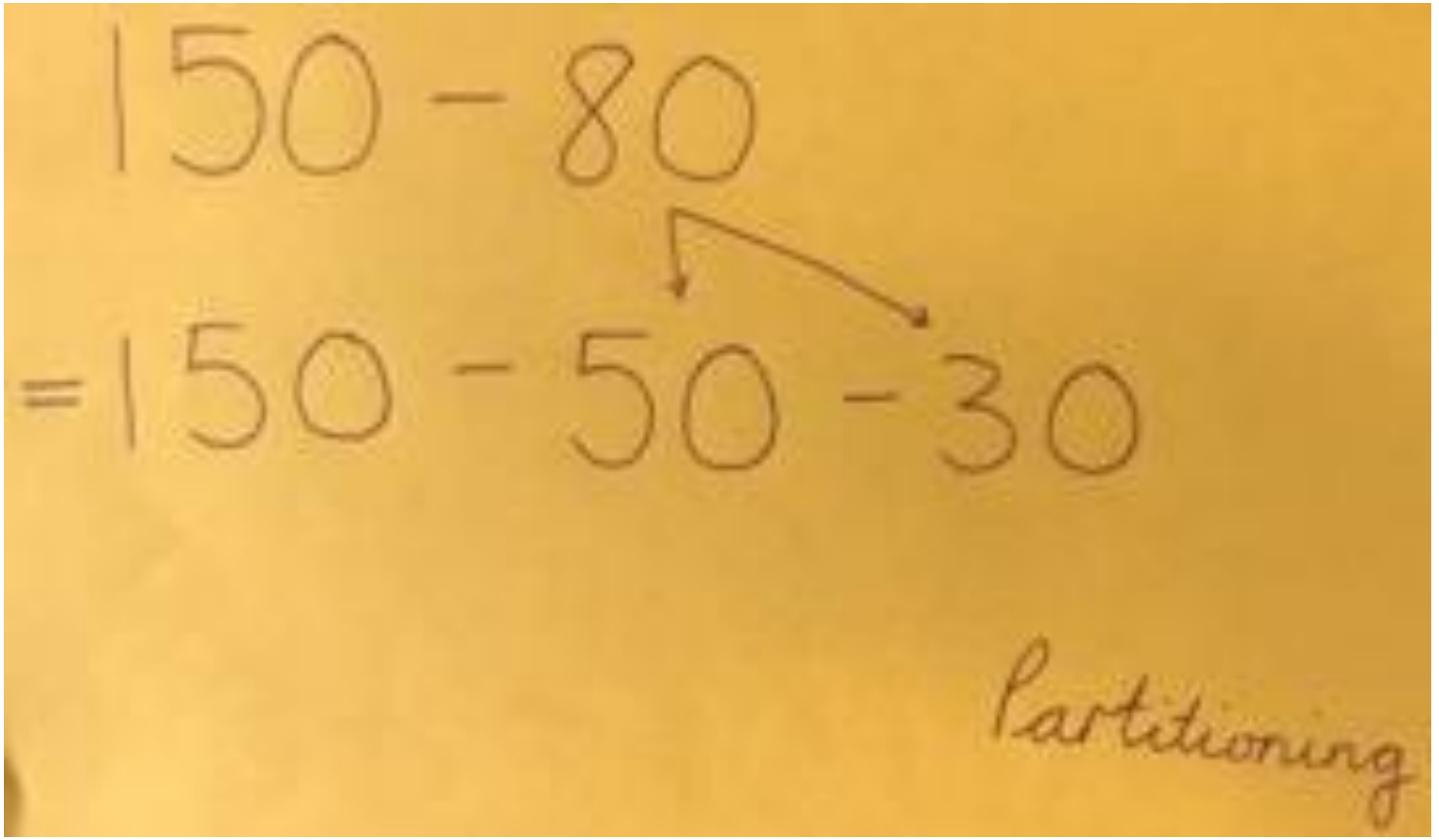


45 − 17 = 28





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5,536 – 200

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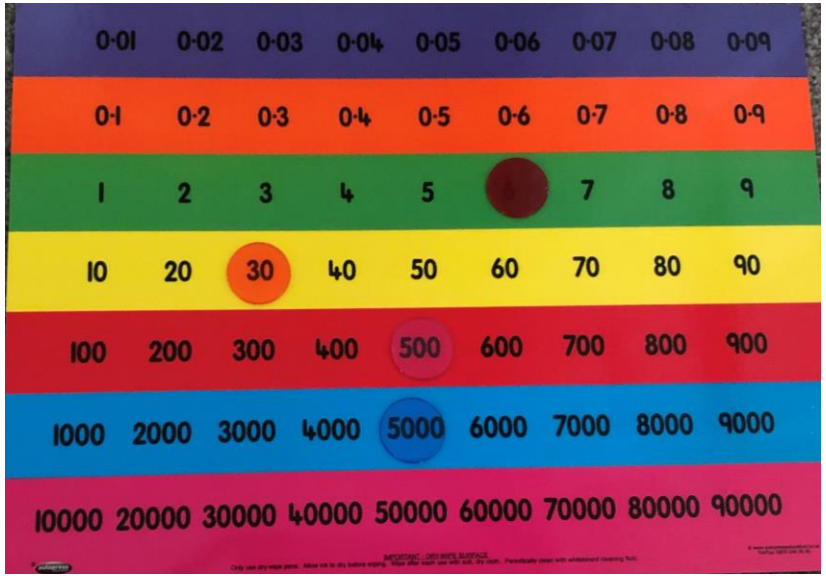
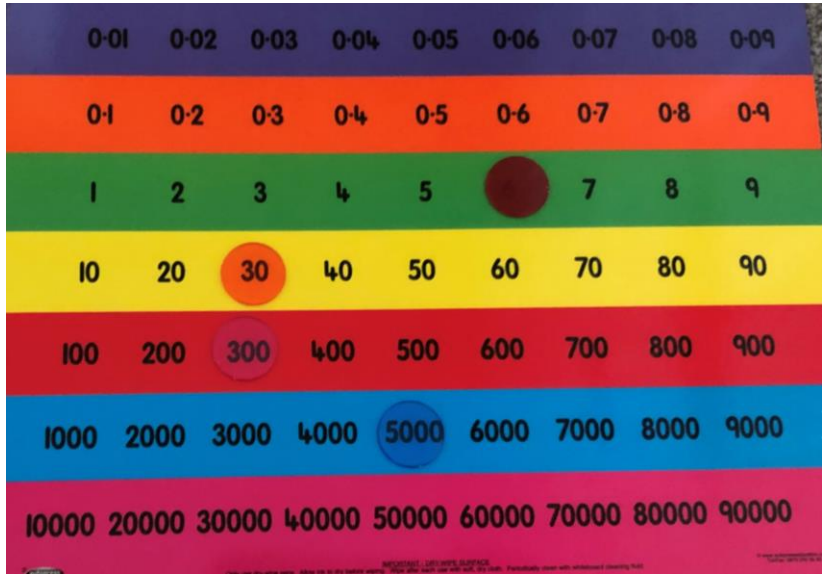
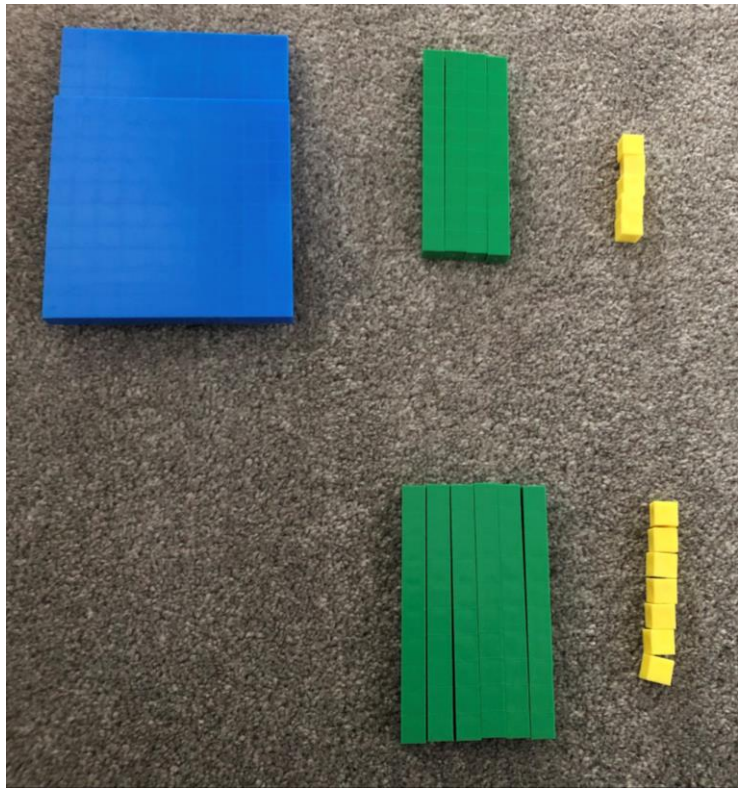




Educator Solutions



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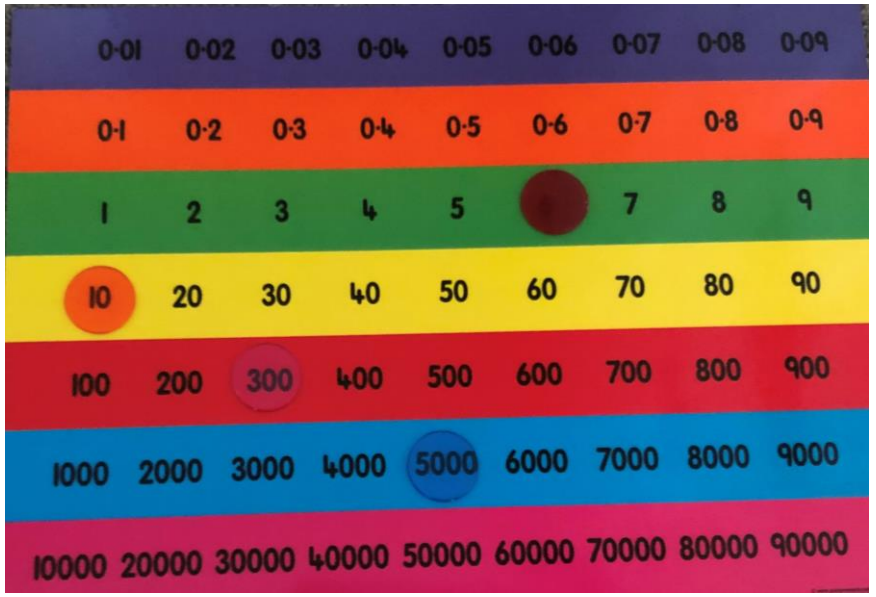
$(100 + 130 + 15) - 67$

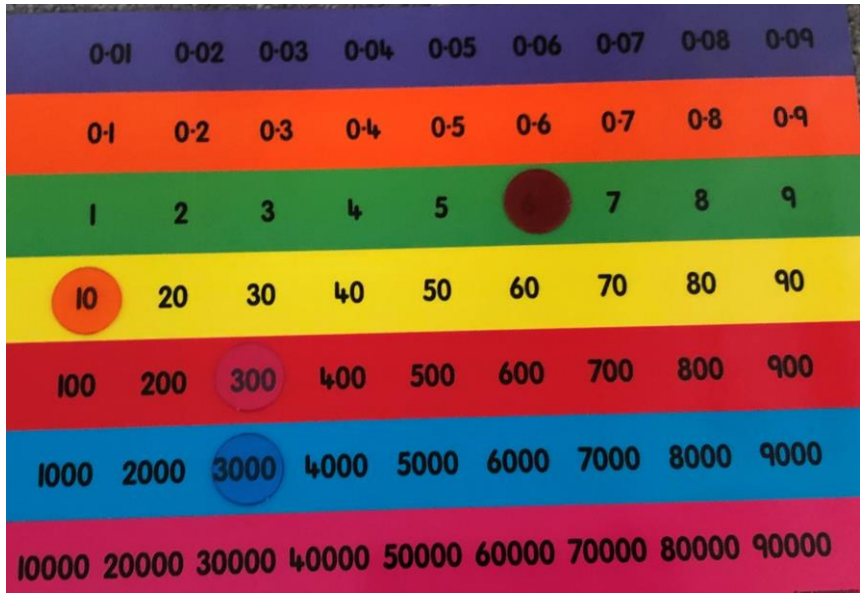
$245 - 67$

$245 - 67 = 178$

Educator Solutions

5,516 – 2,000


0·01 0·02 0·03 0·04 0·05 0·06 0·07 0·08 0·09
0·1 0·2 0·3 0·4 0·5 0·6 0·7 0·8 0·9
1 2 3 4 5 7 8 9
10 20 30 40 50 60 70 80 90
100 200 300 400 500 600 700 800 900
1000 2000 3000 4000 5000 6000 7000 8000 9000
10000 20000 30000 40000 50000 60000 70000 80000 90000


0·01 0·02 0·03 0·04 0·05 0·06 0·07 0·08 0·09
0·1 0·2 0·3 0·4 0·5 0·6 0·7 0·8 0·9
1 2 3 4 5 7 8 9
10 20 30 40 50 60 70 80 90
100 200 300 400 500 600 700 800 900
1000 2000 3000 4000 5000 6000 7000 8000 9000
10000 20000 30000 40000 50000 60000 70000 80000 90000

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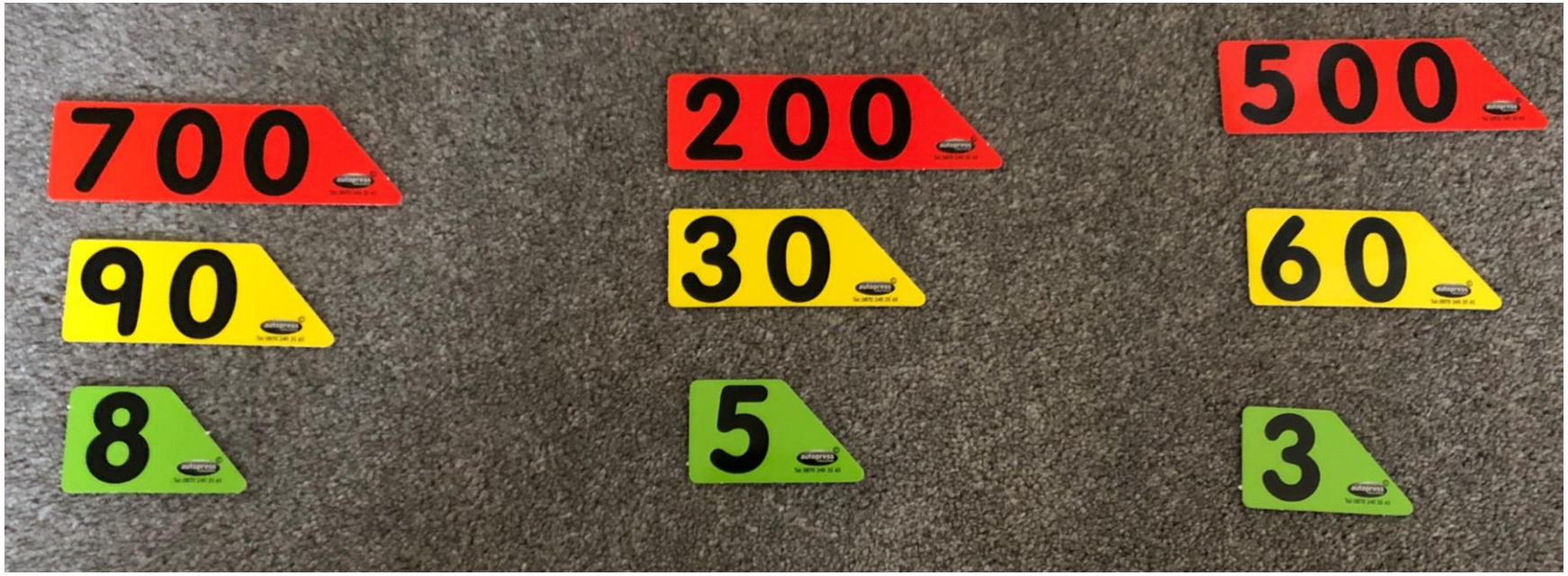

798 – 235 = 563

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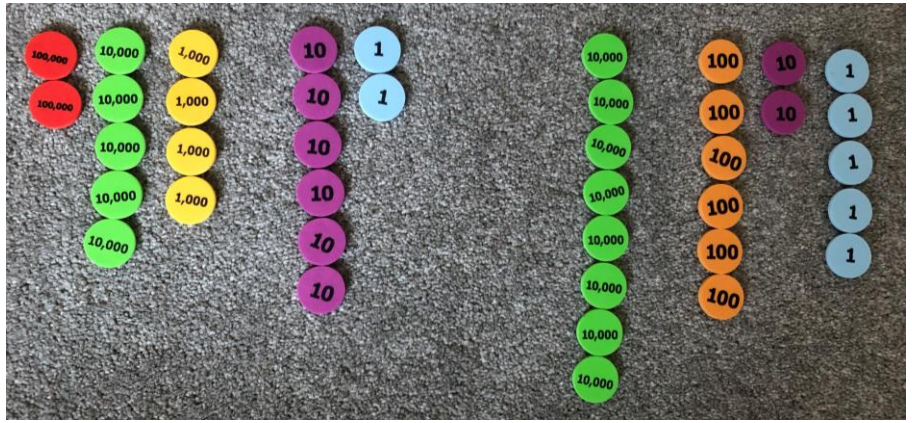

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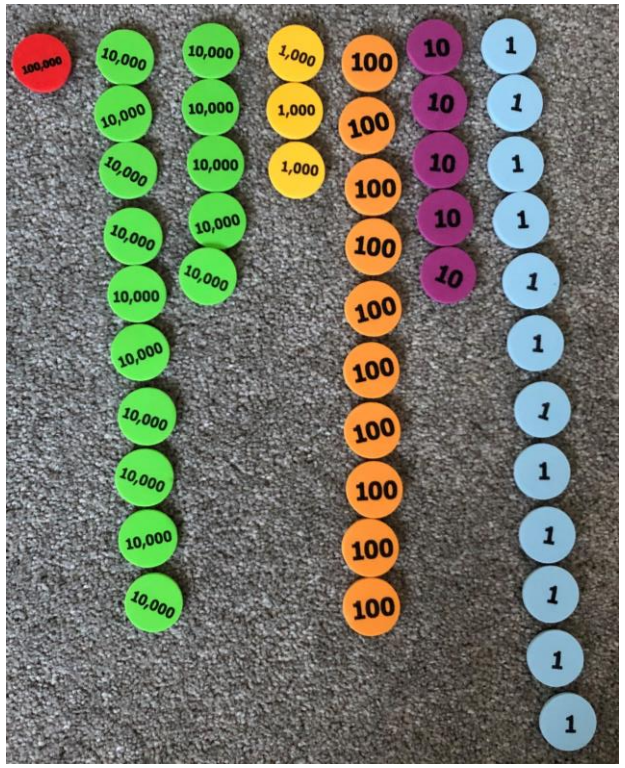

