Maths strategies

Wednesday 9th October 2019

Purpose

- Review methods of calculation for :

➢ Addition

➢ Subtraction

➢ Multiplication

➢ Division

Buzzword Bingo

- Array
- Grid method
- Bar method
- Formal method
- Cuisinaire
- Numicon
- Prosecco
- Hundreds
- Tens
- Ones
- Borrow
- Bus stop
- Pay back
- Units
- partitioning
- Decomposition
- chunking
- Multiples
- Factors
- Dienes
- Exchange
- Prime numbers

Choose 9 mathematical words

prime	cuisinaire	chunking
partitioning	grid method	
bar method		

- Any 3 in a line = BINGO Full House = BINGO BINGO

Buzzword Bingo

- Array
- Grid m
- Bar met
- Formal m
- Cuisinaire
- Numicon
- Prosecco

- Decomposition
- chunking
- Multiples
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tioning

Buzzword Bingo

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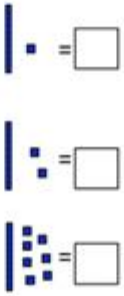
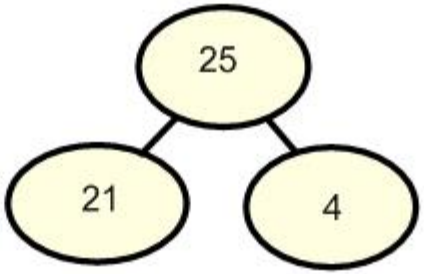
- Prime numbers

concrete - pictorial - abstract

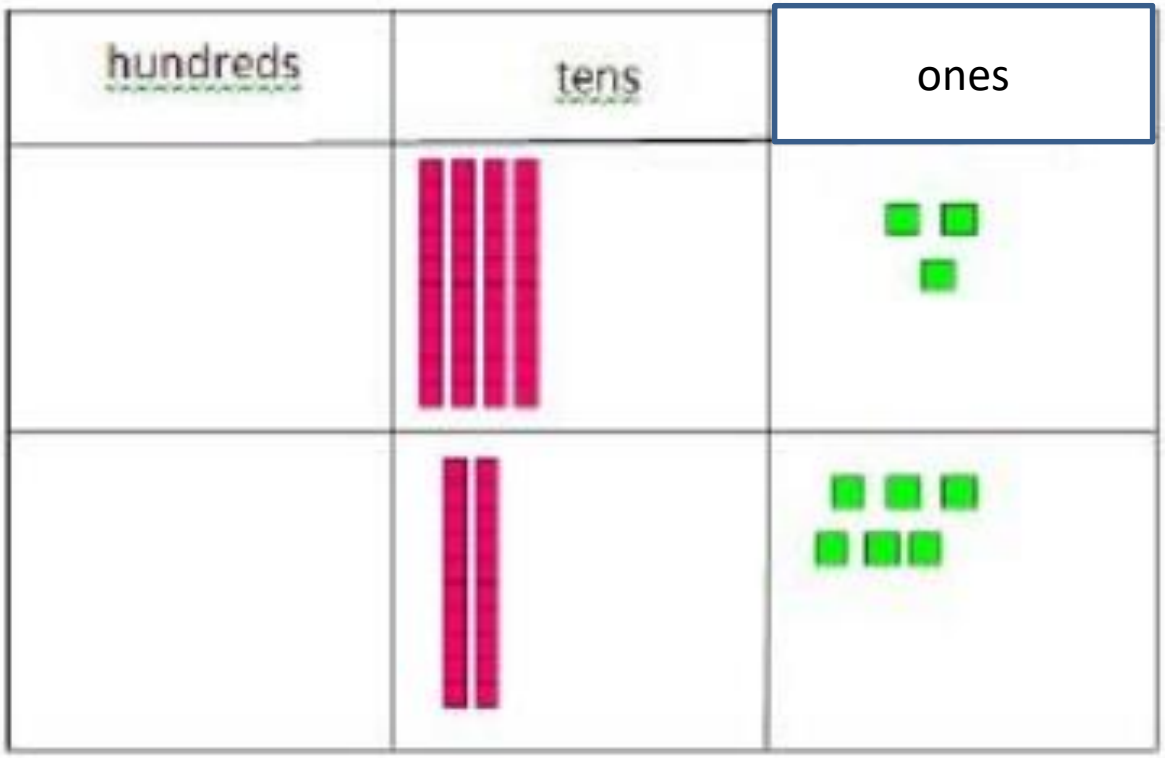


11

24 + 34



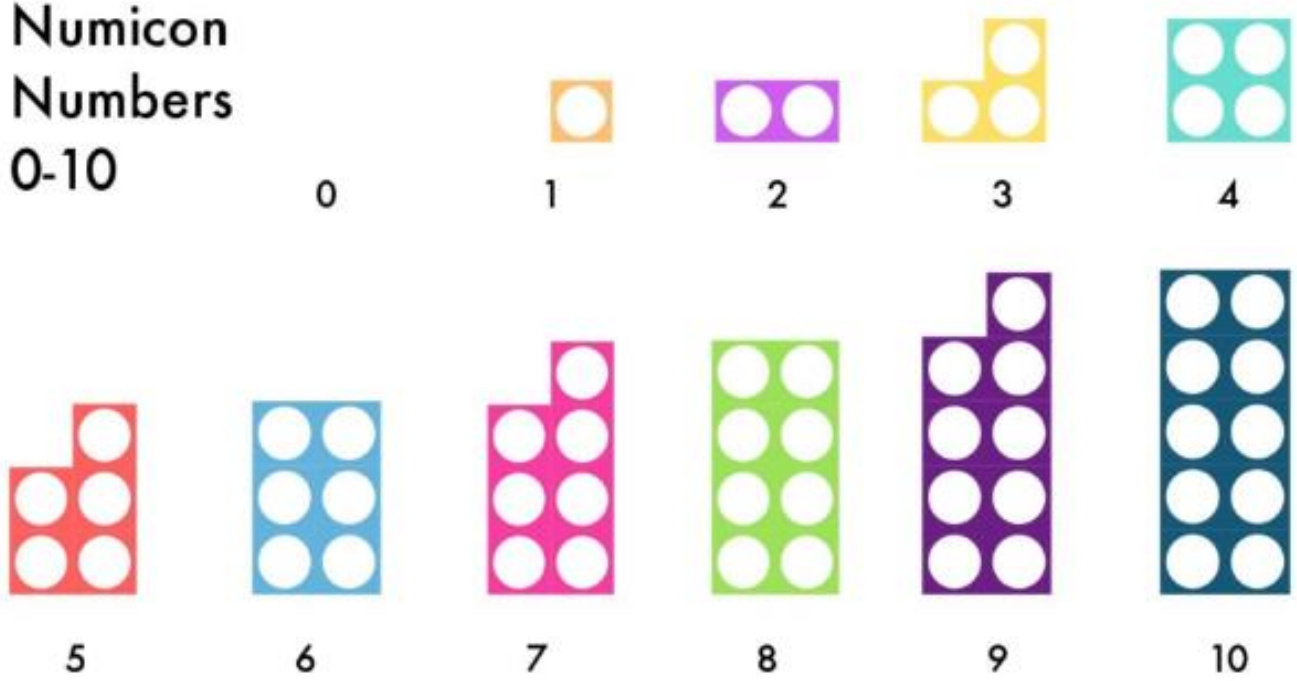
Addition



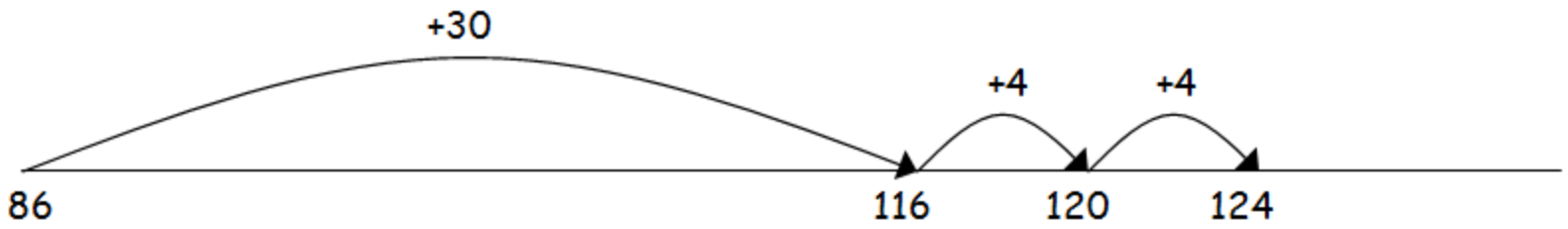
DIENES

$$\begin{array}{r} 43 \\ +\ 26 \\ \hline \\ \hline \end{array}$$

Numicon
Numbers
0-10

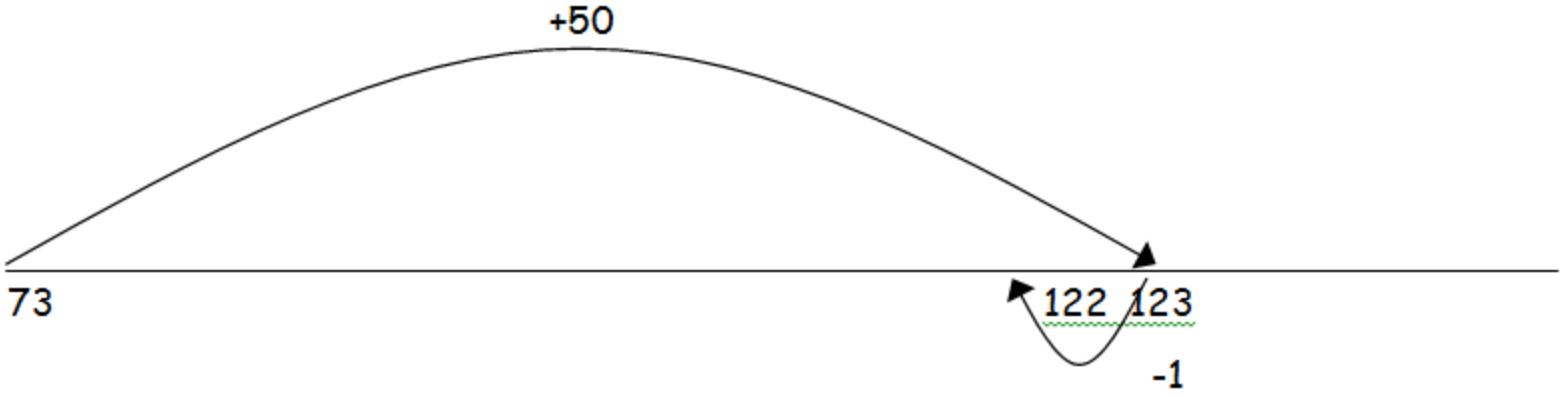