254, 062 – 80,625

(100,000 + 150,000 + 3,000 + 1,000 + 50 + 12) – 80,625

Educator Solutions

254, 062 – 80,625 = 173, 437

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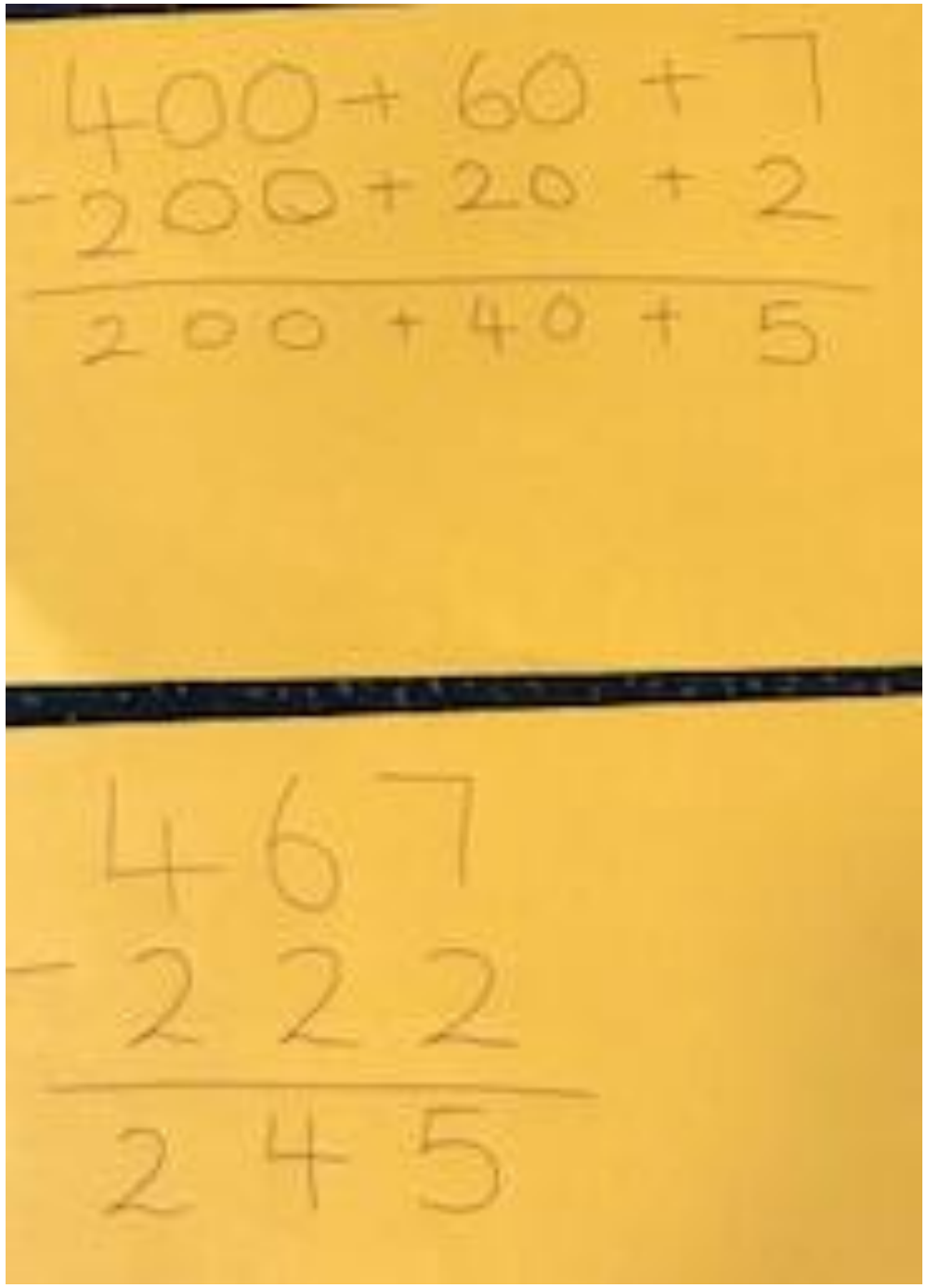
Educator Solutions



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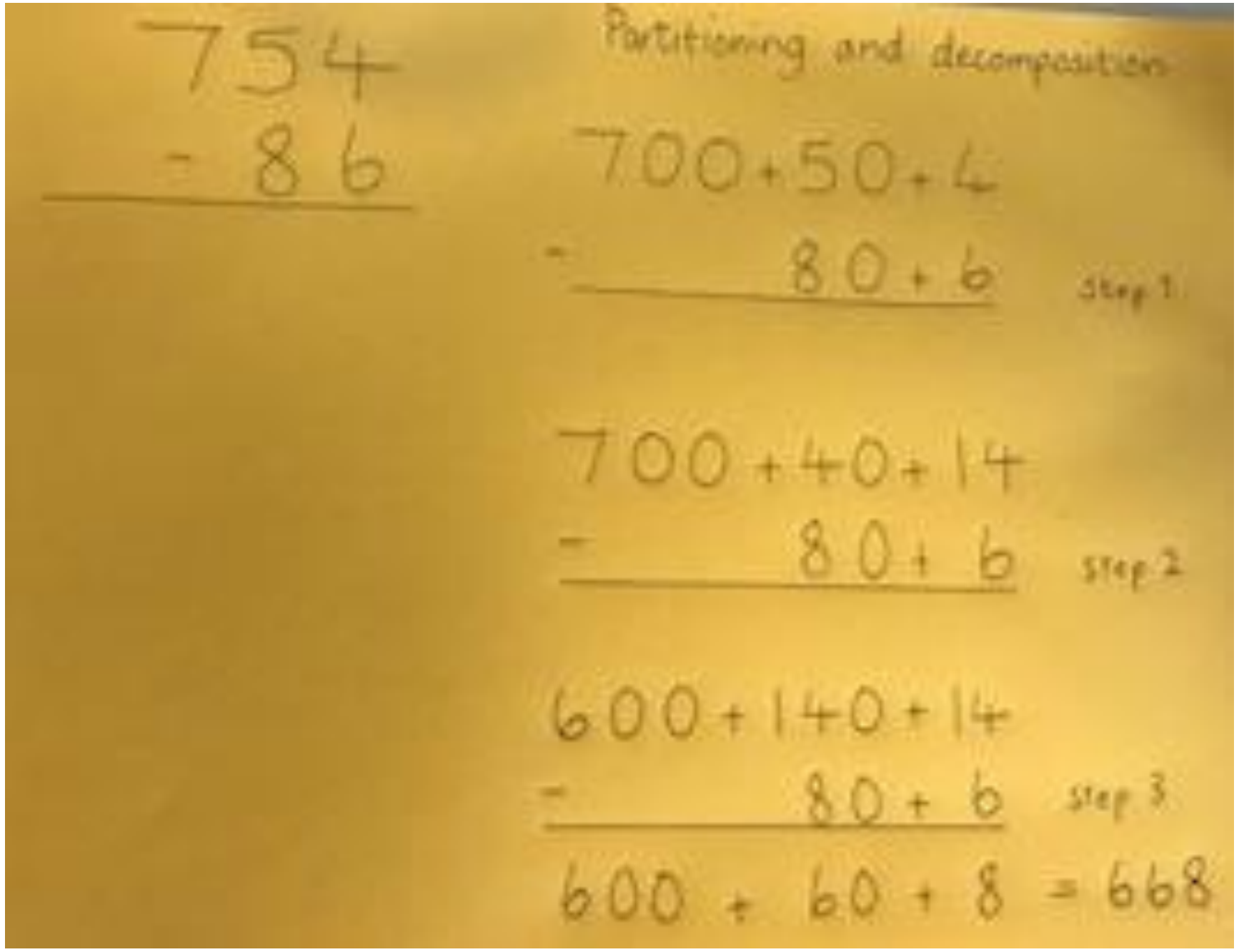
Education and
Academies Trust

Educator
Solutions



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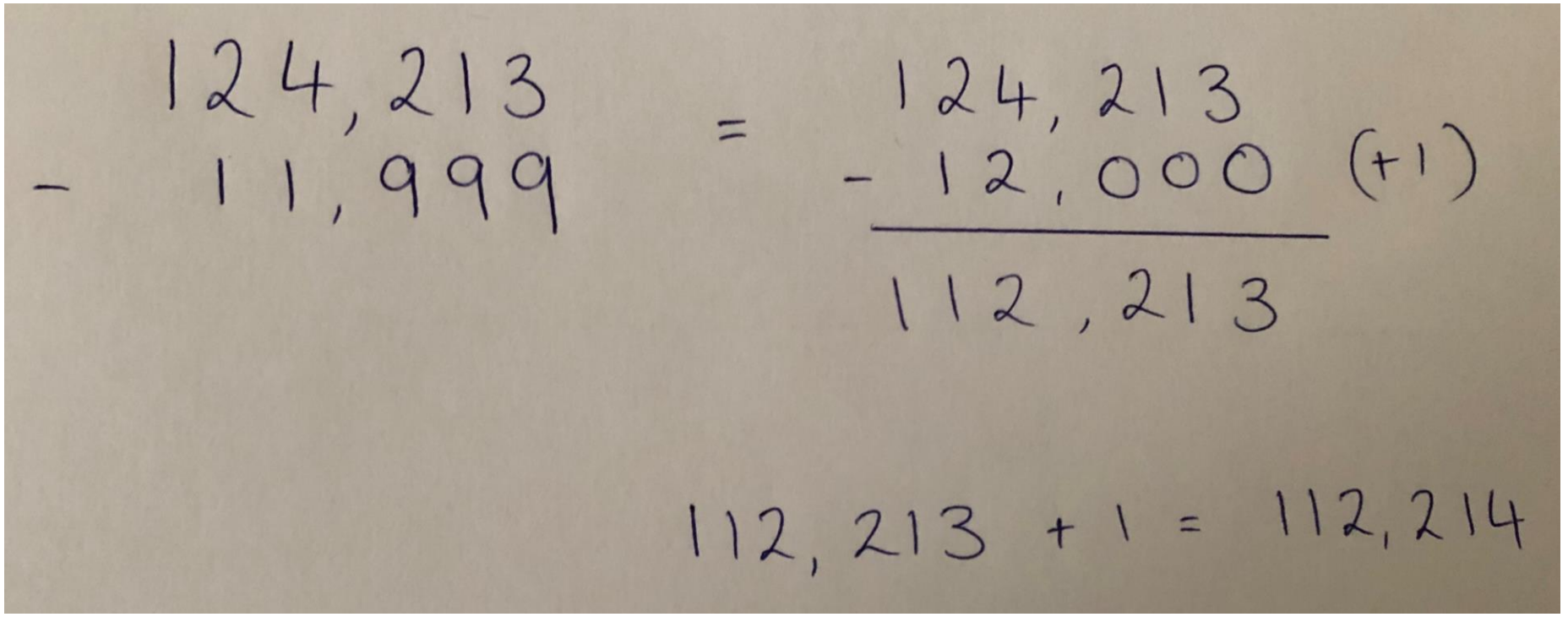
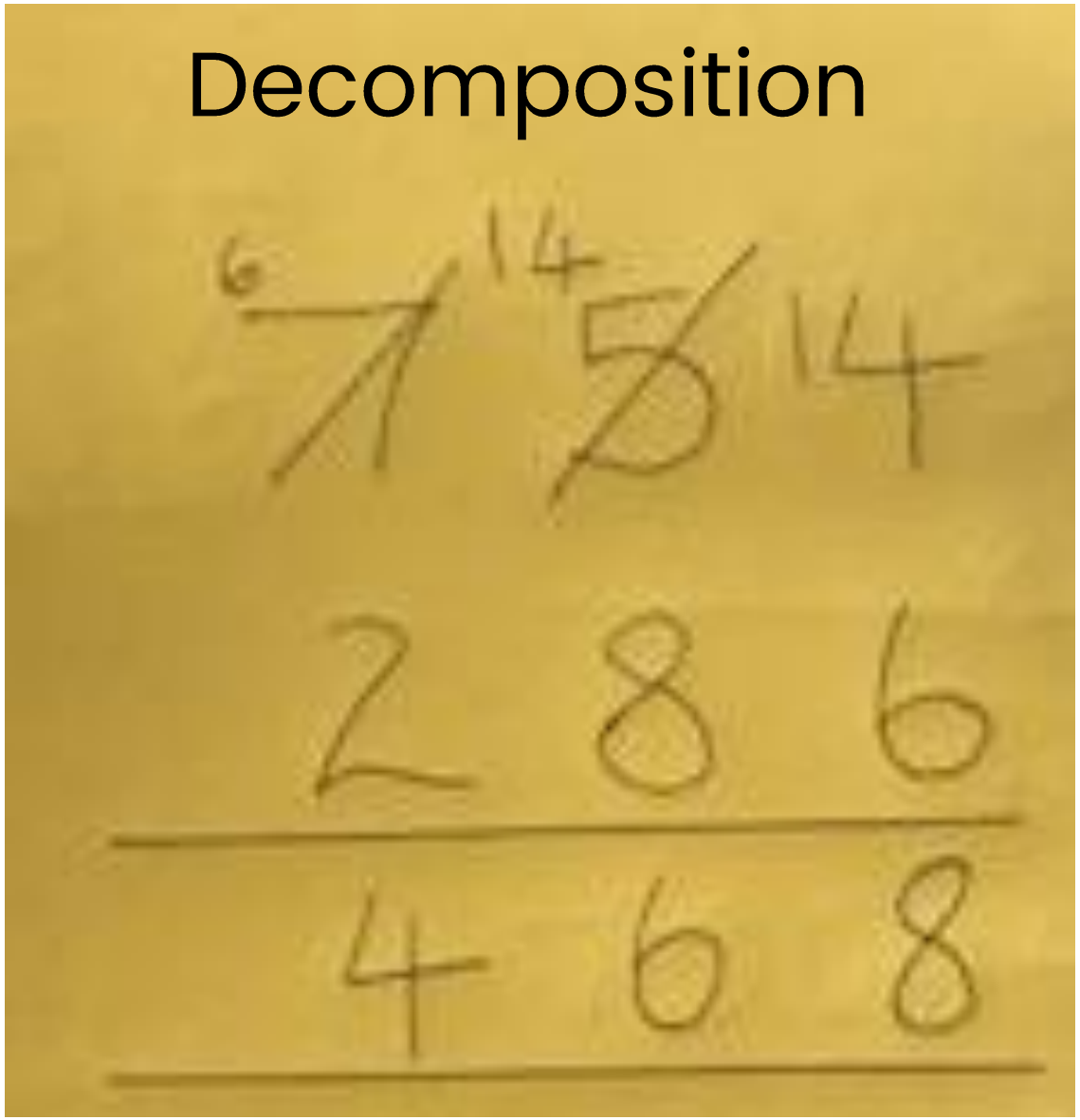
Educator Solutions



Decomposition



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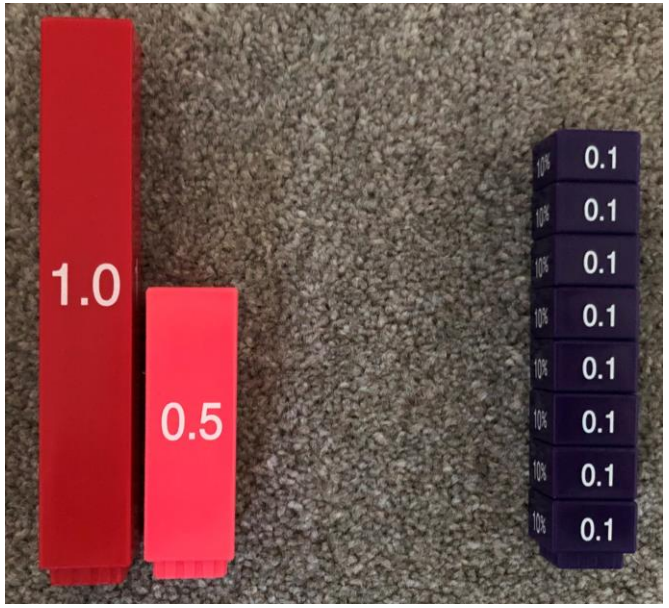
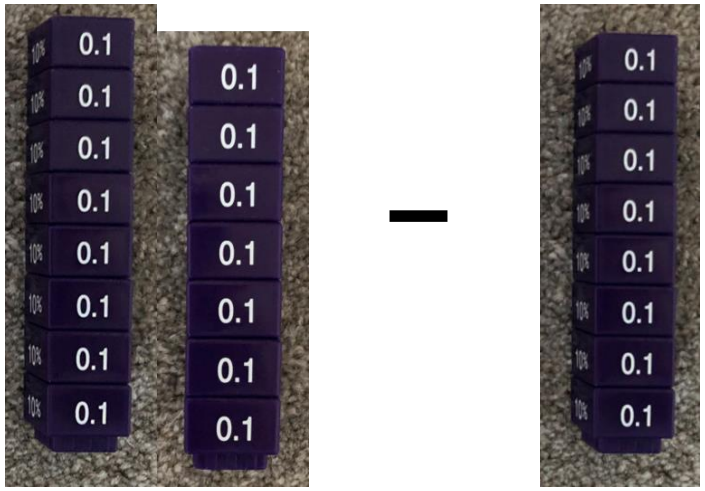
Educator Solutions

1.5 – 0.8





–

=

0.7

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Educator Solutions

10/10 – 1/10 = 9/10

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Using a beadstring

Educator Solutions

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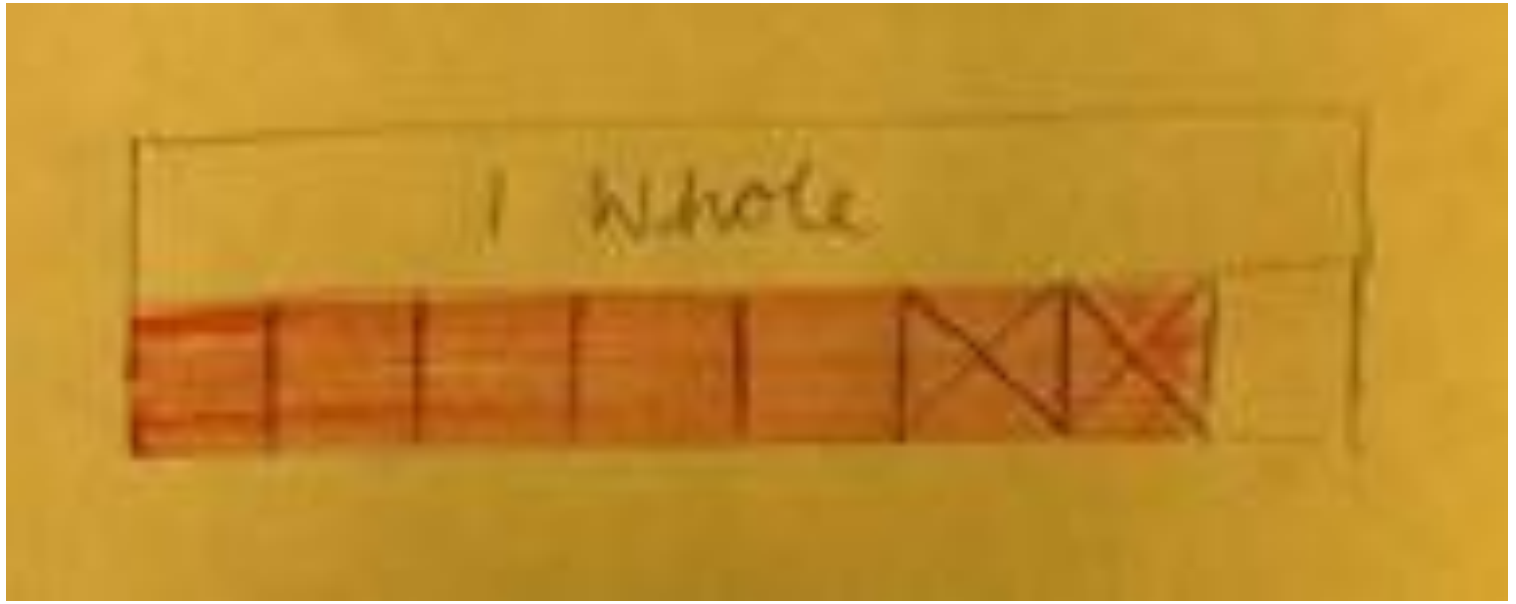
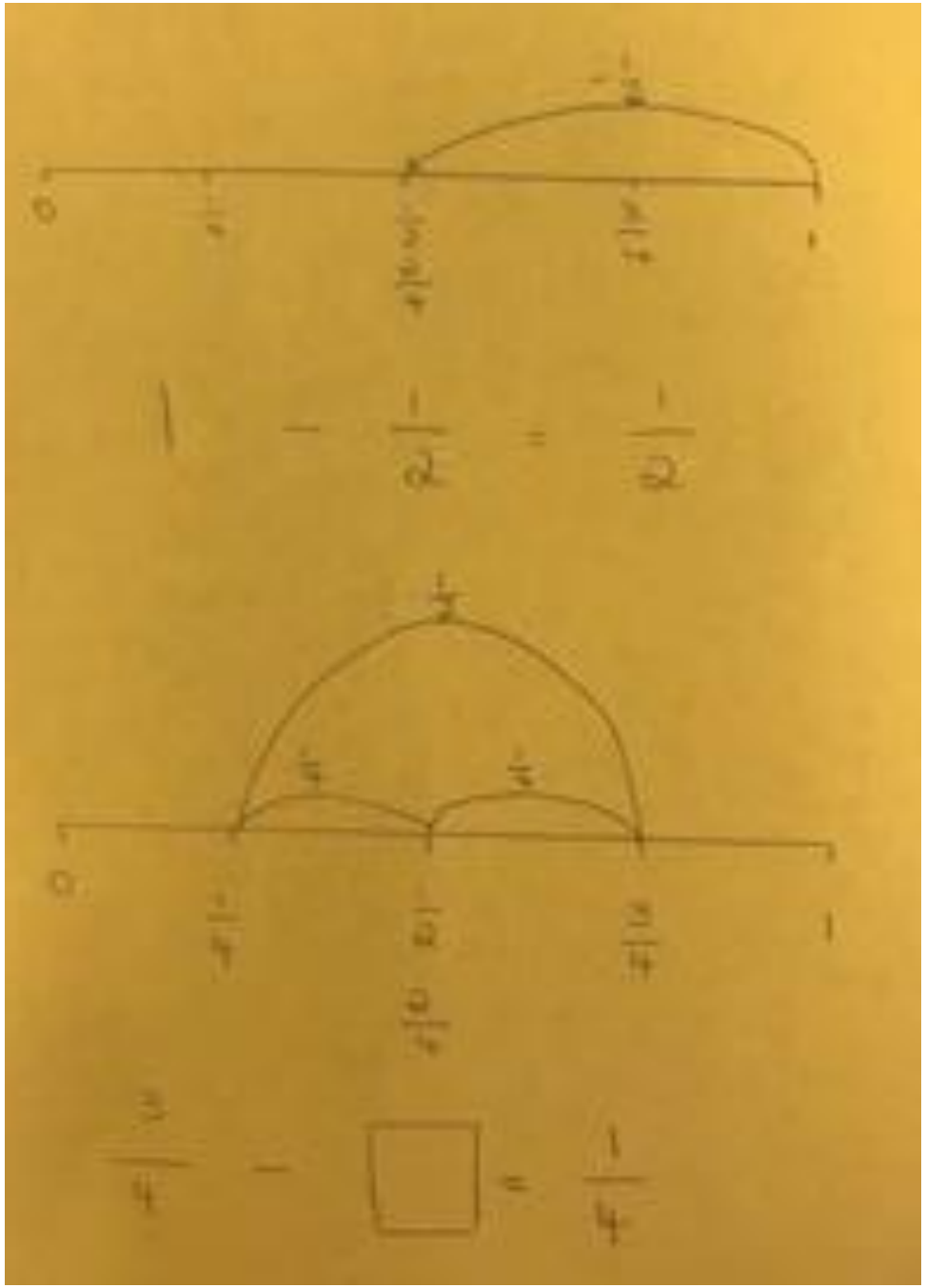
7/8 – 2/8 = 5/8



Educator Solutions



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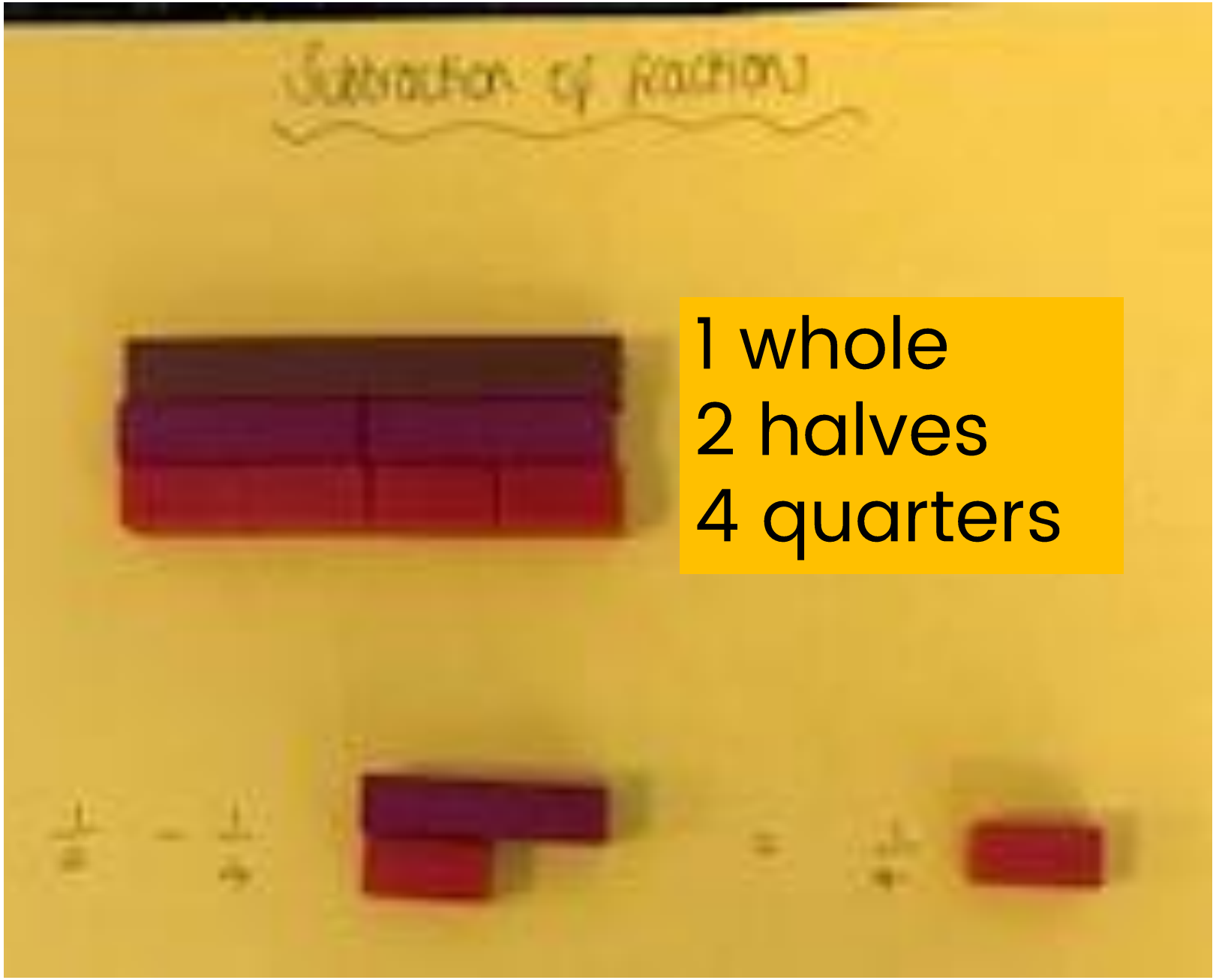

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$4/4 - \frac{1}{4} = \frac{3}{4}$

(1 whole)

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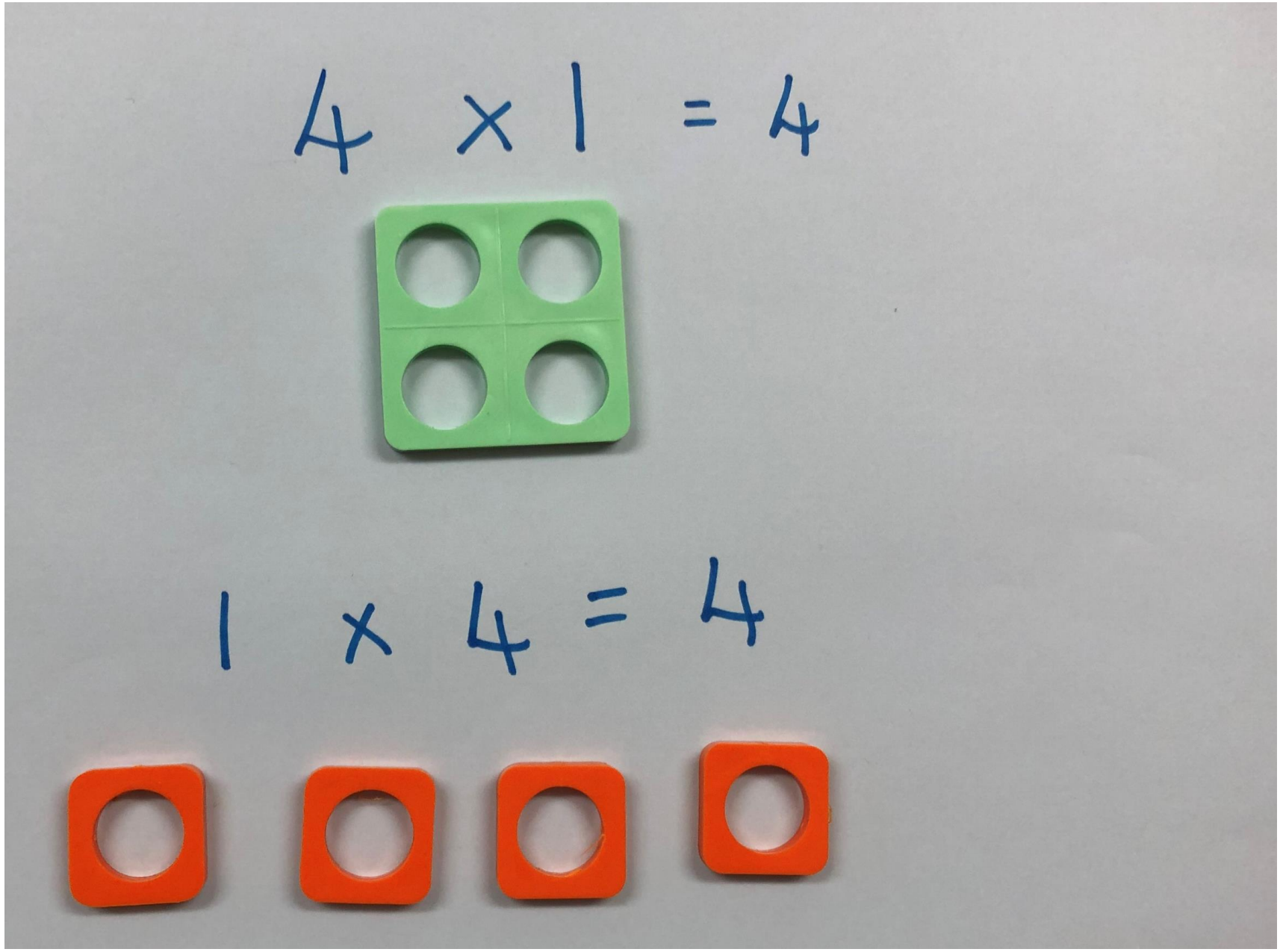
Multiplication

Educator Solutions



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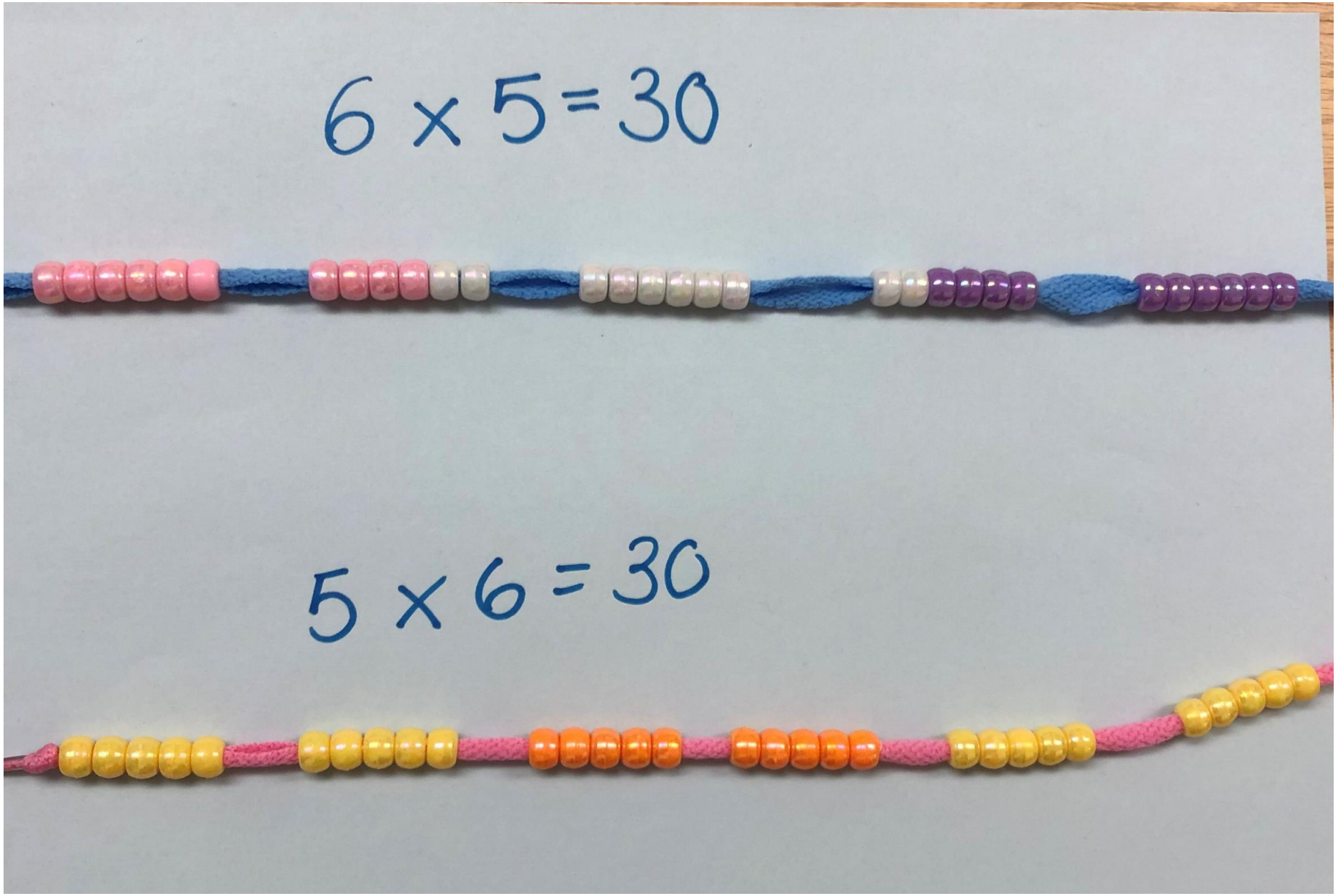
Educator Solutions



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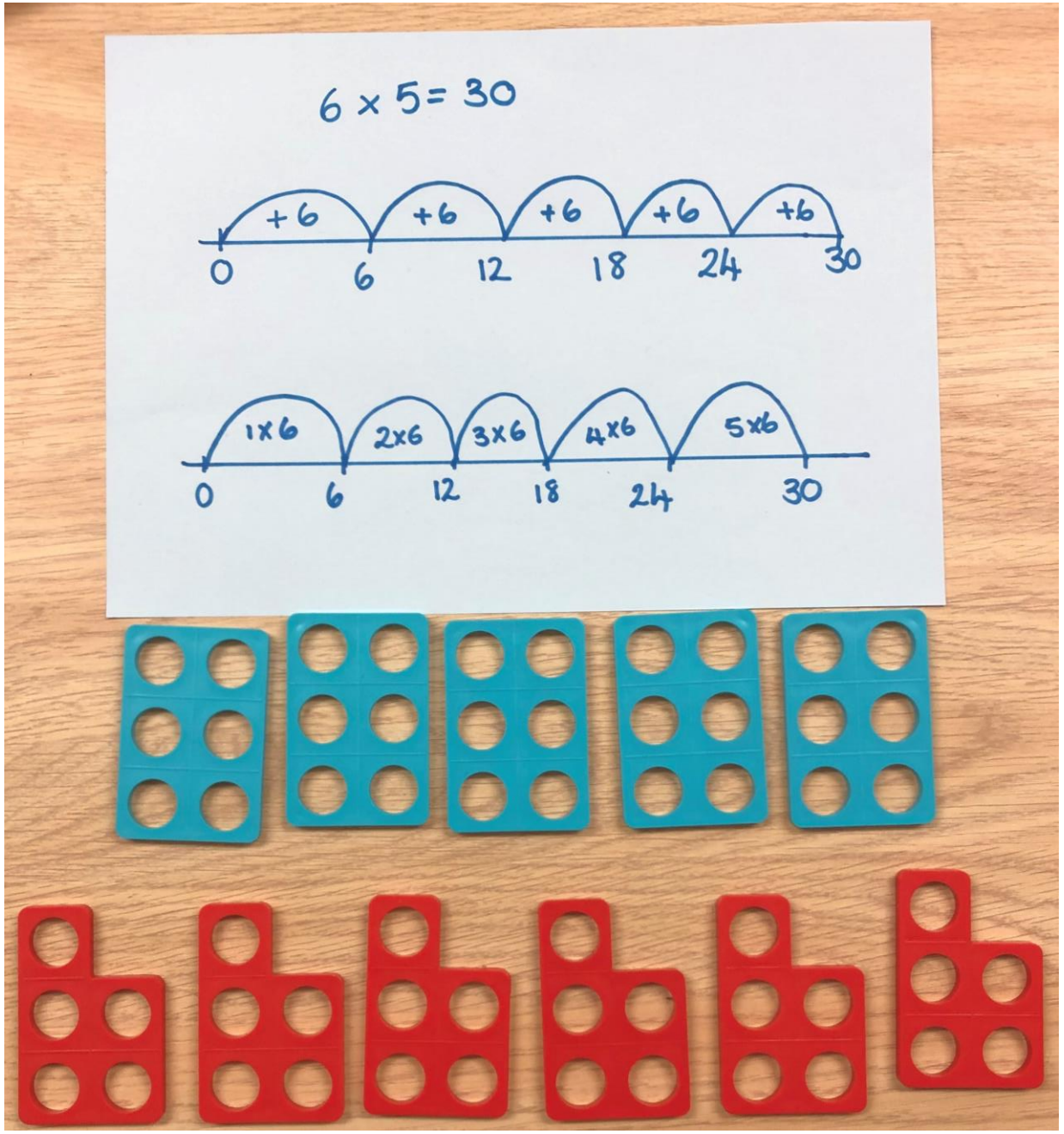
Educator Solutions



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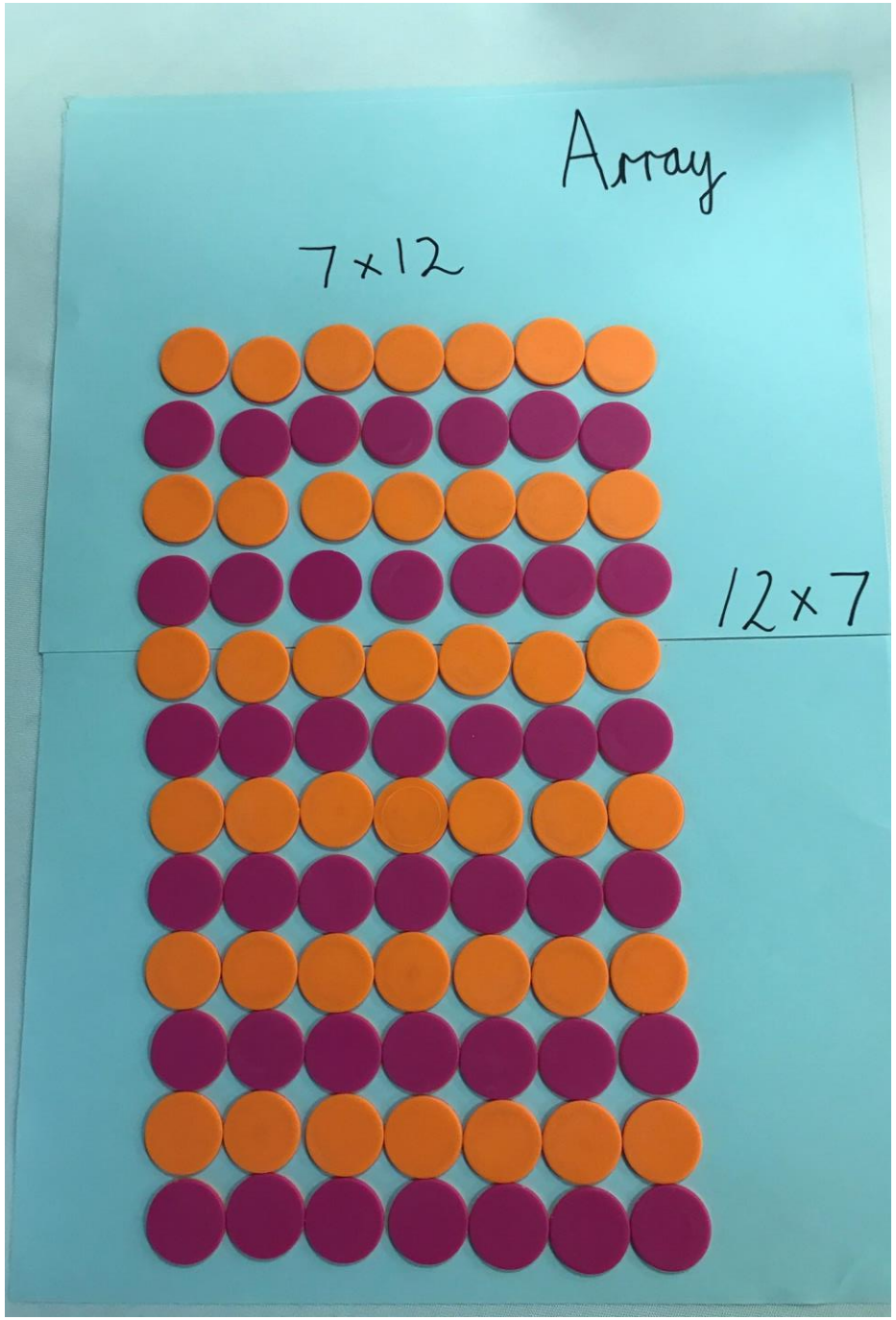
Educator Solutions