38 + 86 = 124

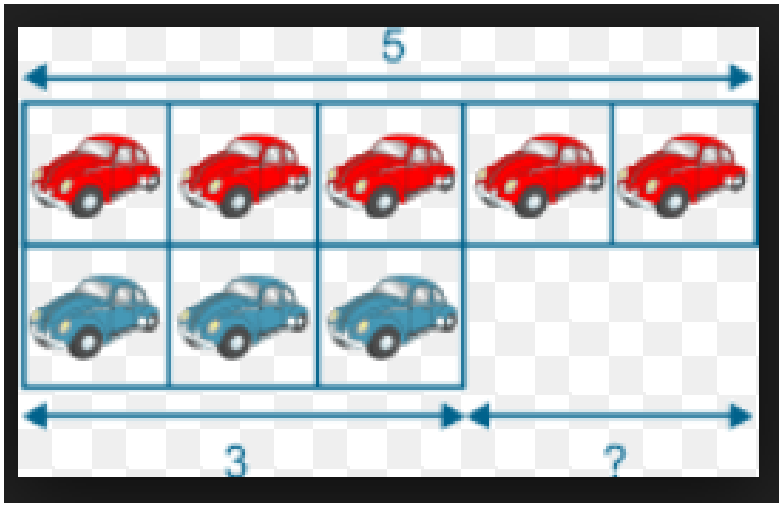


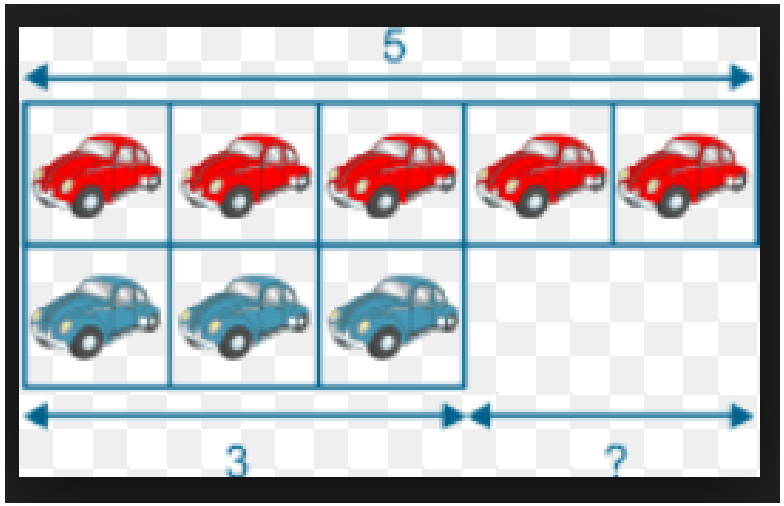
✓ Compensation

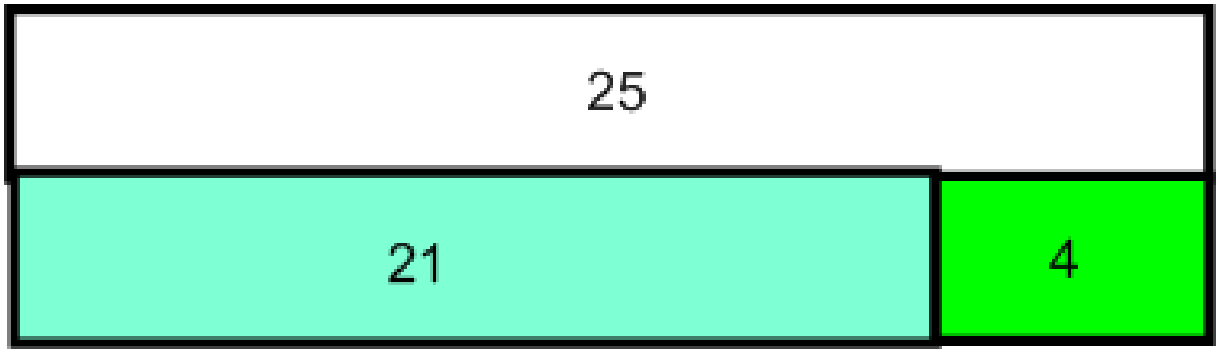
49 + 73 = 122



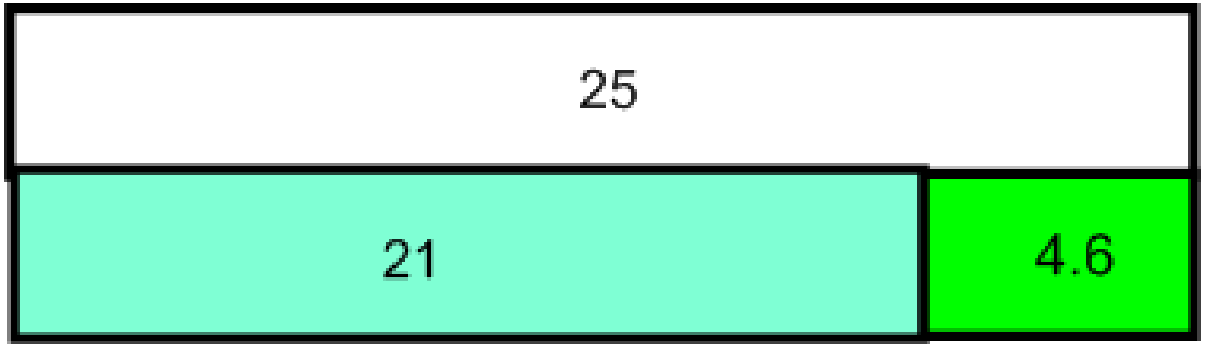
Singapore bar method



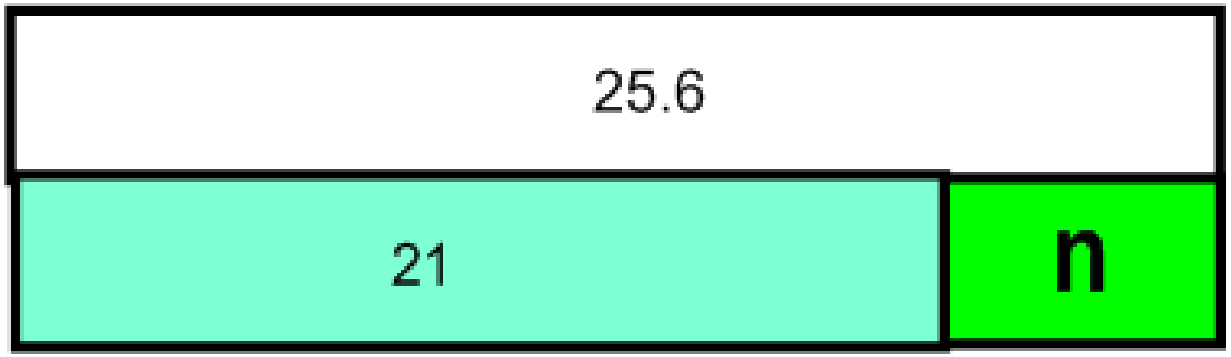

5
3
?



25= 21+4
25=4+21
25-4=21
25-21=4

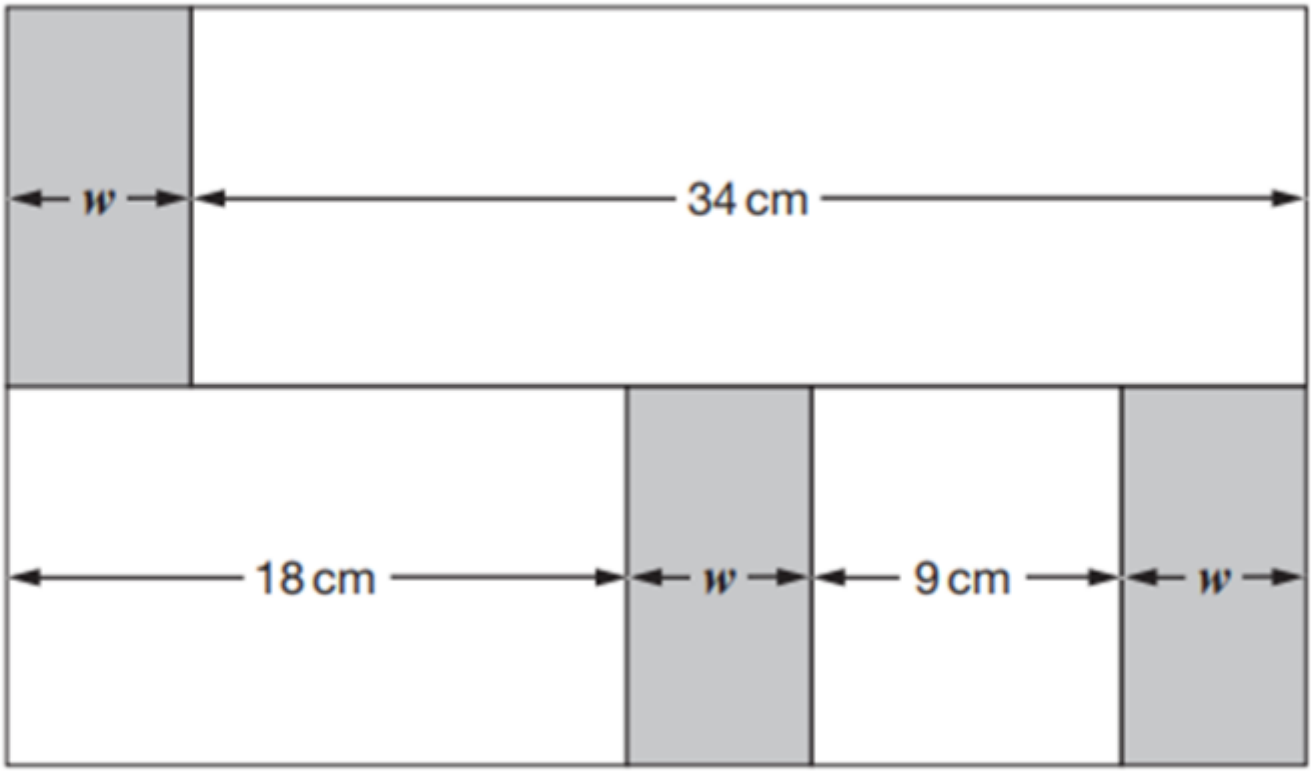


25.6 = 21 + 4.6
25.6 = 4.6 + 21
25.6 - 4.6 = 21
25.6 - 21.6 = 4.6



25.6 = 21 + **n**
25.6 = **n** + 21
25.6 - **n** = 21
25.6 - 21.6 = **n**

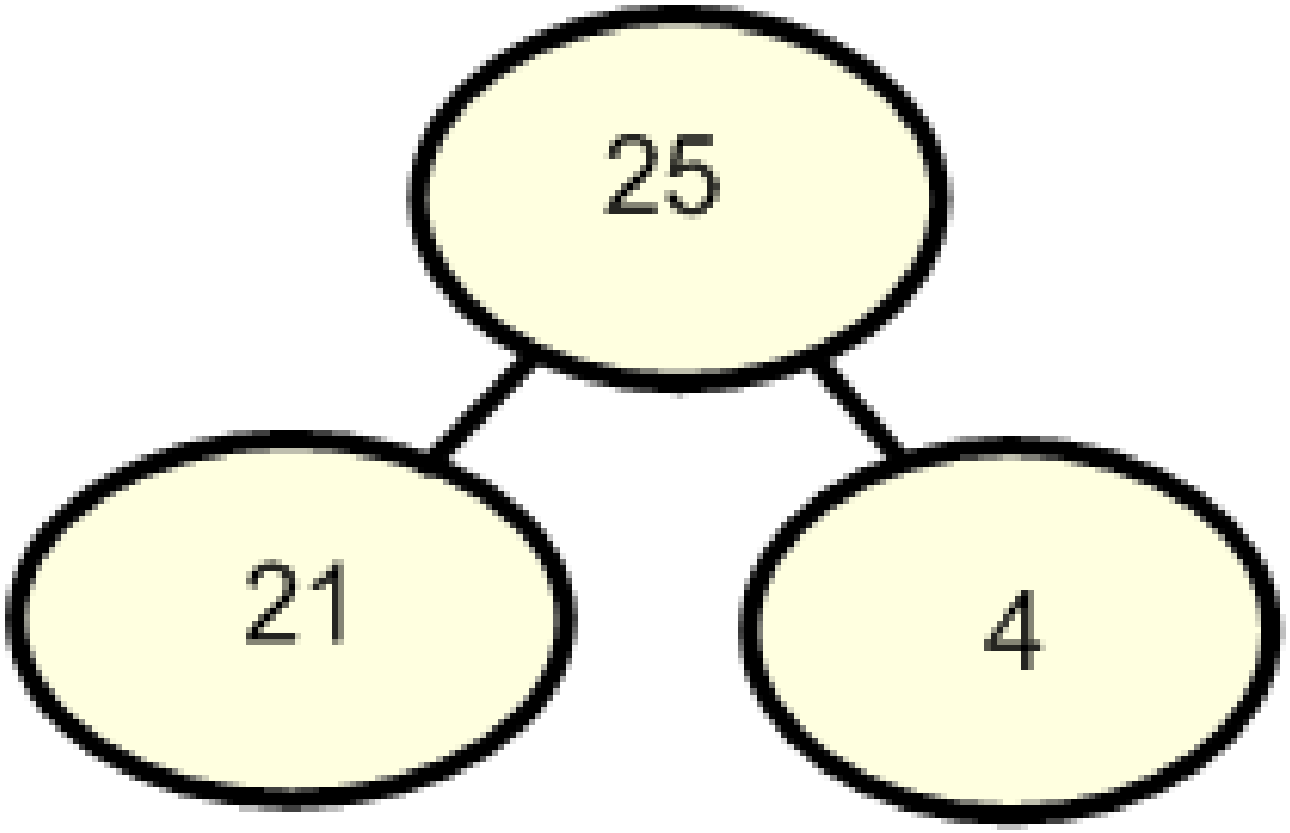
22 In this diagram, the shaded rectangles are all of equal width (w).