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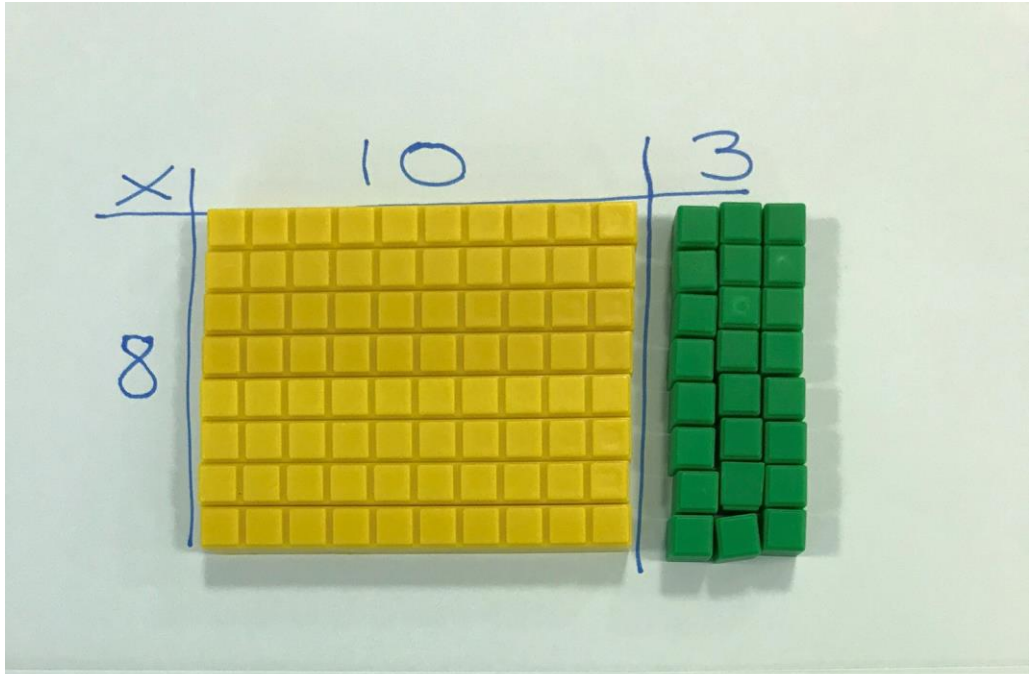
Educator Solutions



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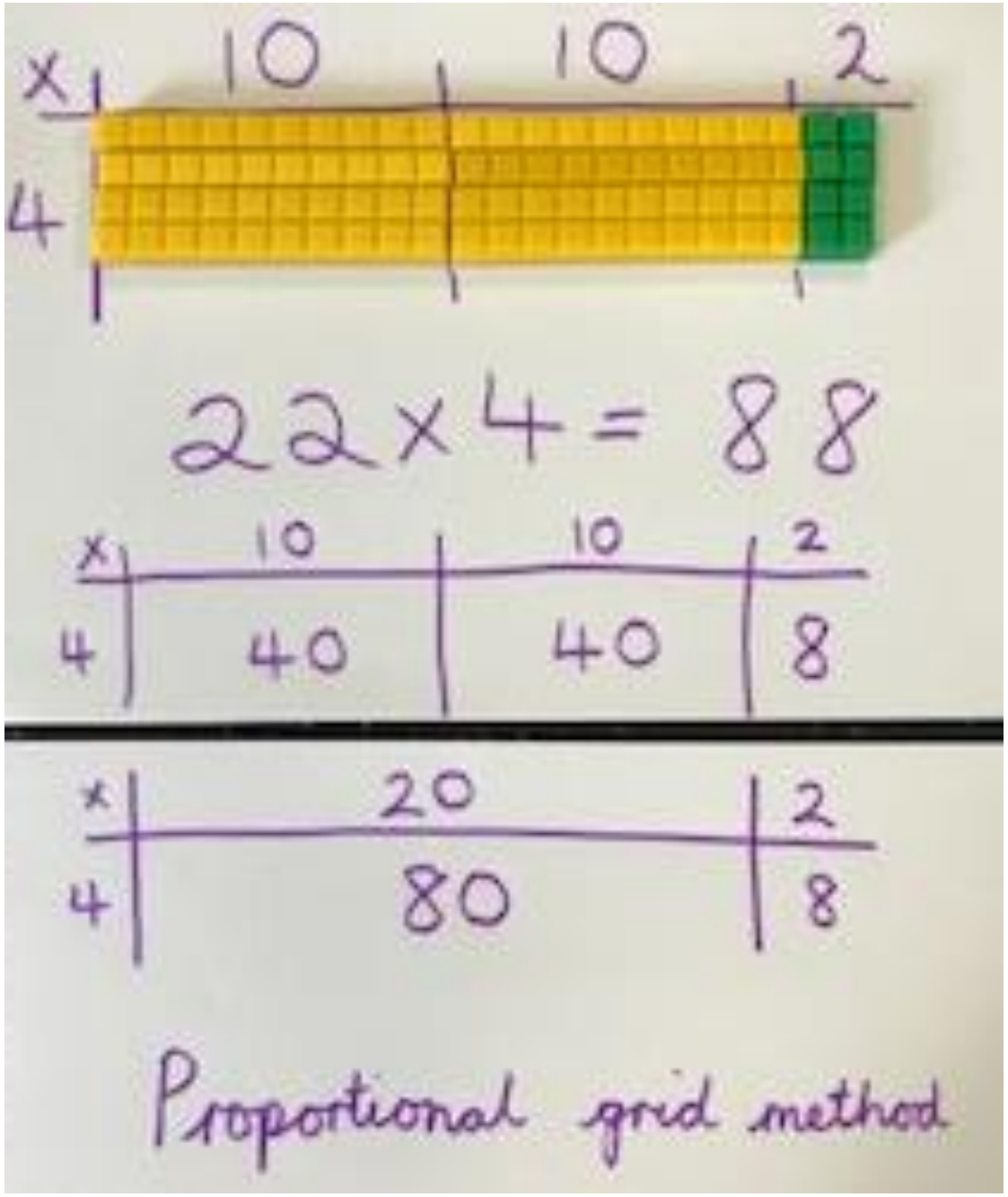
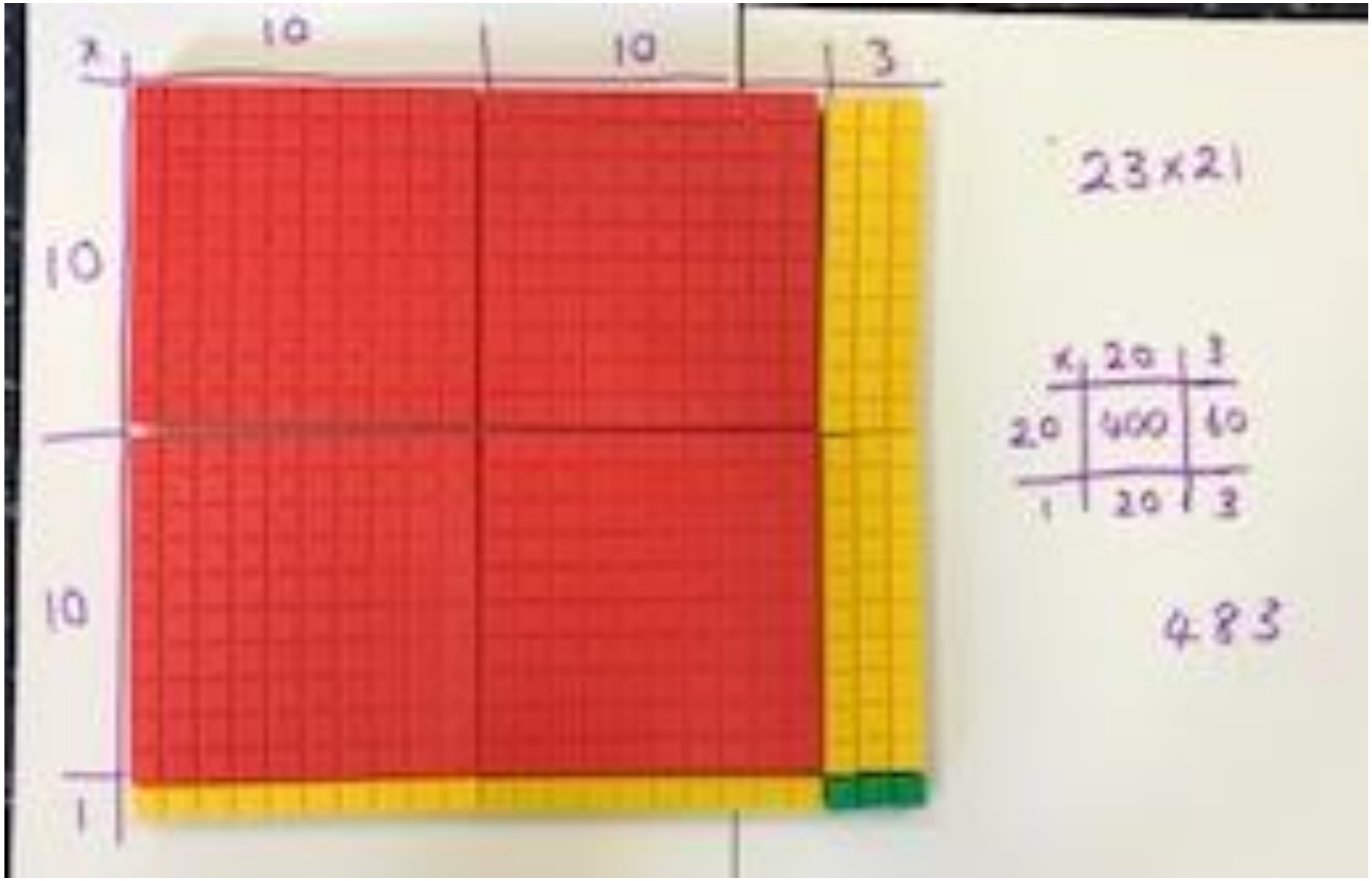
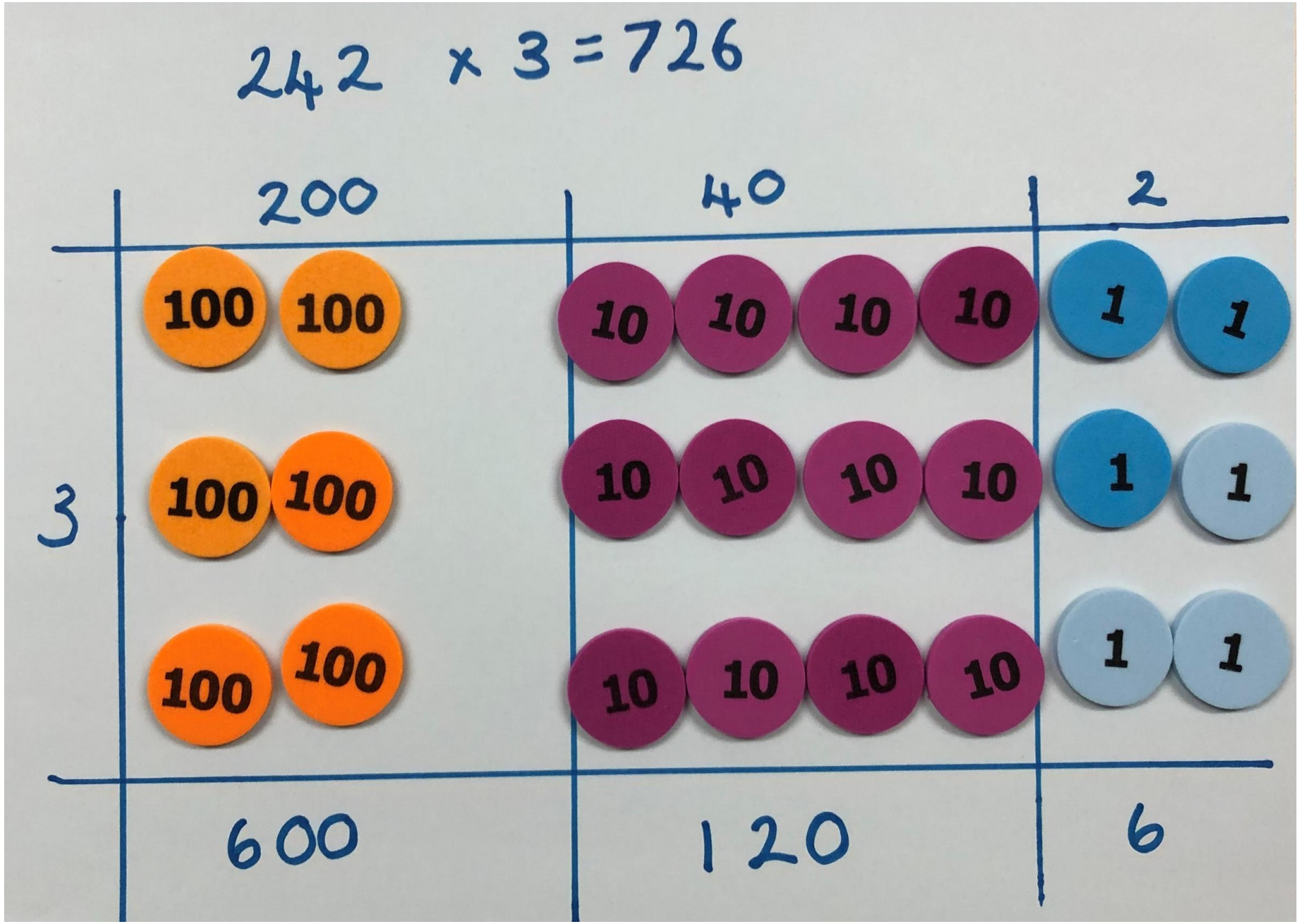
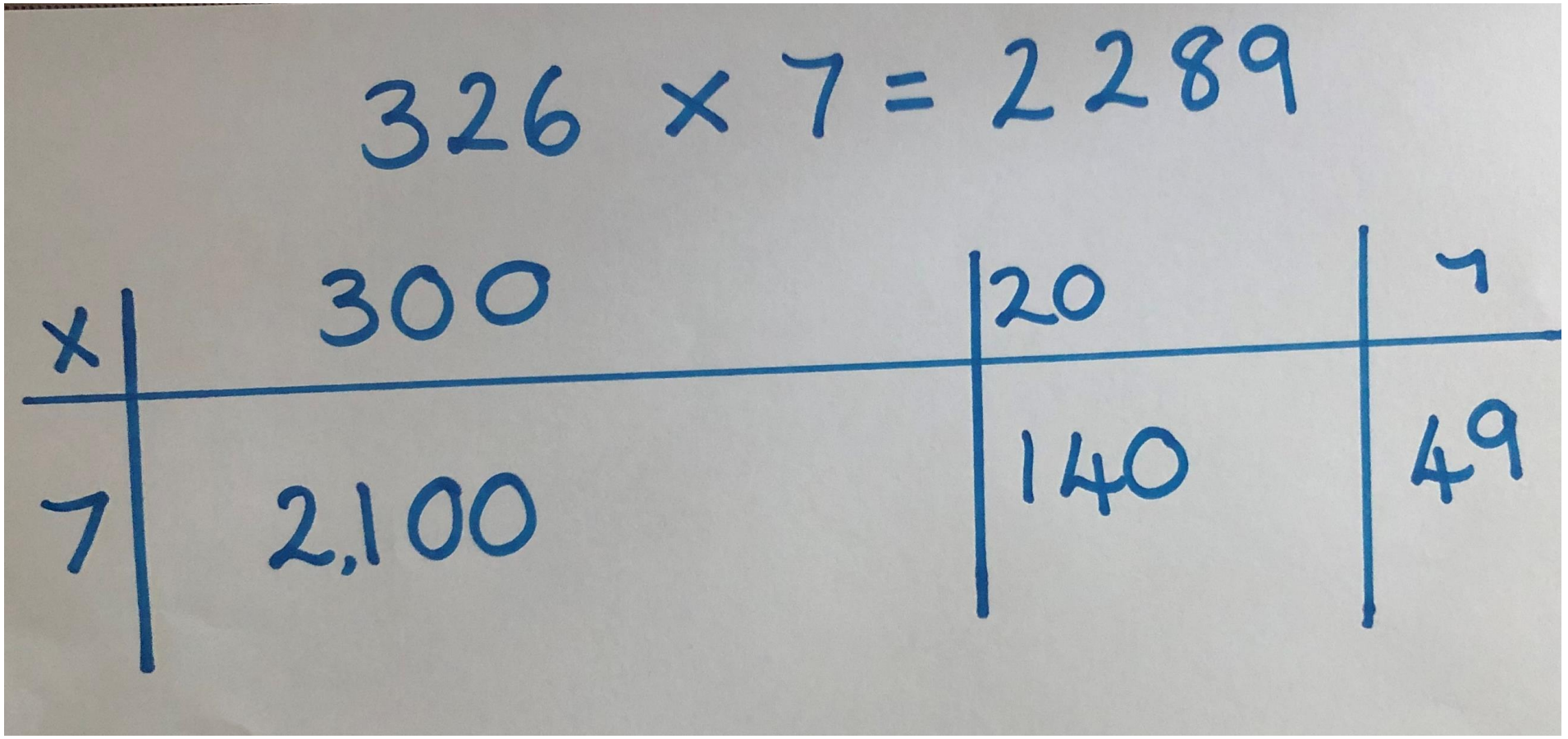








$12.5 \times 2.3 = 28.75$

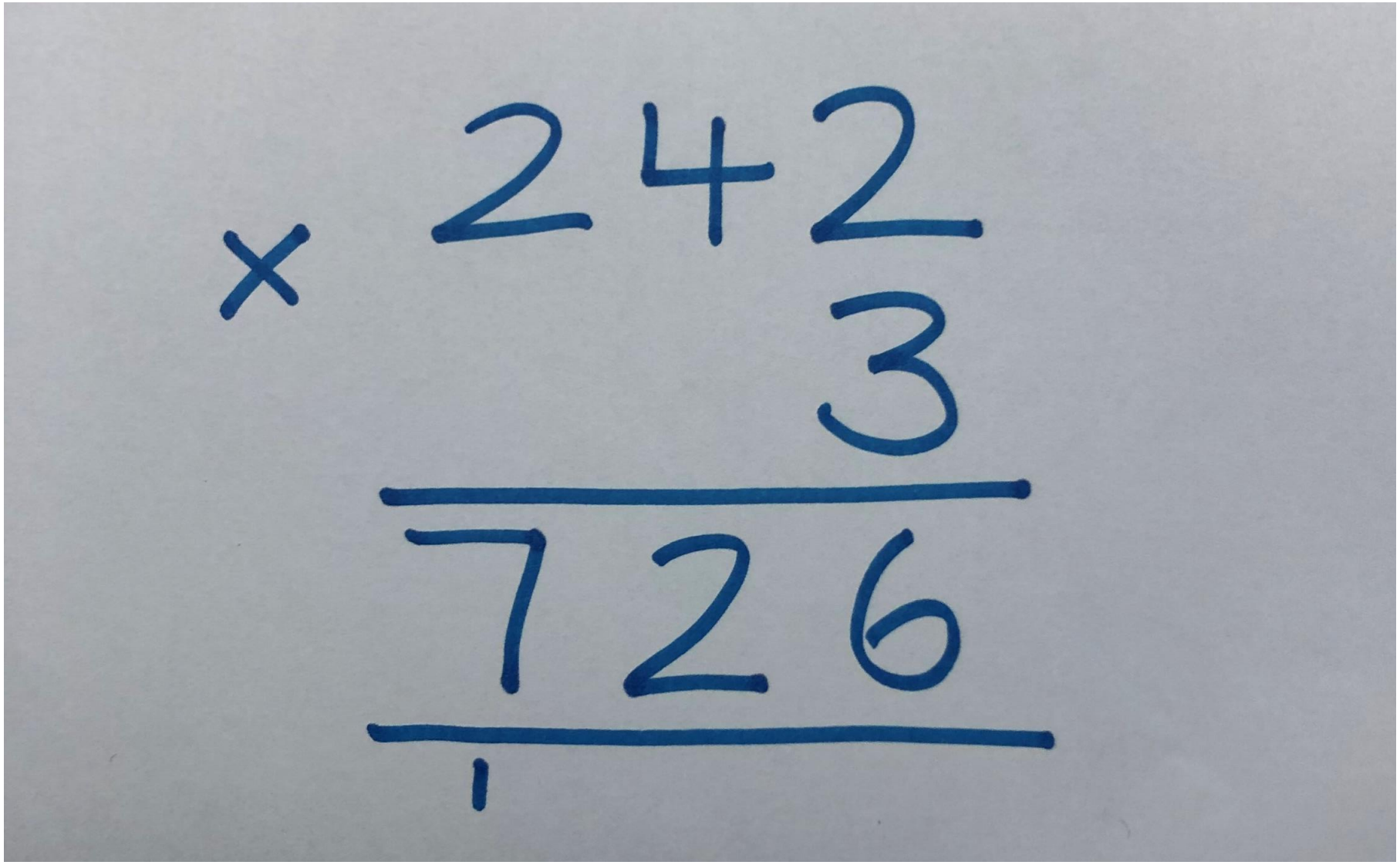
x	10	2	0.5
2	20	4	1
0.3	3	0.6	0.15

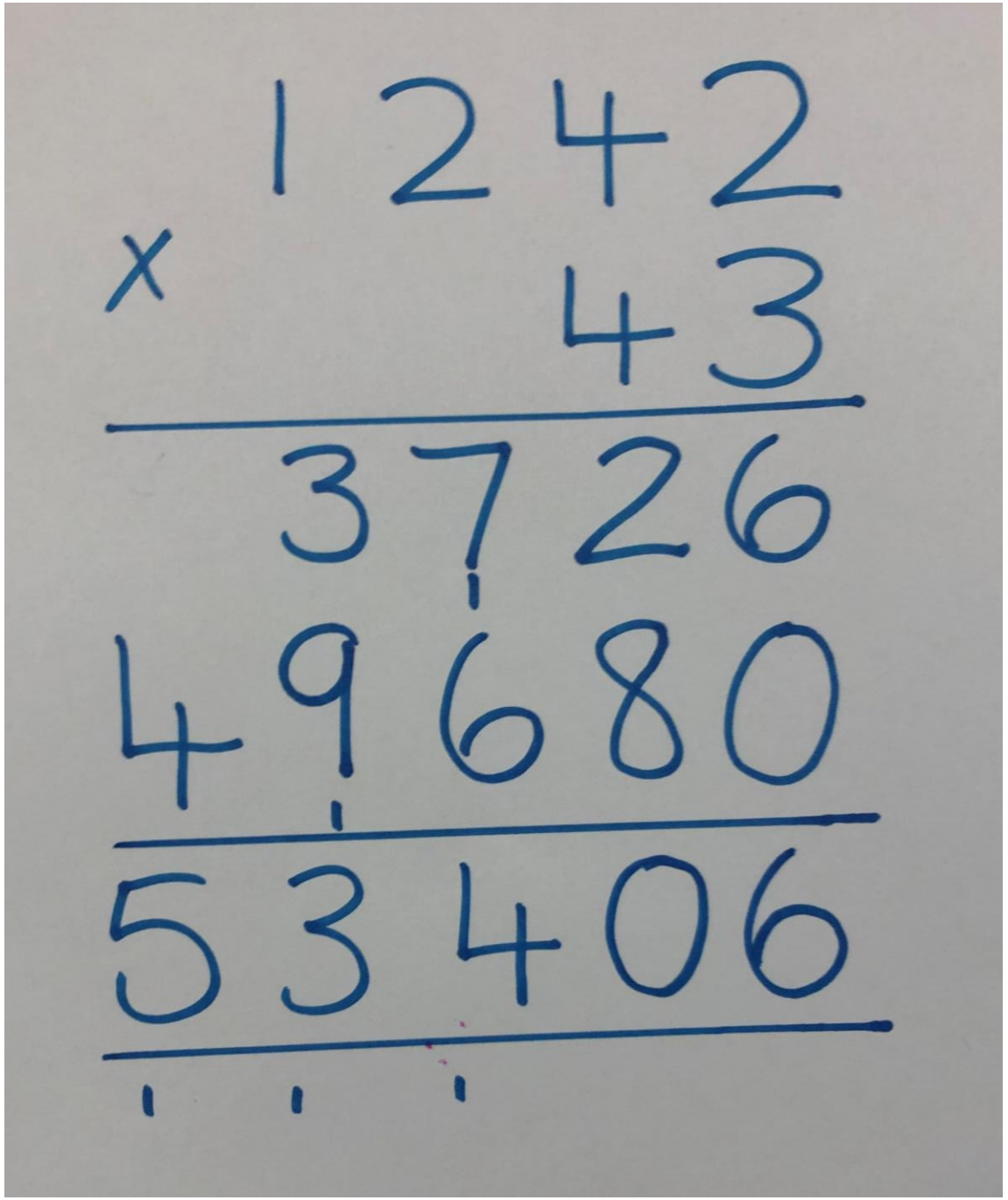
The playground measures 30metres by 164 metres. Calculate the area of the playground.

164m x 30m

x	100	60	4
30	3000	1800	120

Area = 4920m²





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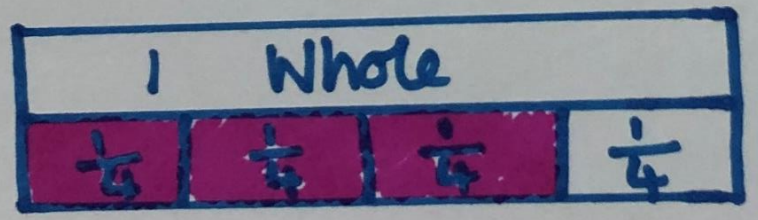
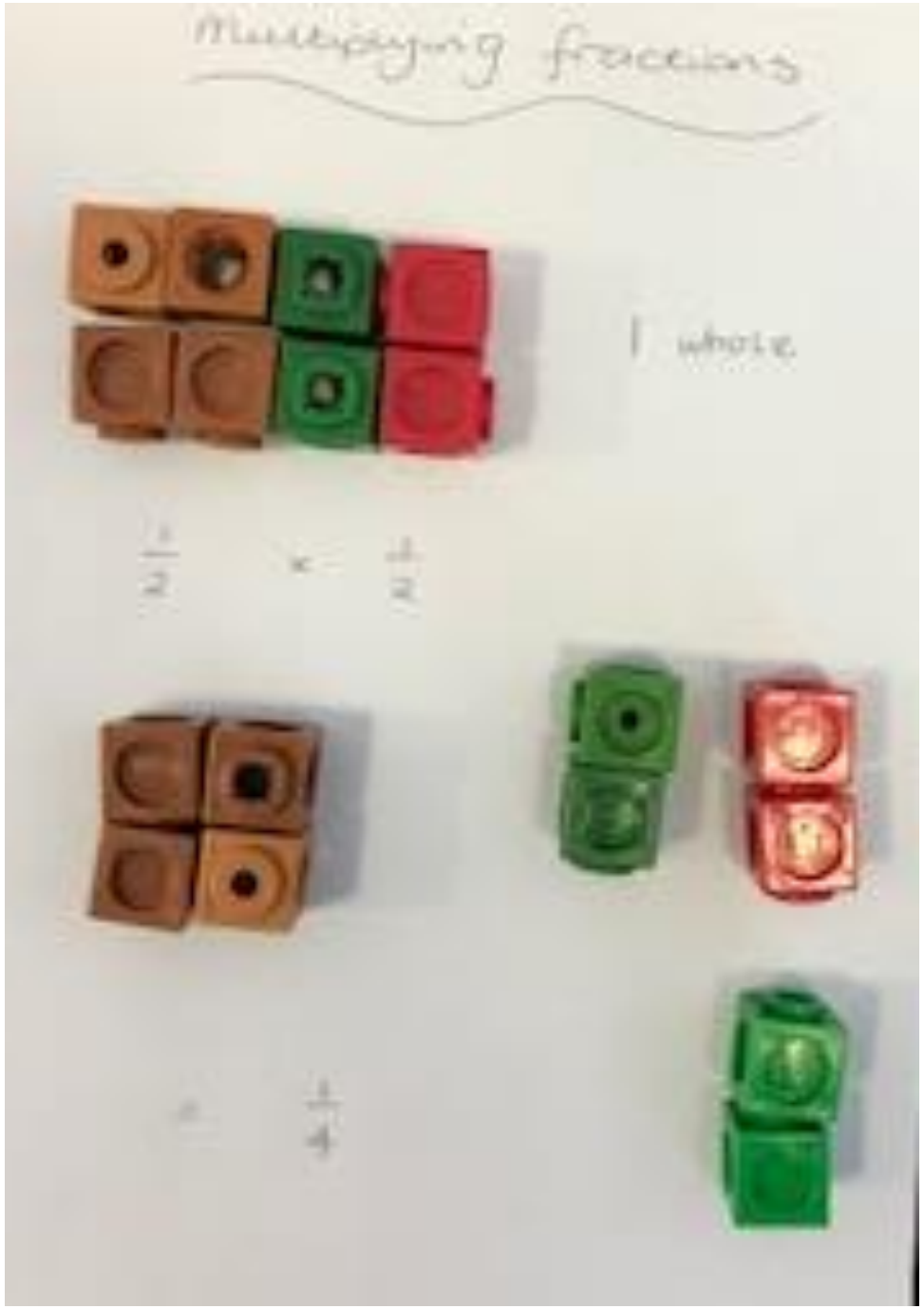
Educator Solutions

$$\frac{1}{4} \times 3 = \frac{3}{4}$$

$$\frac{1}{4} \times 3 = \frac{3}{4}$$





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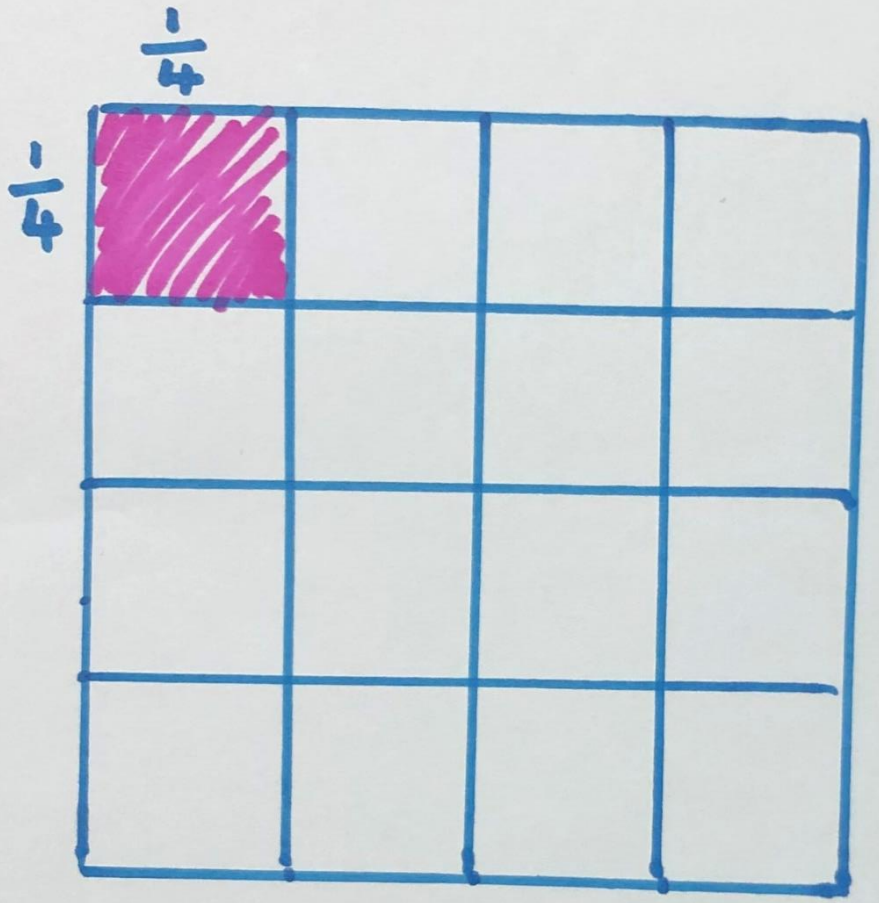
Educator Solutions

$$\frac{1}{4} \times \frac{1}{4} = \frac{1}{16}$$



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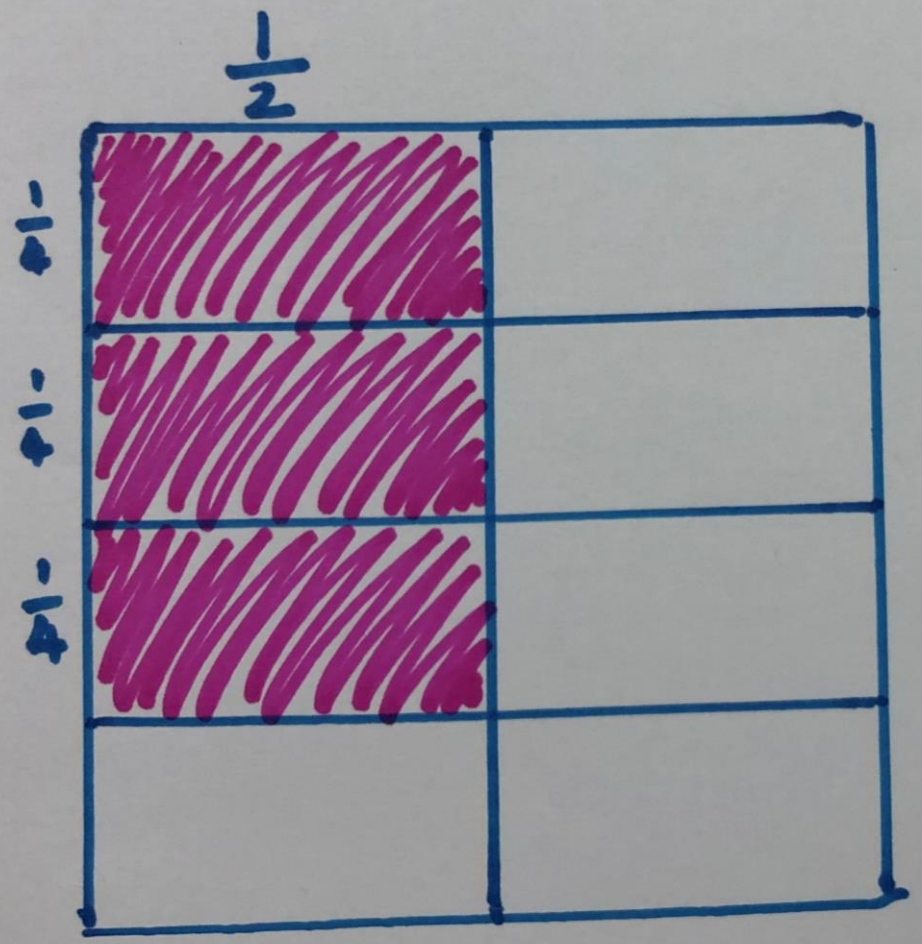
Educator Solutions

$$\frac{1}{2} \times \frac{3}{4} = \frac{3}{8}$$



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Educator Solutions

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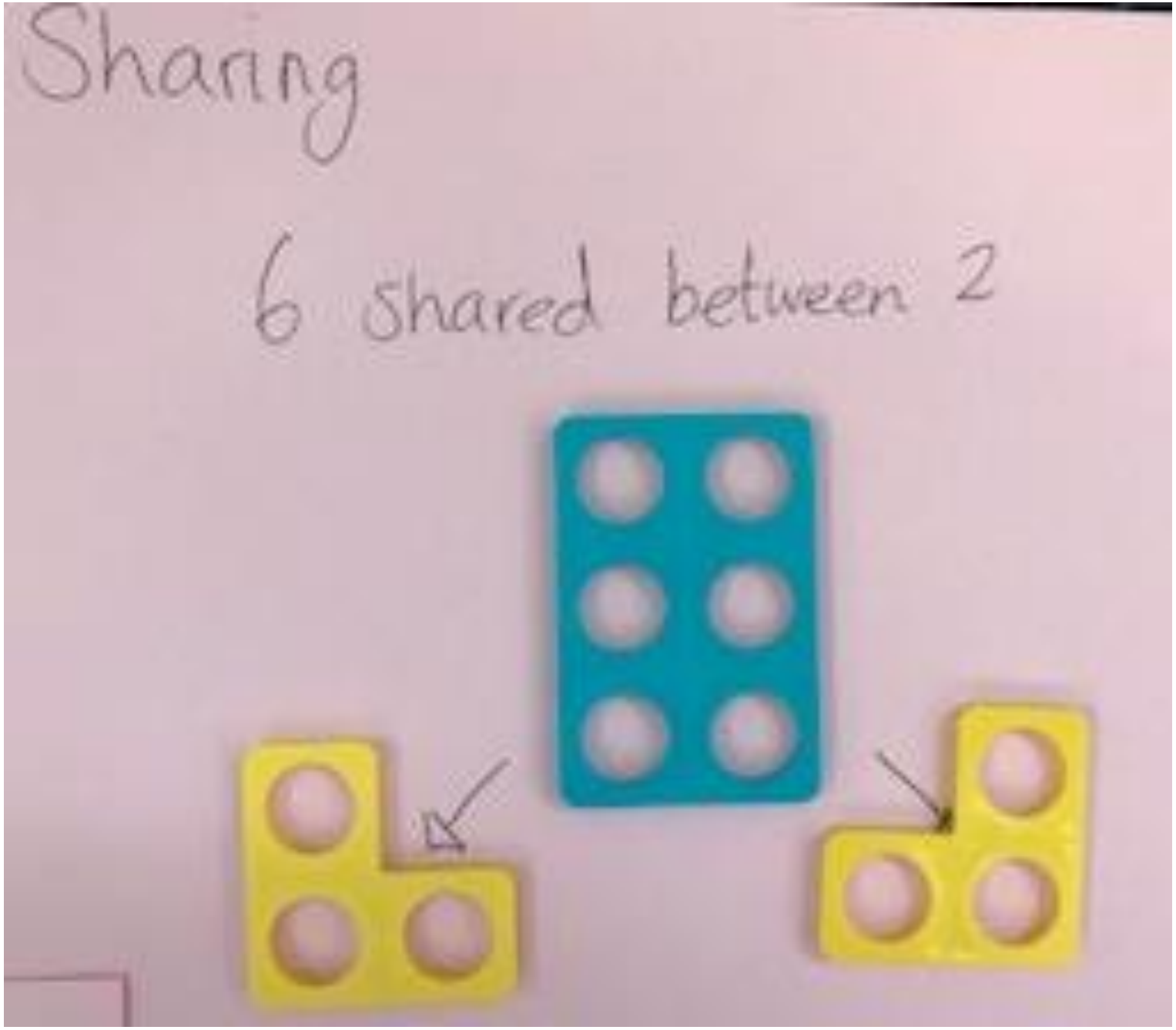
Division

Educator Solutions



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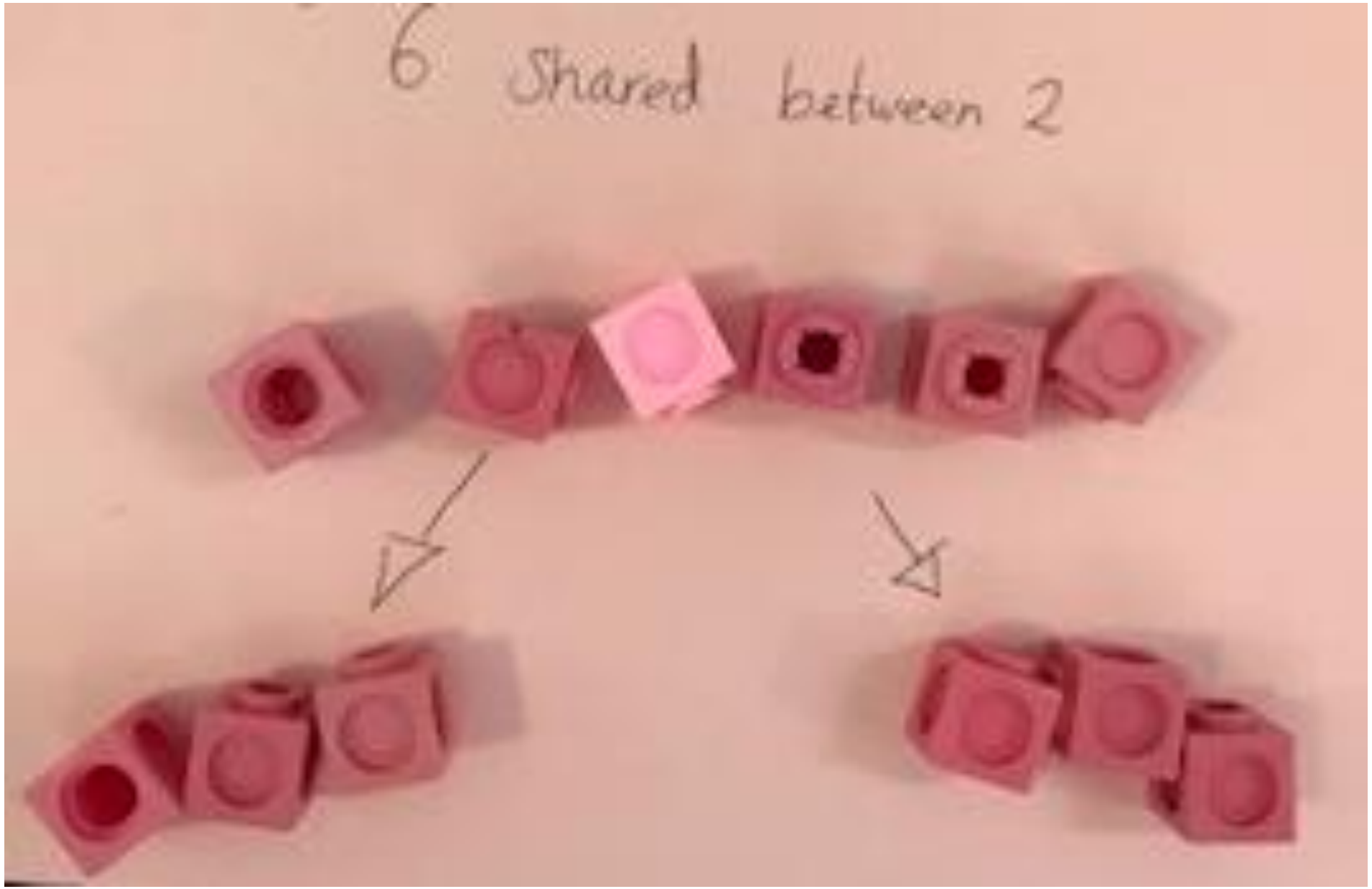
Educator
Solutions