Not to scale

Calculate the width (w) of one shaded rectangle.

Part – part - whole



partitioning

56 + 62

50 + 60 = 110
6 + 2 = 8
56 + 62 = 118

$$\begin{array}{r} 56 \\ +62 \\ \hline 118 \\ \hline 1 \end{array}$$

$$\begin{array}{r} 42 \\ 6432 \\ 786 \\ 3 \\ +\ 4681 \\ \hline 11944 \\ \hline 1\,2\,1 \end{array}$$

YOUR GO!
TALK FOR LEARNING

23.4 + 45.34 + 73.1 + 99.87

	23.4		23.40		23.04
	45.34		45.34		45.34
+	73.1	+	73.10	+	73.01
	99.87		99.87		99.87

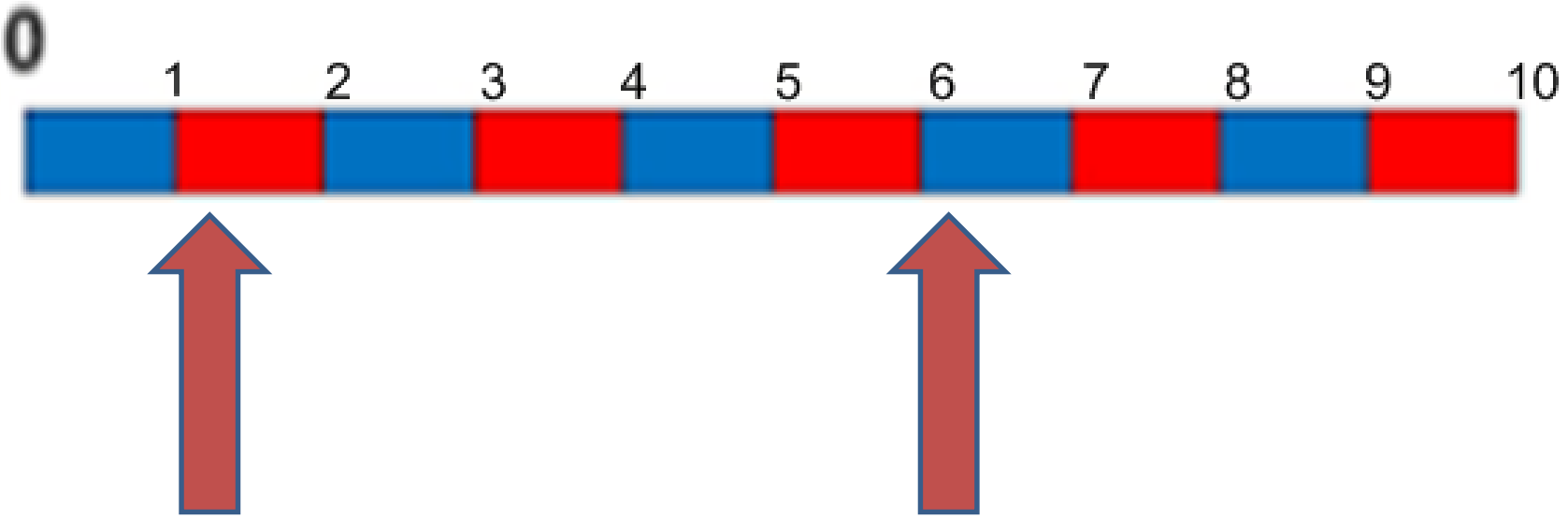
- What's the same and what's different?

23.4 + 45.34 + 73.1 + 99.87

	23.4		23.40		23.04
	45.34		45.34		45.34
+	73.1	+	73.10	+	73.01
	99.87		99.87		99.87

- What's the same and what's different?

Pick a number between 1 and 2



Subtraction

- Learning buddies

- 82-47

- 102-89

YOUR GO!
EXPLAIN TO YOUR LEARNING BUDDY YOUR METHOD

- Number sense
- Use Jim's method

left side of the room A
right side of the room B

What is the same ?

- **Set a**
- **120-90**
- **235-180**
- **502-367**
- **122-92**
- **119-89**
- **237-182**

Variety

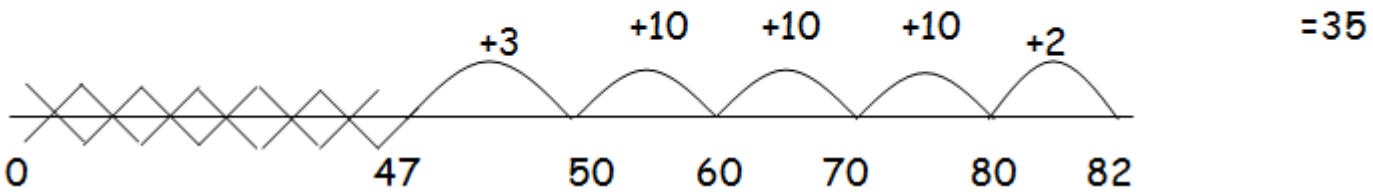
What is different ?

- **Set b**
- **120-90**
- **122-92**
- **119-89**
- **235-180**
- **237-182**
- **502-367**

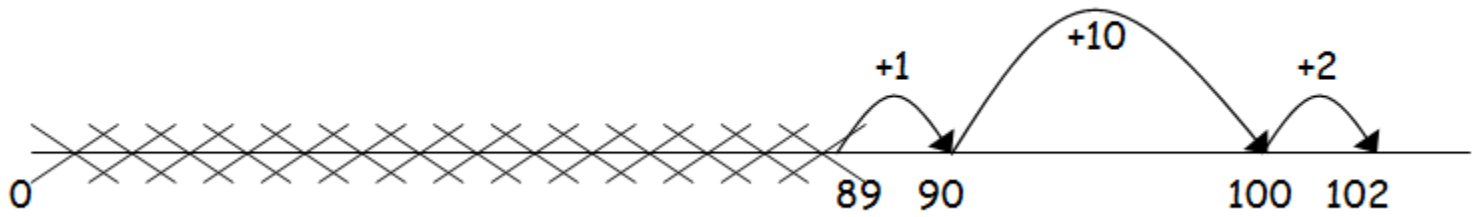
Variation

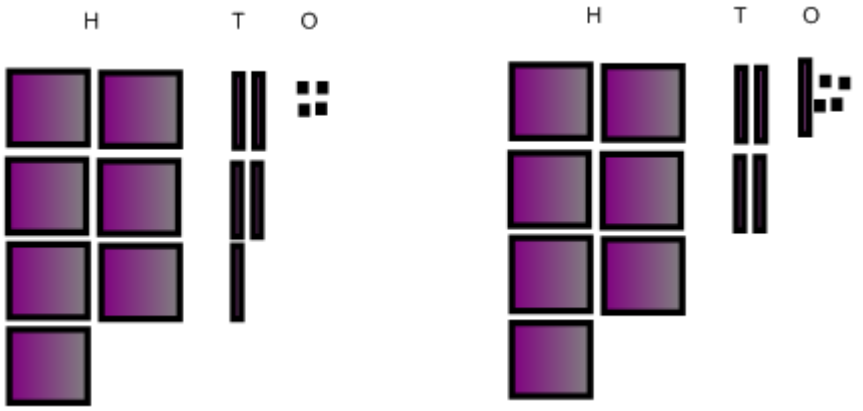
Subtraction

82 - 47



102 - 89 = 13





dienes

754 =
- 86

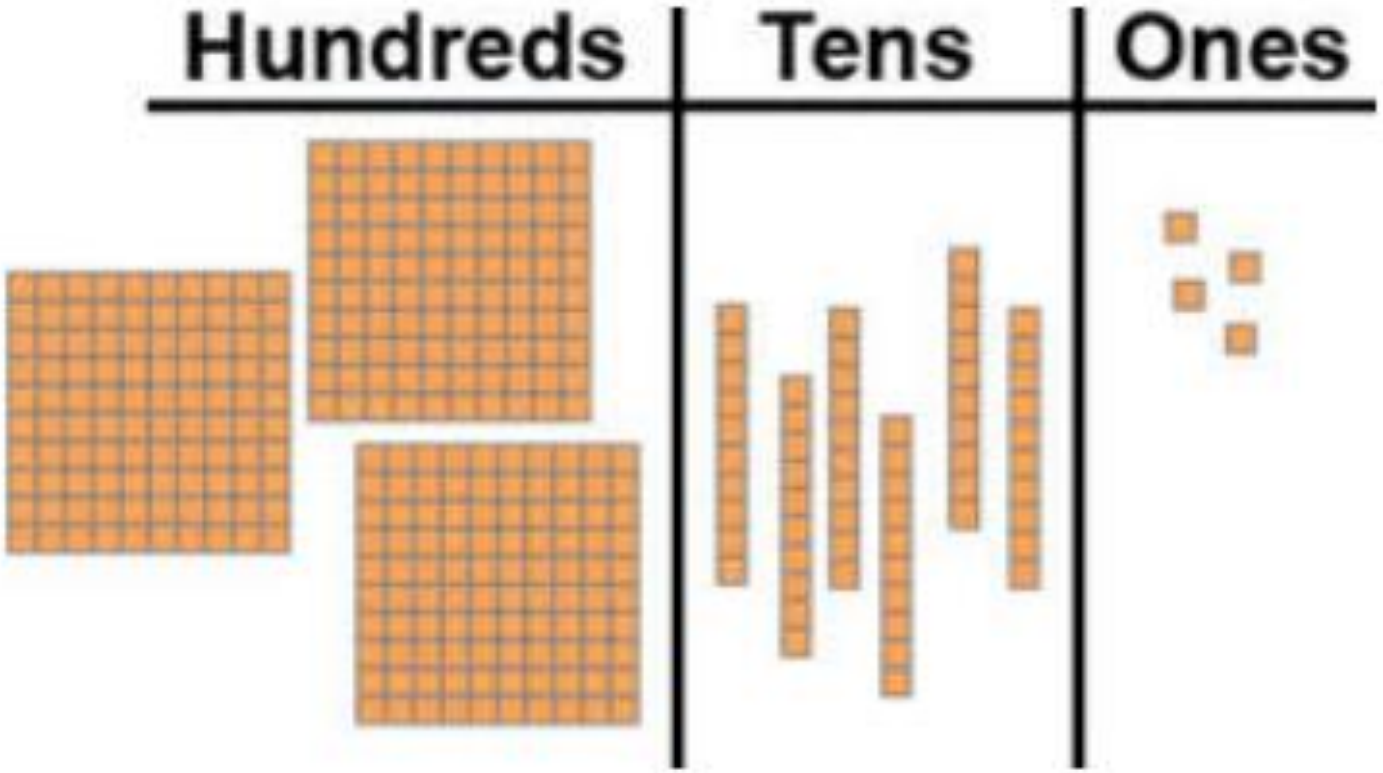
Step 1 700 + 50 + 4
- 80 + 6

Step 2 700 + 40 + 14 *(adjust from T to O)*
- 80 + 6

Step 3 600 + 140 + 14 *(adjust from H to T)*
- 80 + 6

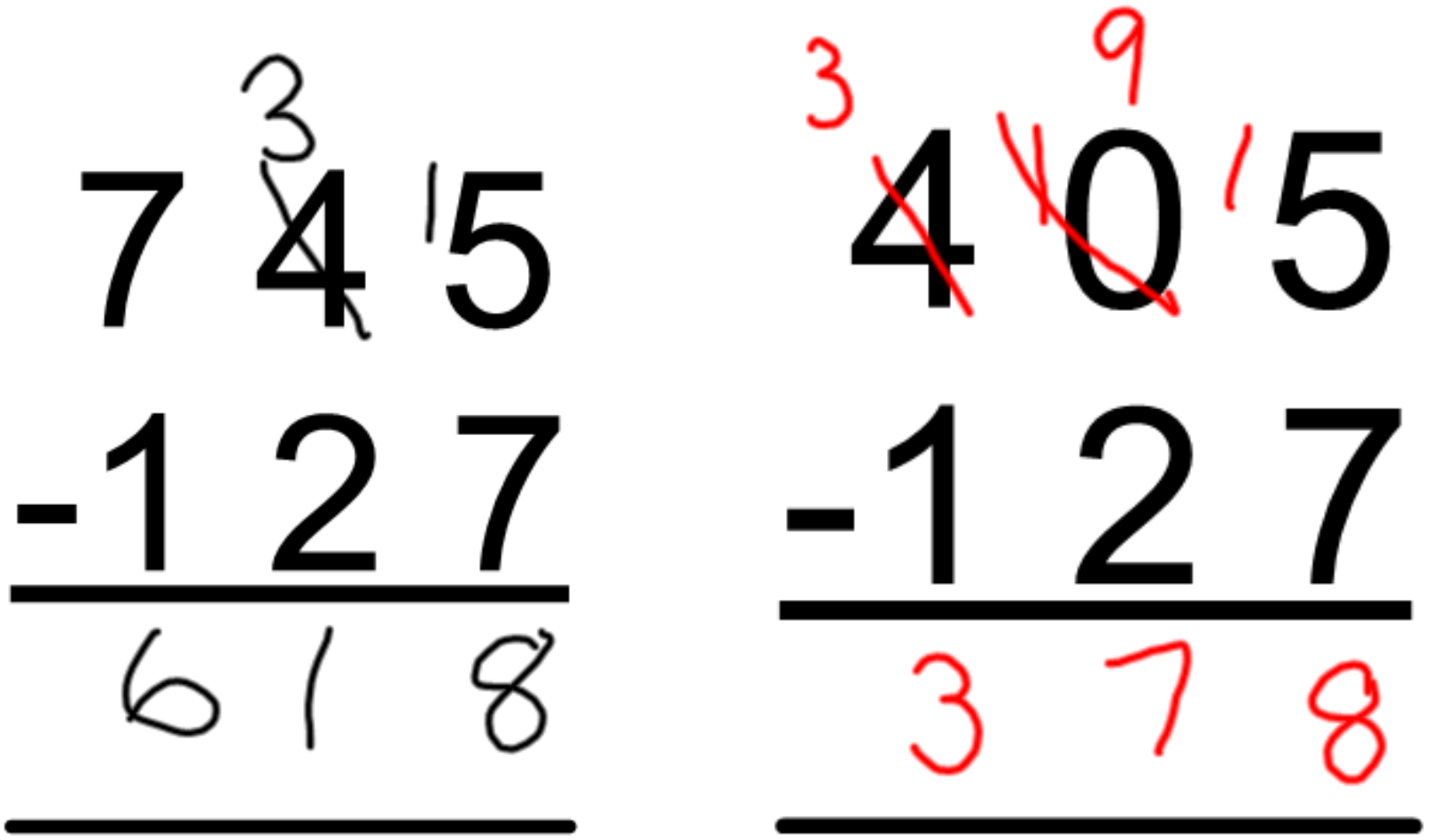
600 + 60 + 8 = 668

Subtraction



dienes

Exchange from the next column



JIM

$$\begin{array}{r} 725 \\ -147 \\ \hline 622 \\ \hline \end{array}$$

reasoning

Jim has made a mistake because you cannot do 5-7 in the ones column. He needs to exchange in the tens column. Also the tens column you cannot subtract 4 from 2. It should be 2 minus 4. He should have exchanged and used a hundred from the next column to make 12 tens minus 4 tens.