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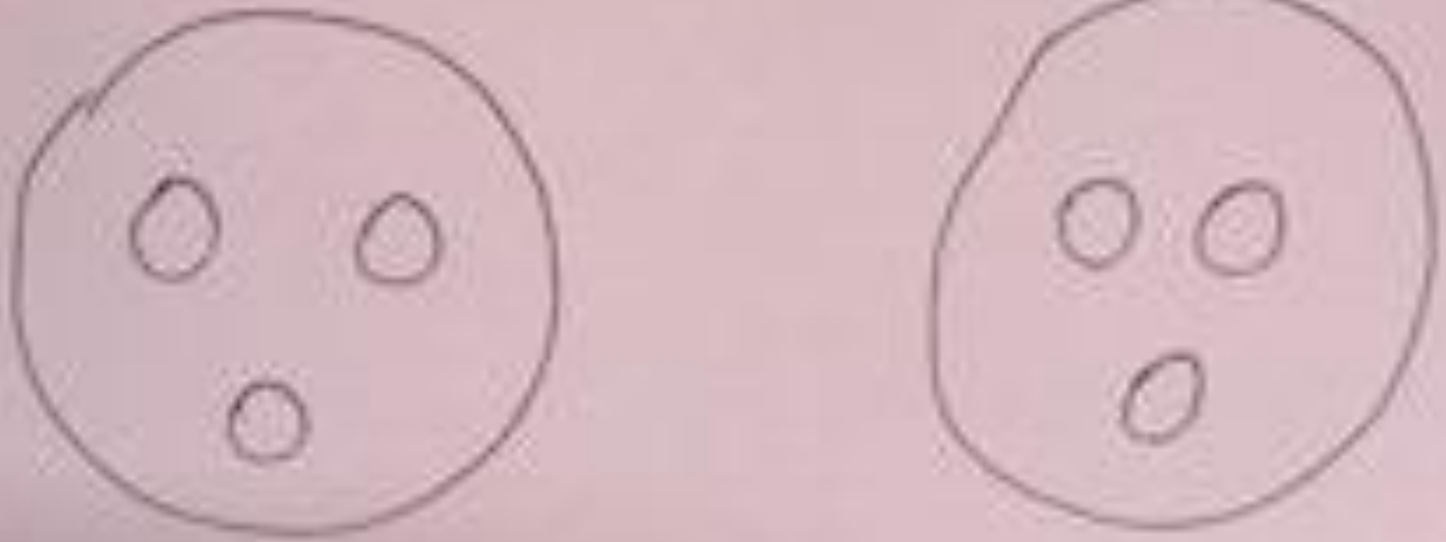
Solutions

Sharing

6 shared between 2



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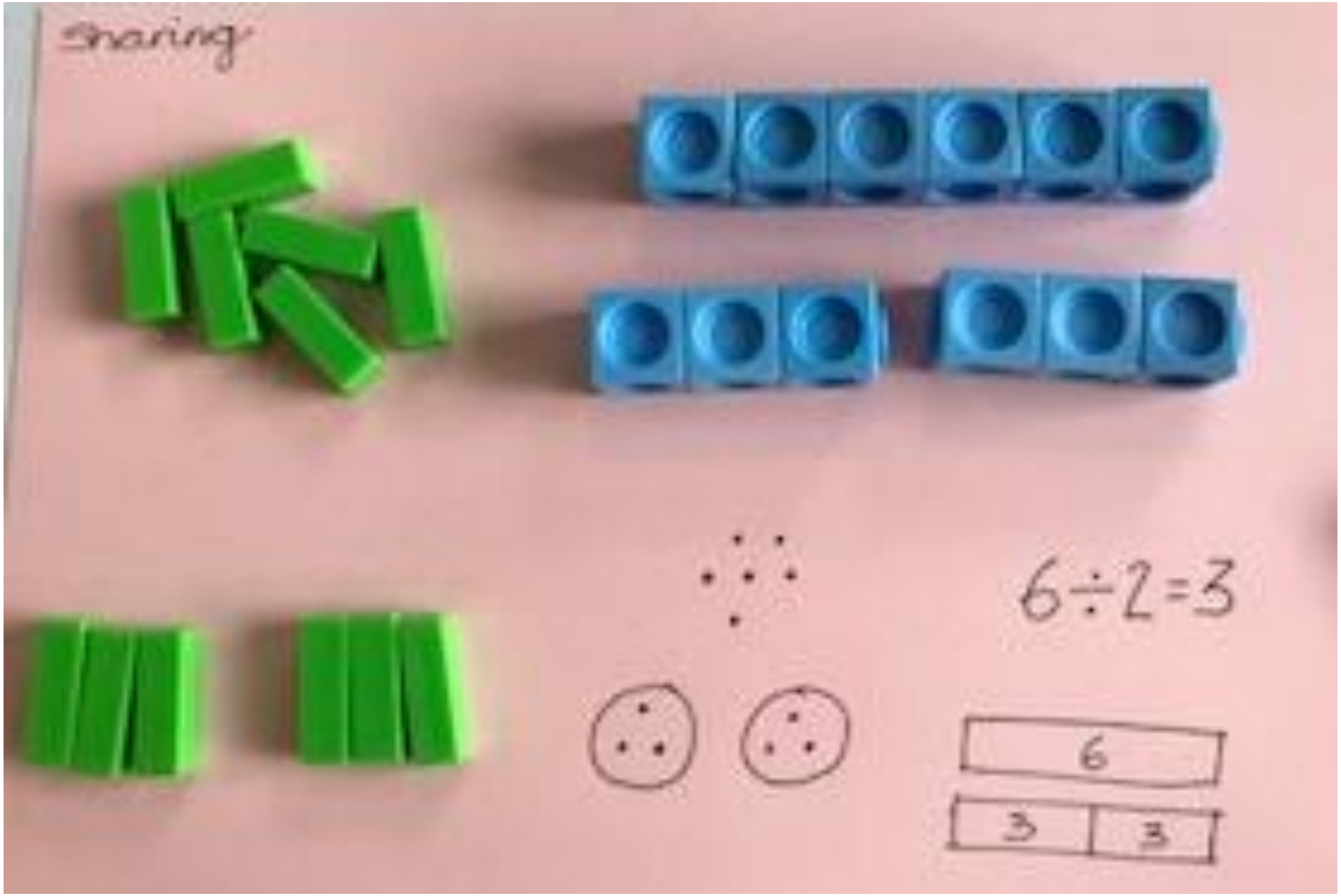
Educator Solutions



Diocese of Norwich
Education and
Academies Trust

Educator
Solutions

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Educator Solutions

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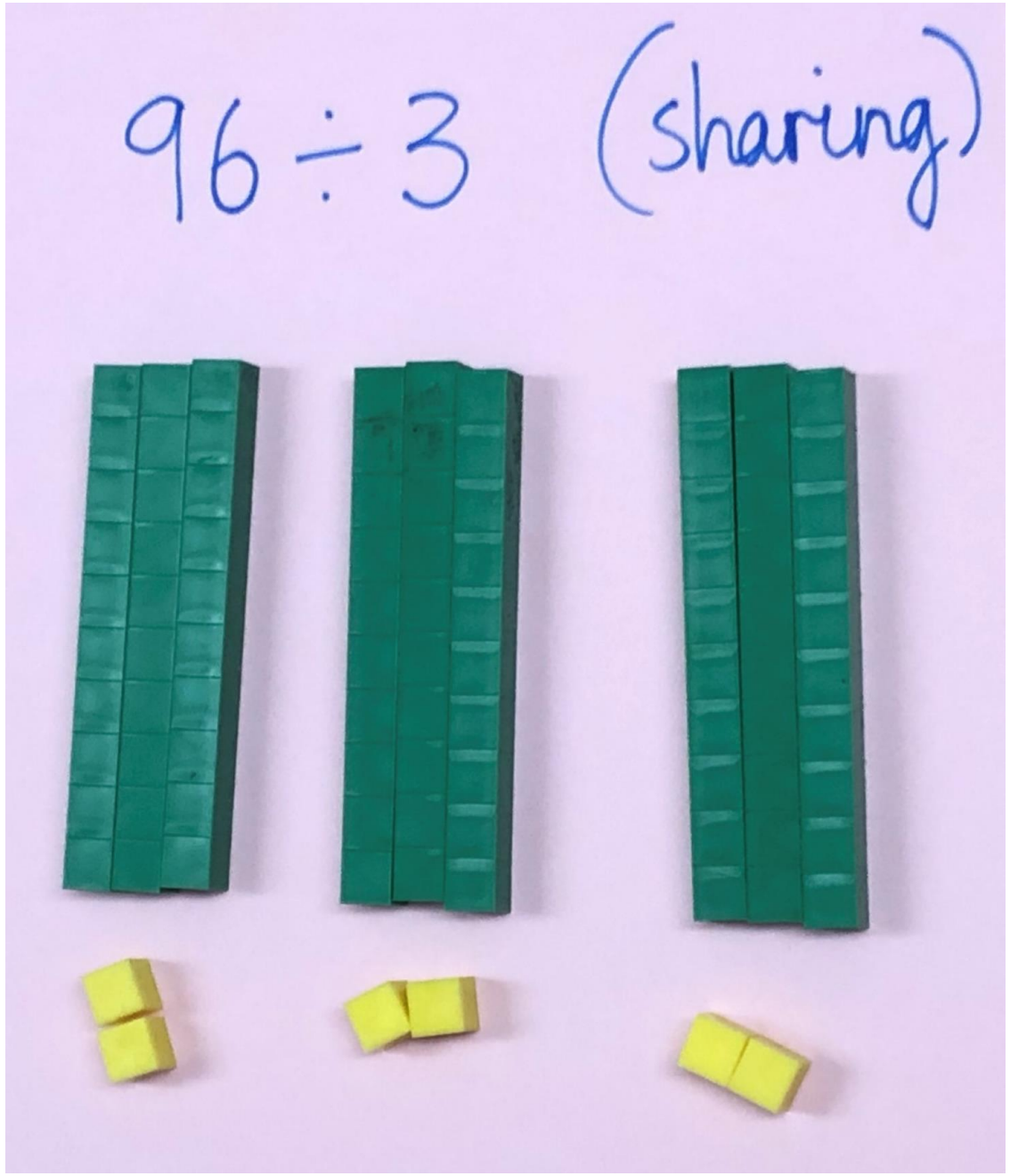
Solutions



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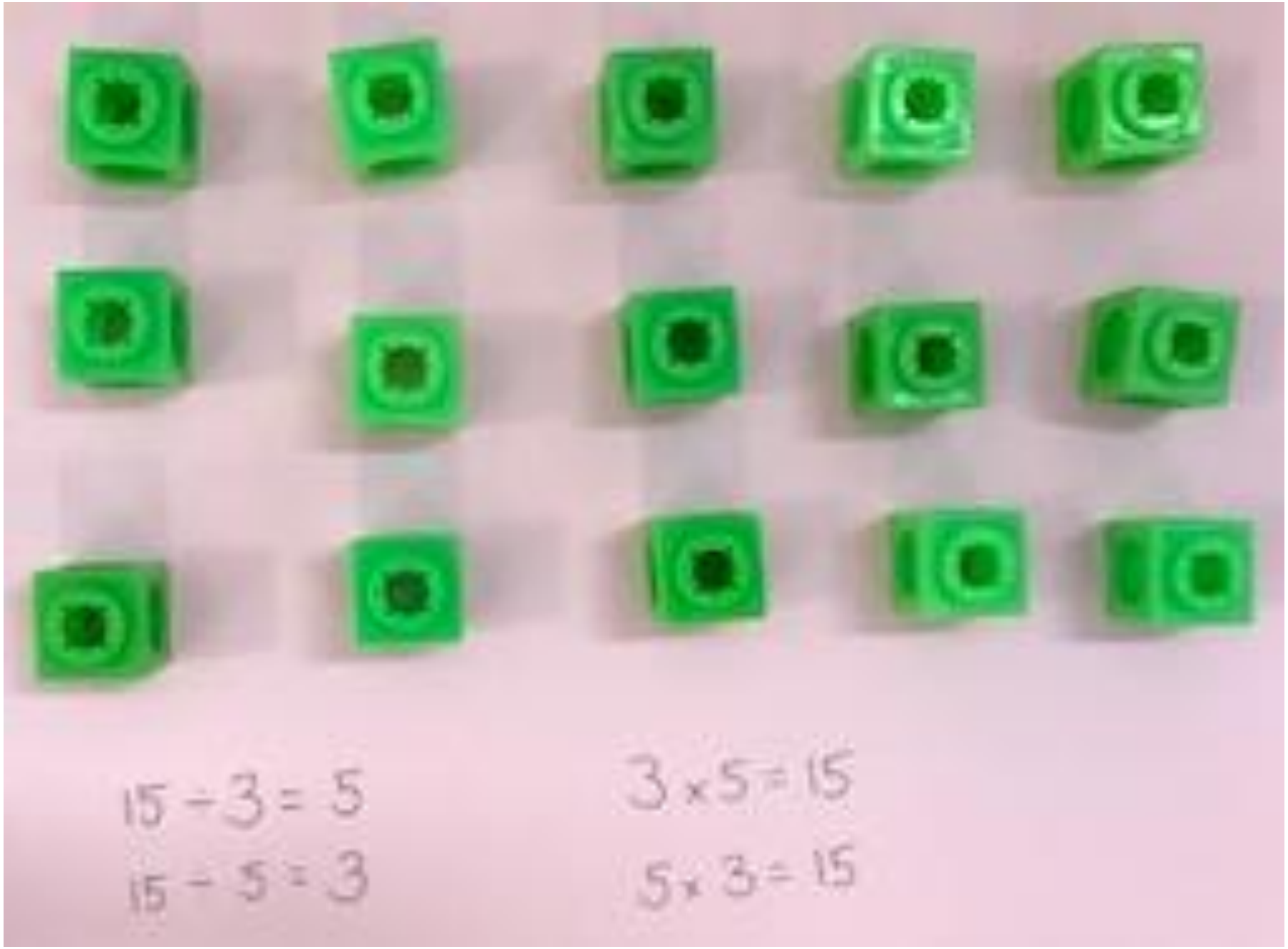

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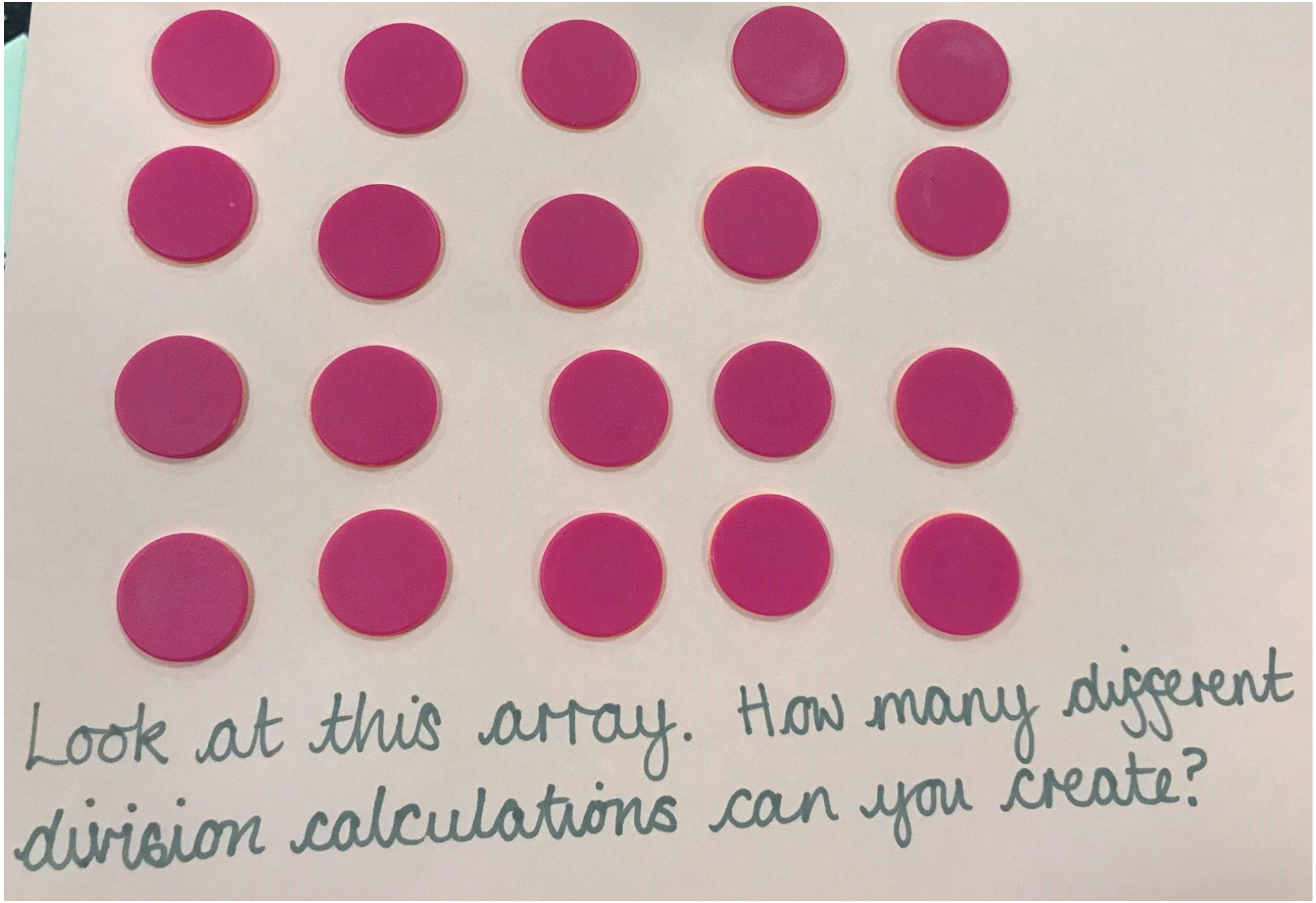

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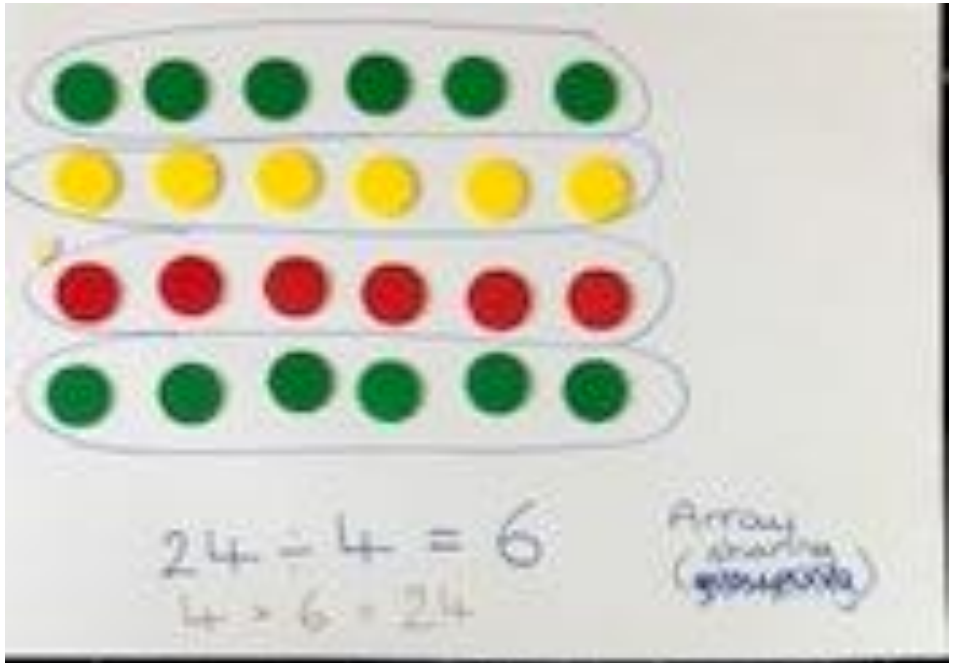

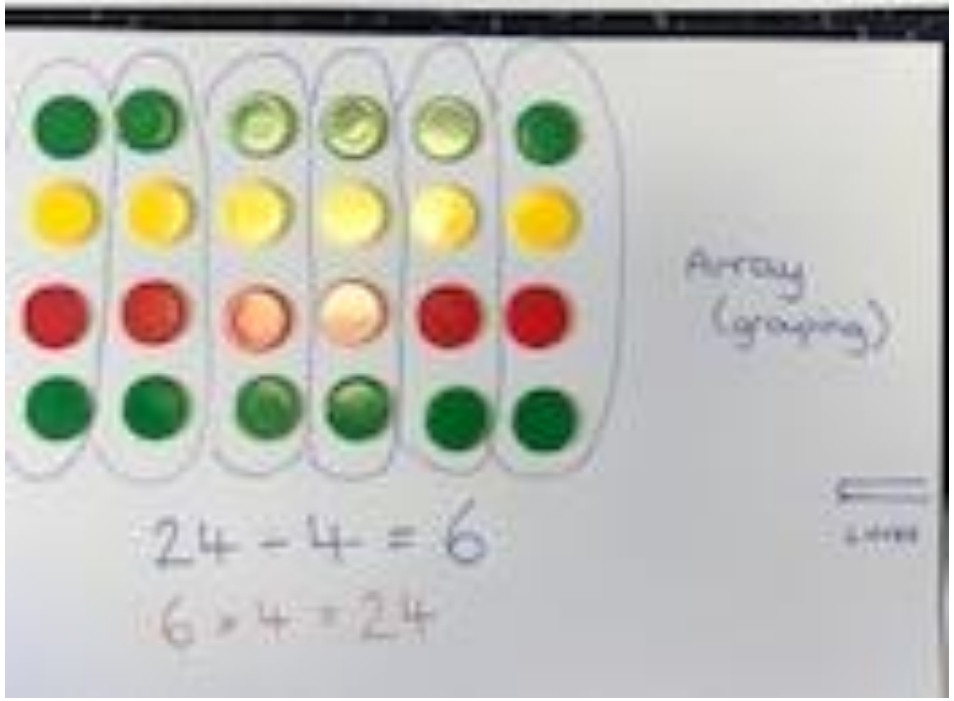

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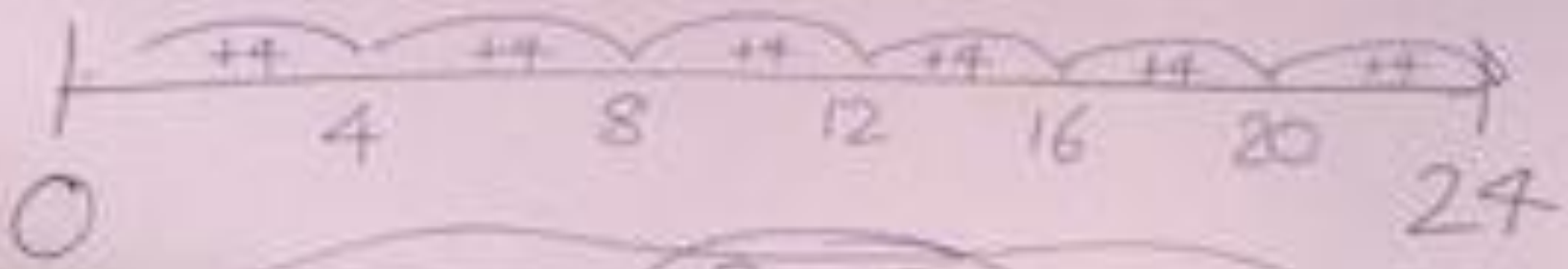
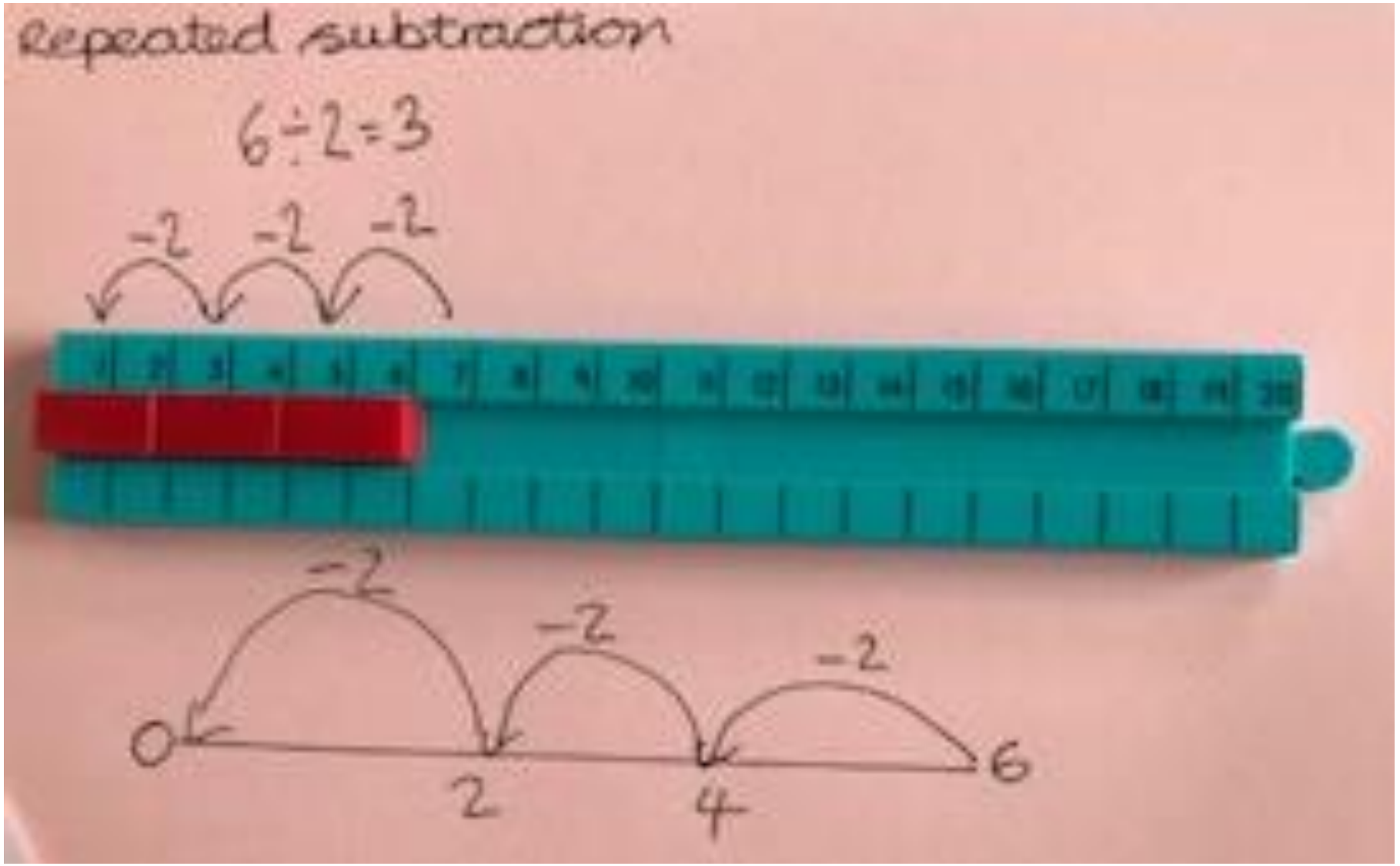
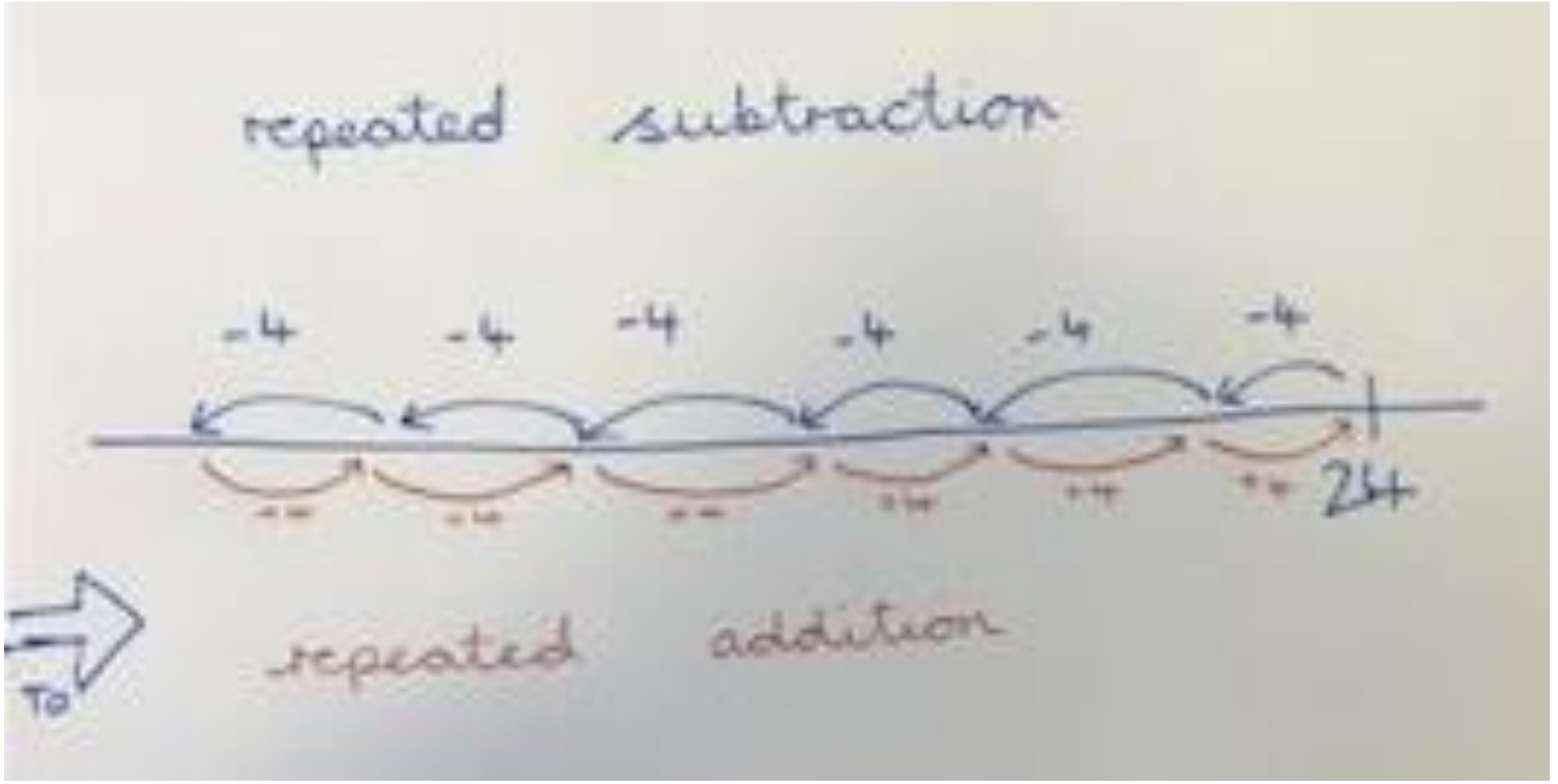
Repeated addition

$24 \div 4 = 6$



$17 \div 5 = 3 \text{ r. } 2$





Pictorial sharing

$593 \div 4 = 123 \text{ r } 1$

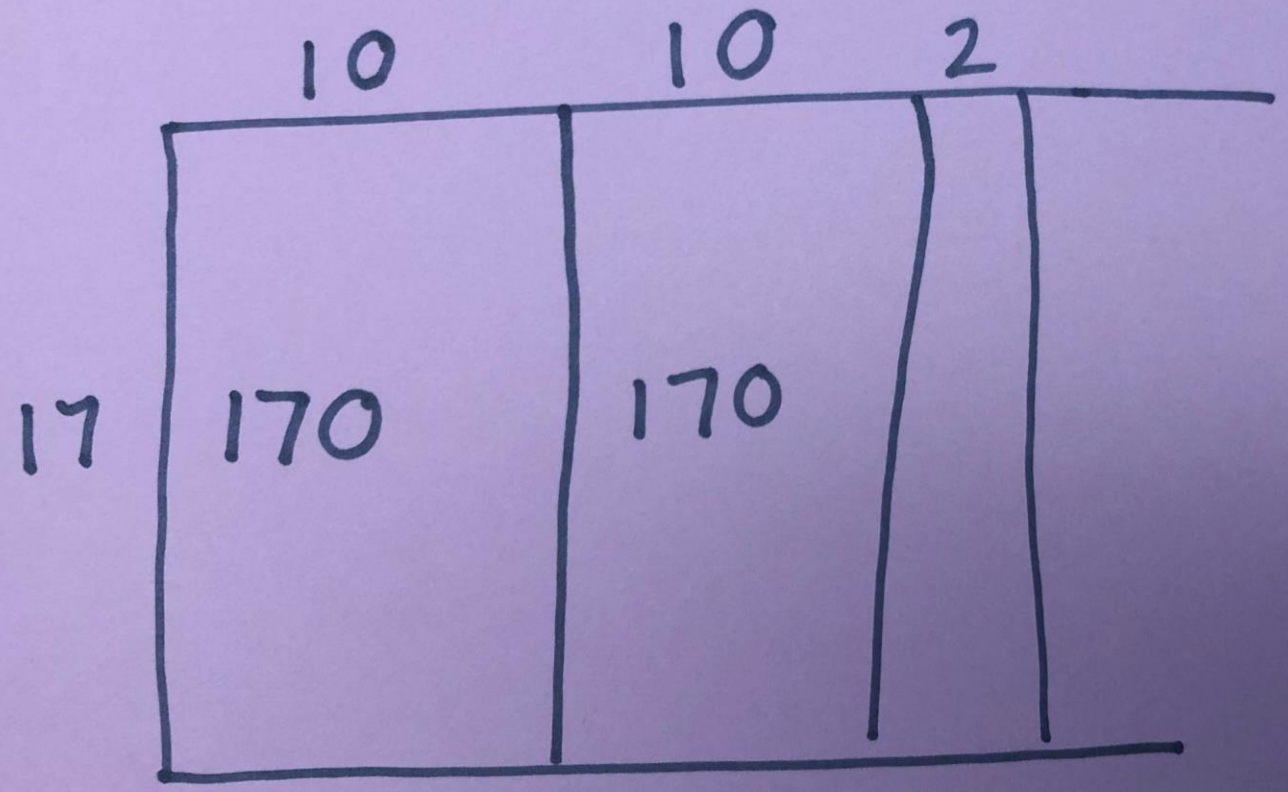
$123\frac{1}{4}$

123·25

100	100	100	100	400
20	20	20	20	80 (480)
3	3	3	3	12 (492)
				r 1

Reverse Proportional grid

397 ÷ 17 =



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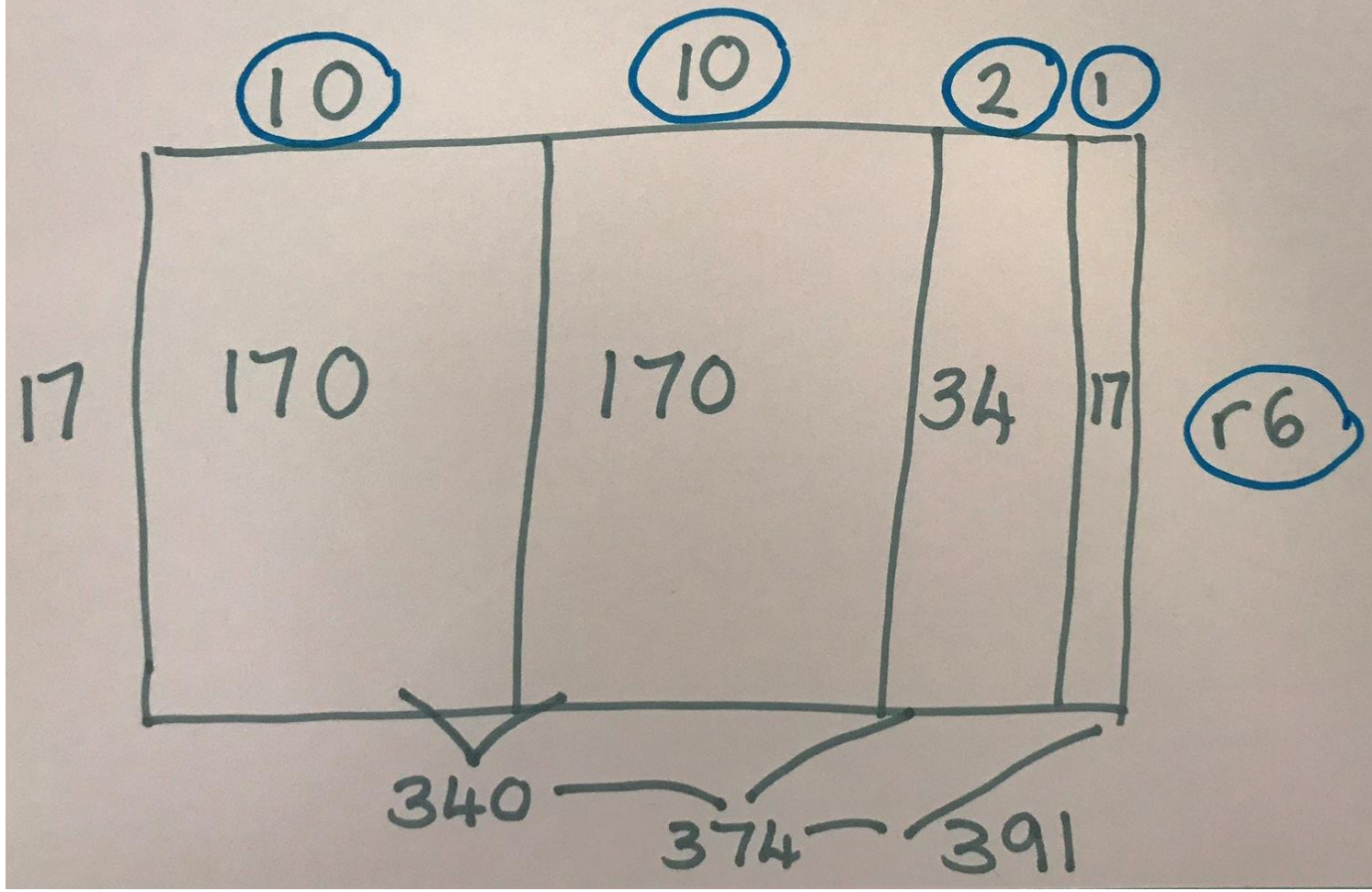
Educator Solutions

Reverse proportional Grid

$397 \div 17 = 23r6$ $\quad 23\frac{6}{17}$



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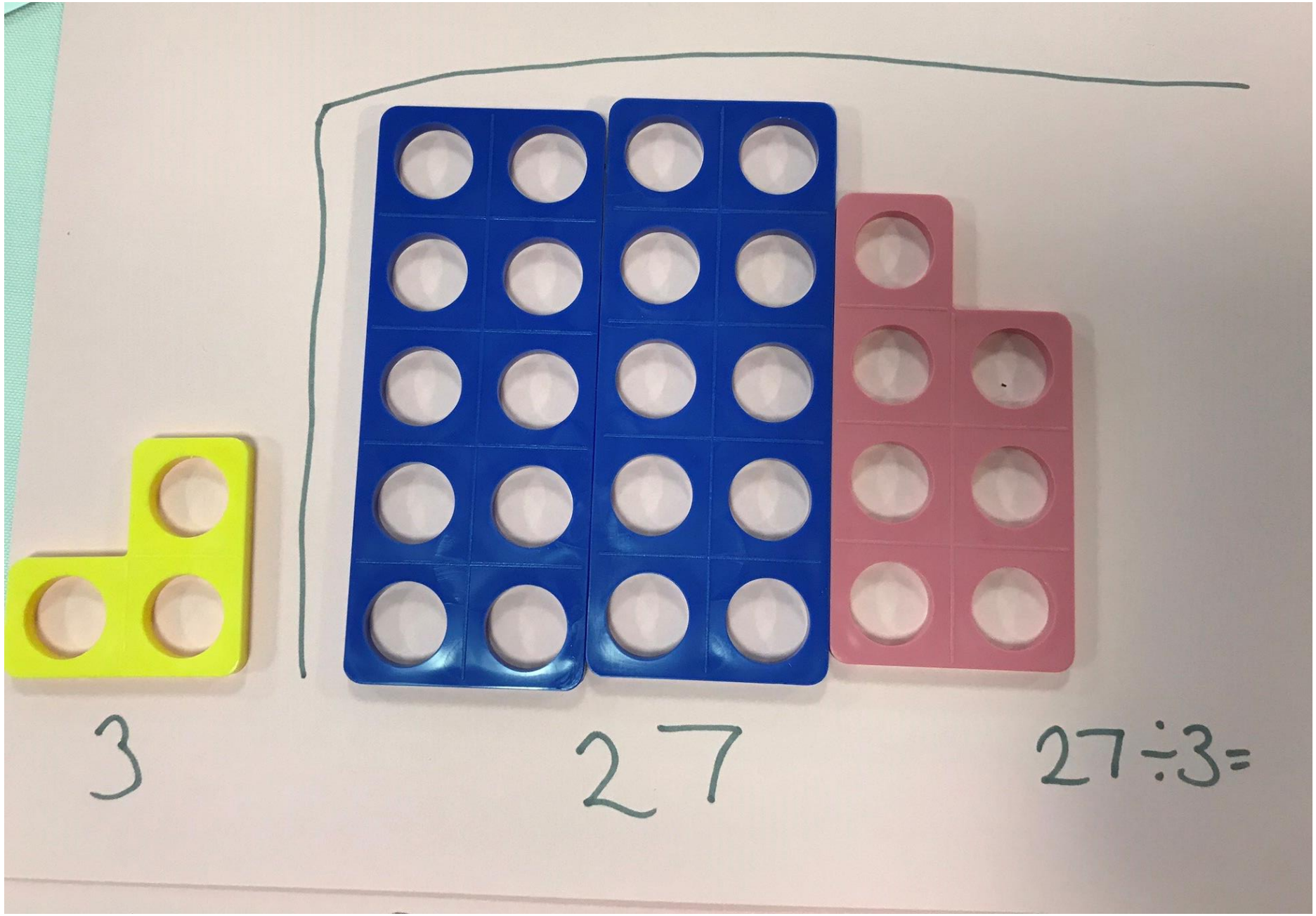