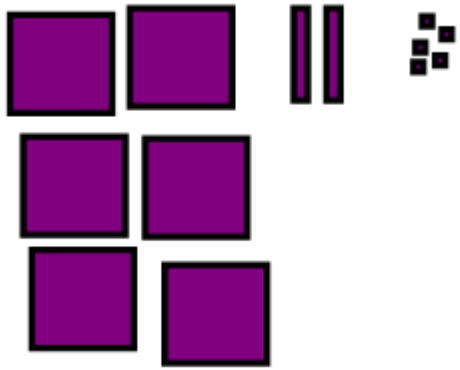
H	T	O
6	2	5
- 1	1	7
5	1	2

How would you explain this to your child?

YOUR GO!
EXPLAIN TO YOUR LEARNING BUDDY YOUR METHOD AND WHAT IS WRONG HERE

useful vocabulary

ones
tens
hundreds
exchange



− 100 = 1,059

37.8 − 14.671 =

707 + 1,818 =

Q3. Write in the missing numbers.

(a) $3.42 + 12.7 = \square$

(b) $32.62 \div 10 = \square$

Q4. Here are five number cards.

4	4	5	8	2

Use all five cards to make an addition that has the **answer 500**

$$\begin{array}{r} \square\,\square\,\square \\ +\ \square\,\square \\ \hline 5\,0\,0 \end{array}$$

Q1. Circle the **two** numbers which add up to **1**.

0.1 **0.65** **0.99** **0.45** **0.35**

Q2. Write in what the missing numbers could be.

$$170 + \square = 220 - \square$$

Q1. Circle the **two** numbers which add up to **1**.