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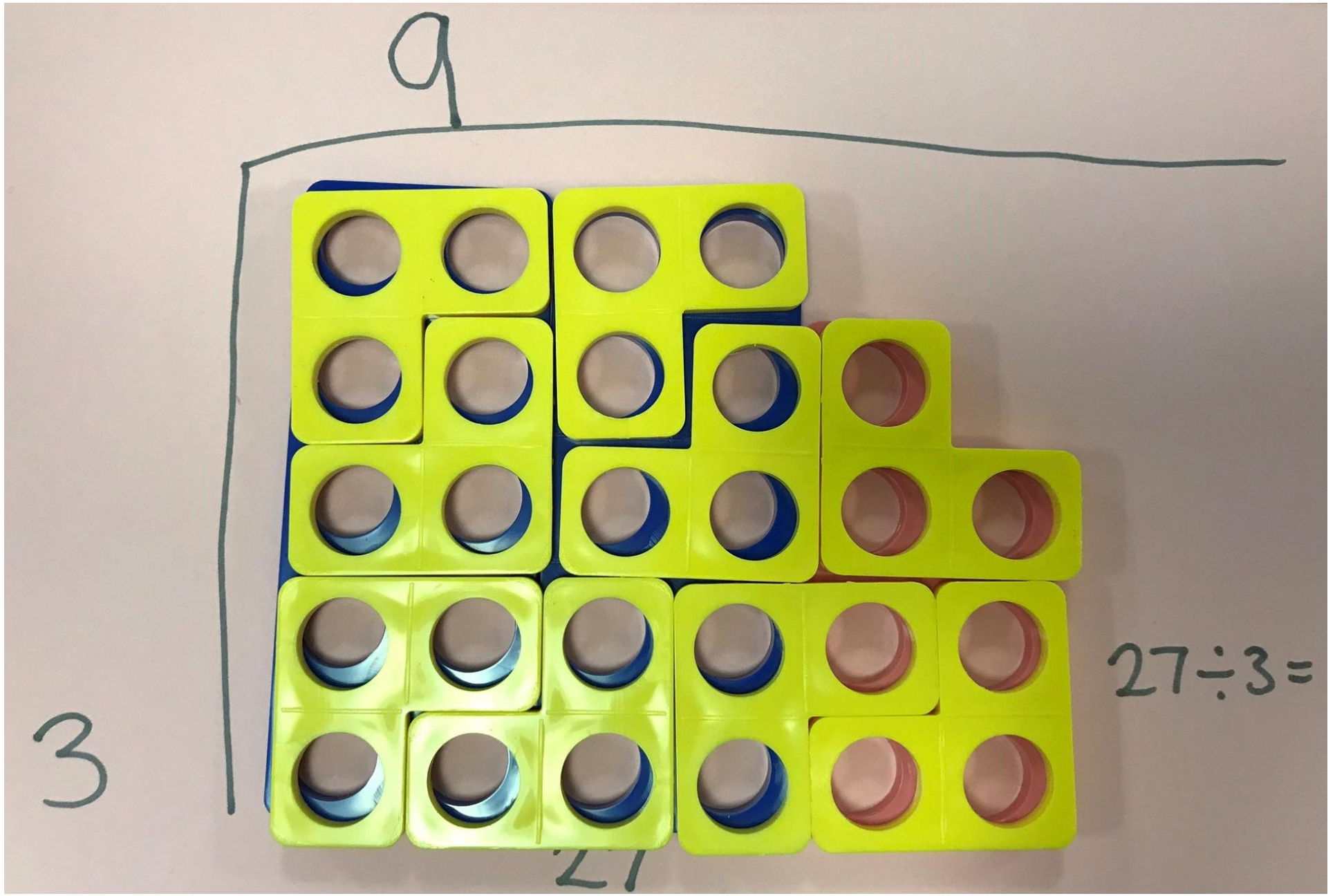

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Qn. 17 2018 R2

8 litres = 8000 ml

 = 225 ml

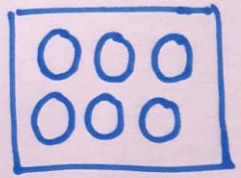
 × 2 = 450 ml

 × 4 = 900 ml

 × 8 = 1800 ml

Qn. 7

2018 R2

 = 1 box

980 ÷ 6

100 boxes = 600 eggs

50 boxes = 300 eggs

150 × 6 = 900 — 900

5 × 6 = 30 — 930

8 × 6 = 48

163 × 6 = 978

163 full boxes

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Educator Solutions

I know:

$10 \times 97 = 970$

$100 \times 97 = 9700$

$50 \times 97 = 4850$

$20 \times 97 = 1940$

$90 \times 97 = 8730$

÷	90	1	
97	8730	97	

91

$? \times 97 = 8827$

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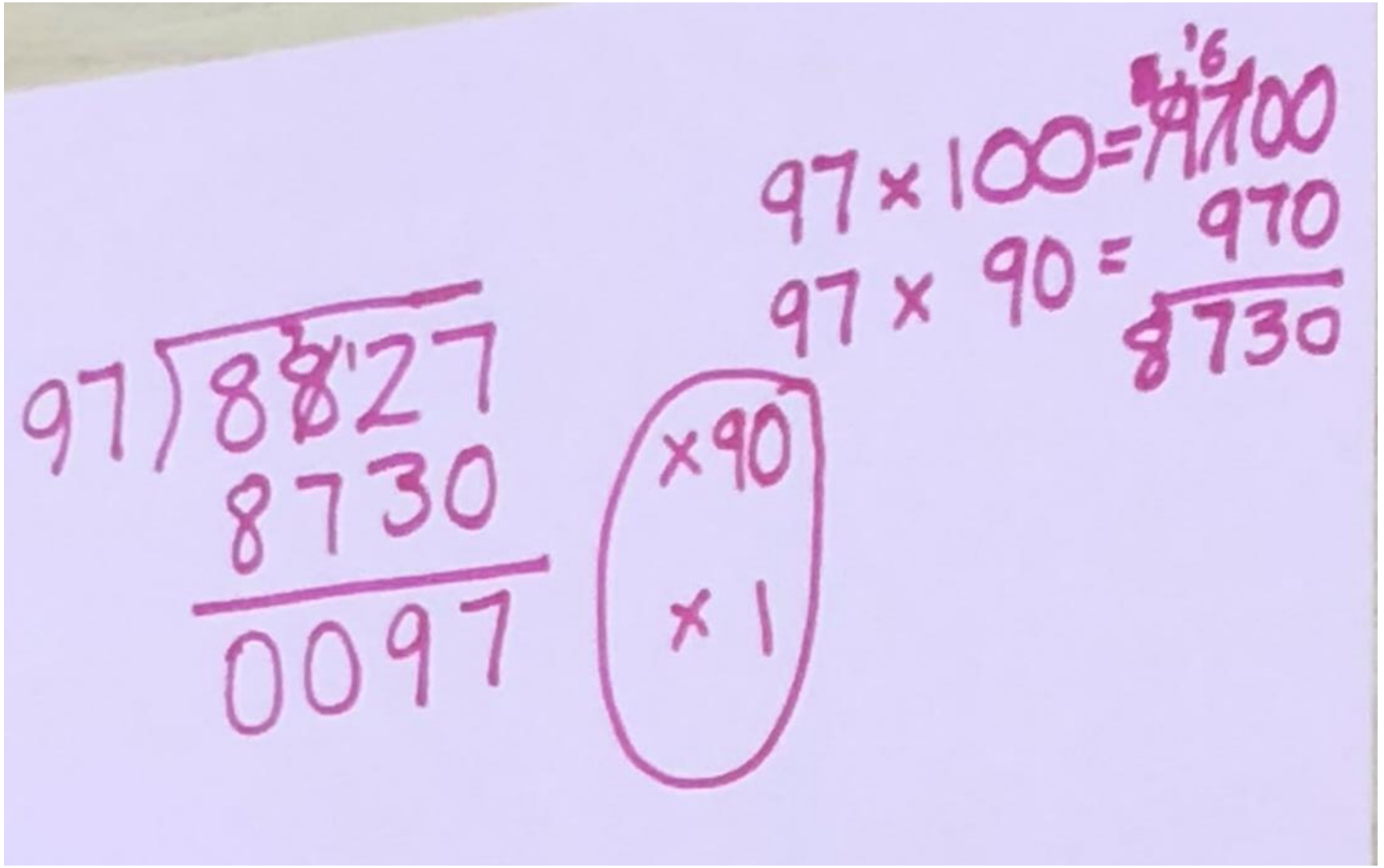
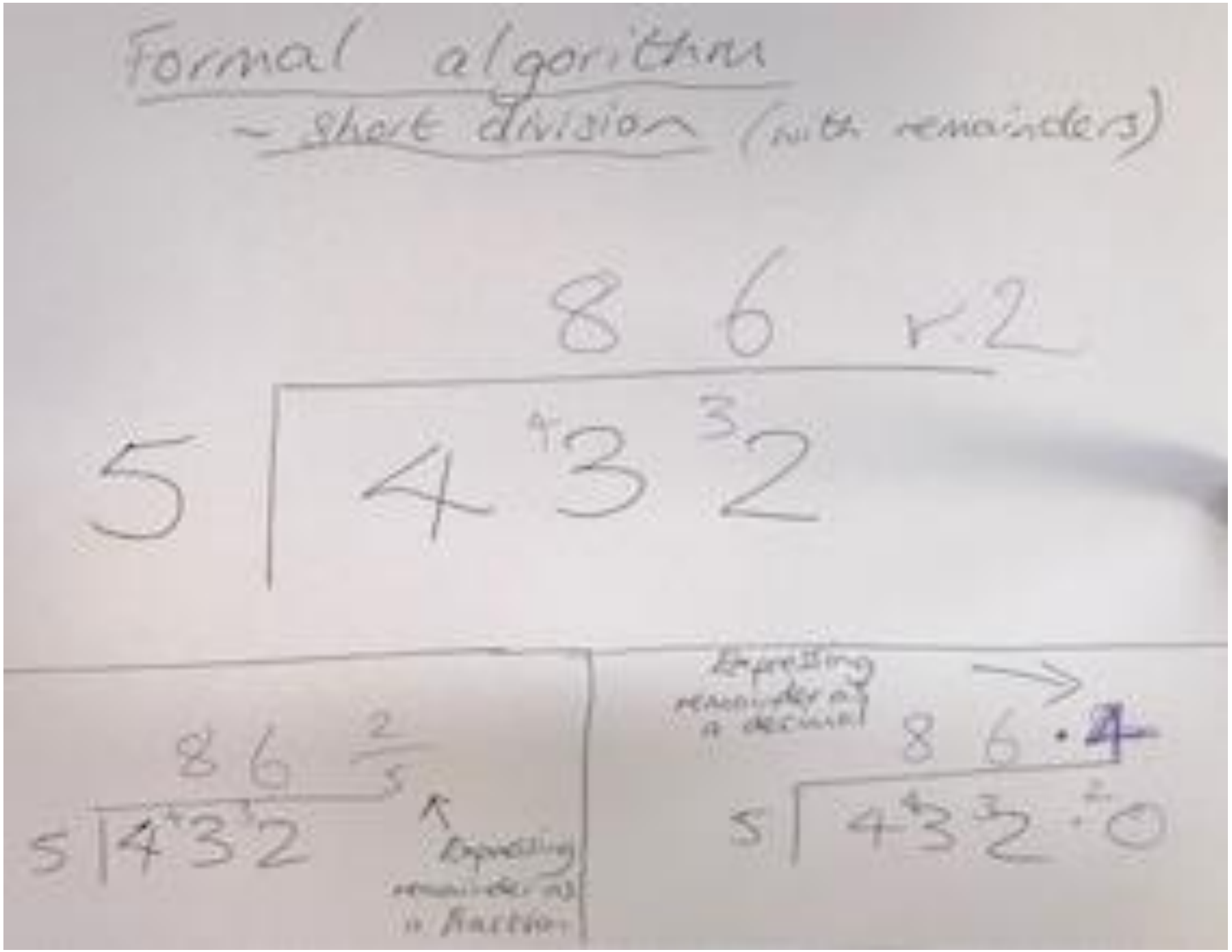


Formal algorithm
~ short division (with remainders)



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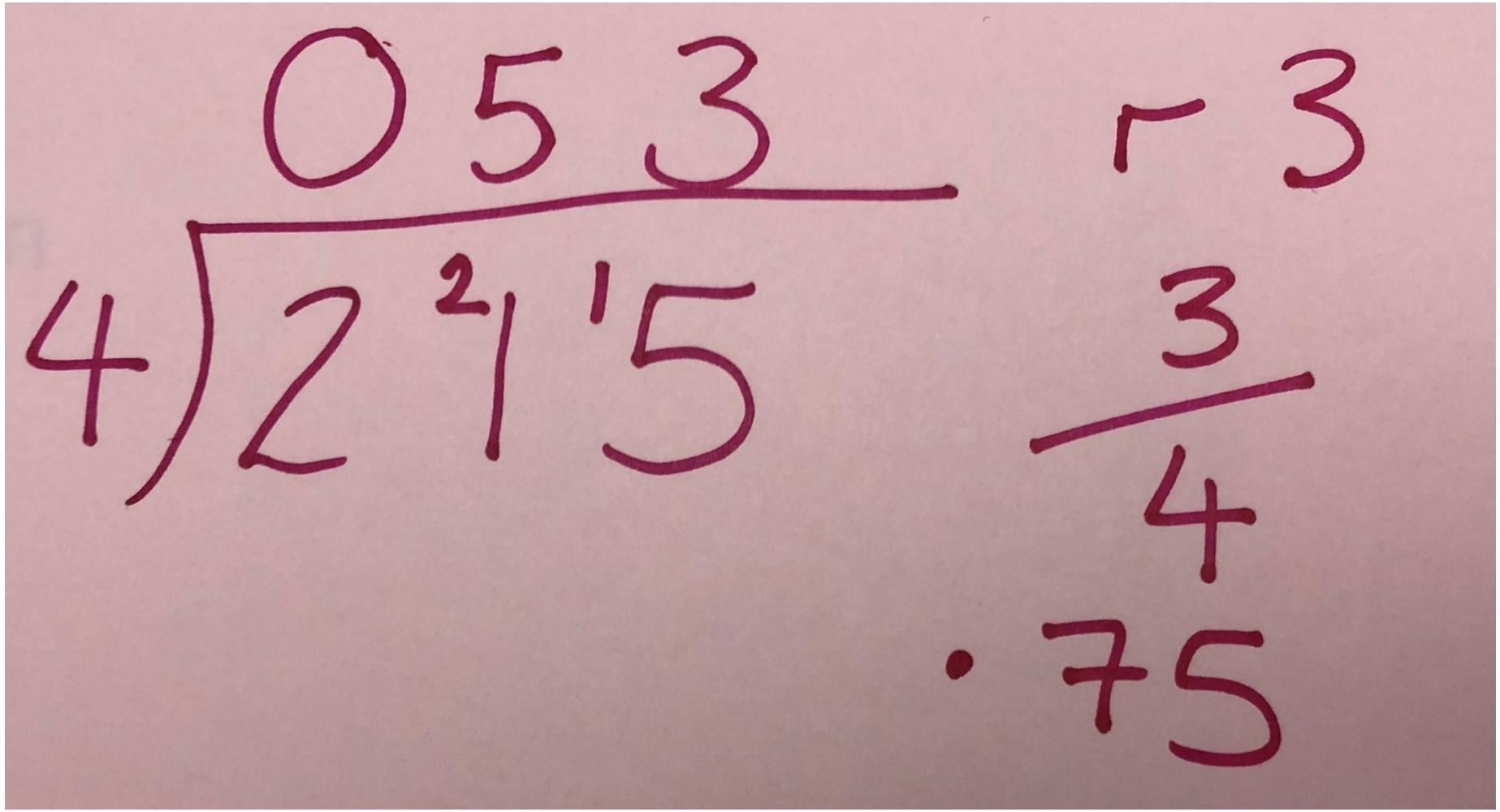

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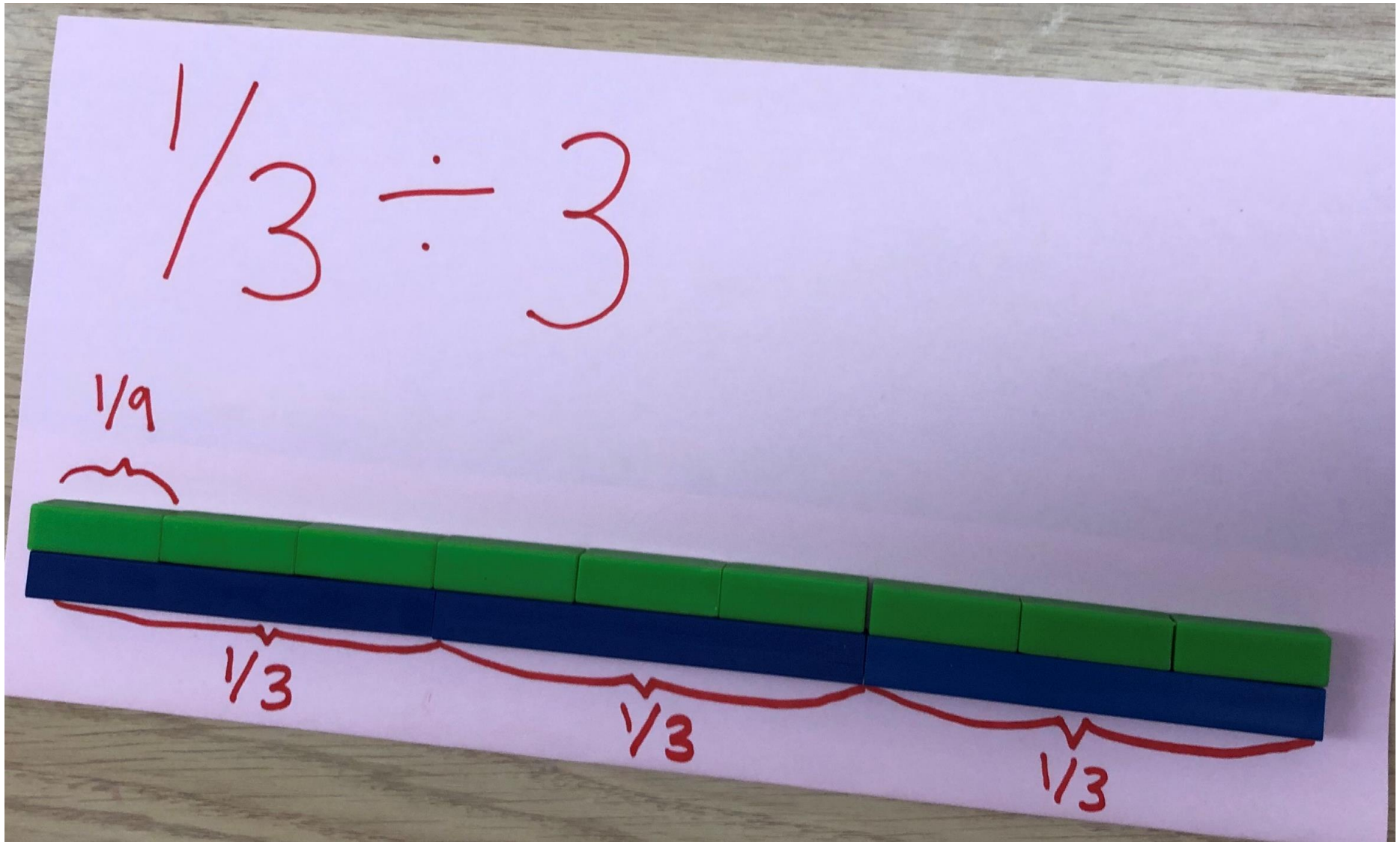

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The End

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