0.1 **0.65** **0.99** **0.45** **0.35**

Q2. Write in what the missing numbers could be.

$$170 + \boxed{40} = 220 - \boxed{10}$$

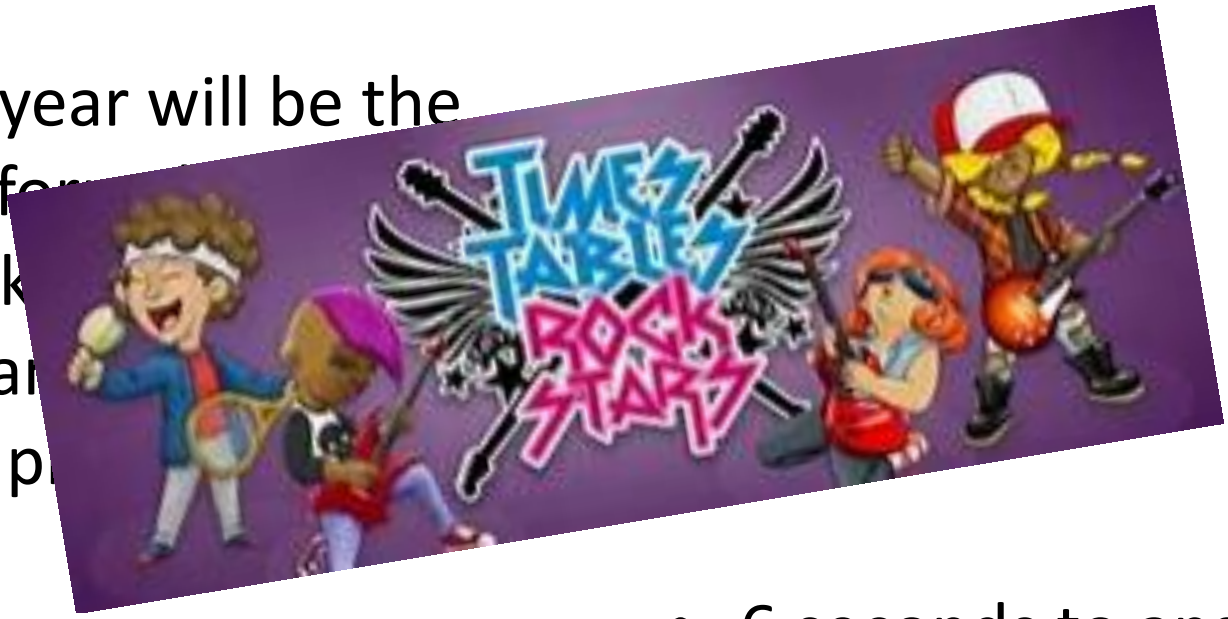
Multiplication

X6=

Even more ‘great and unmatched wisdom’

Year 4 times tables test

- This year will be the first for... check... Englan... best p...



- 6 seconds to answer and type it in

Sharing methods

Your go!

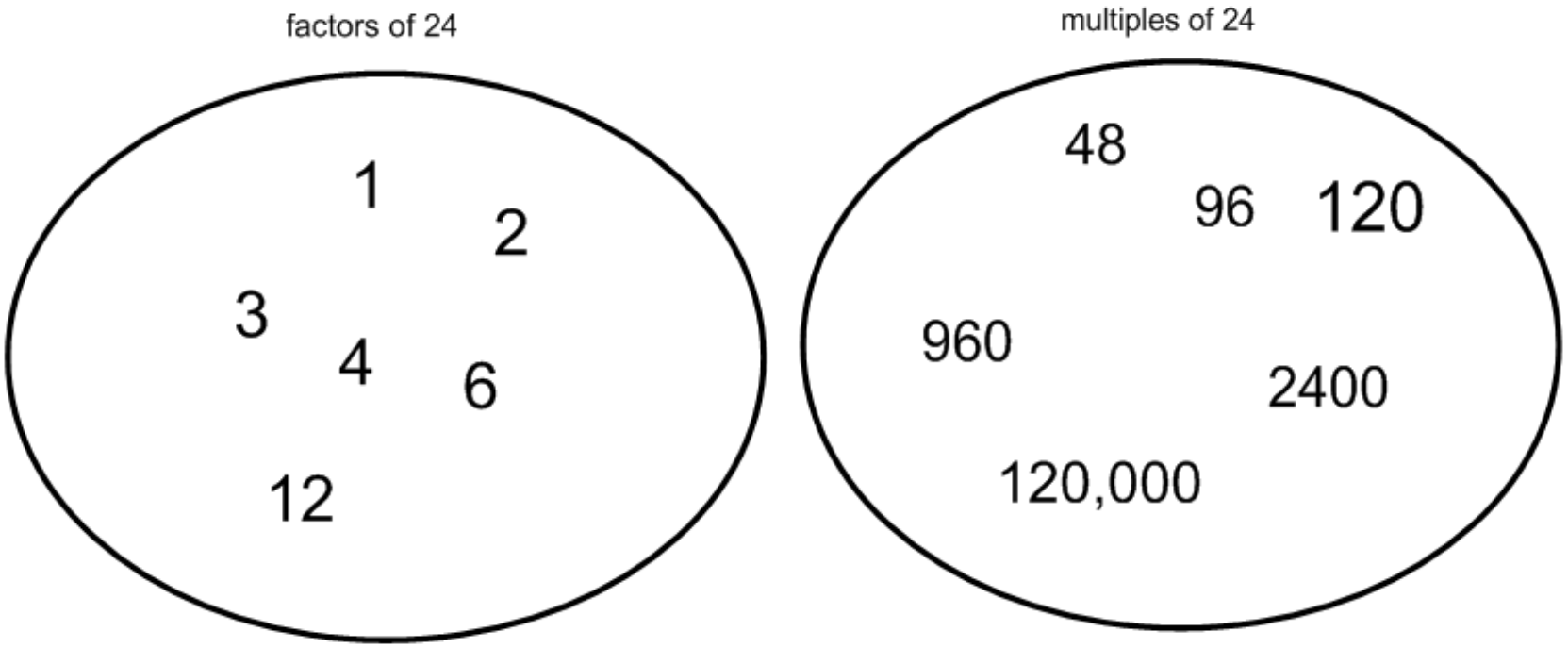
- 22 x 8

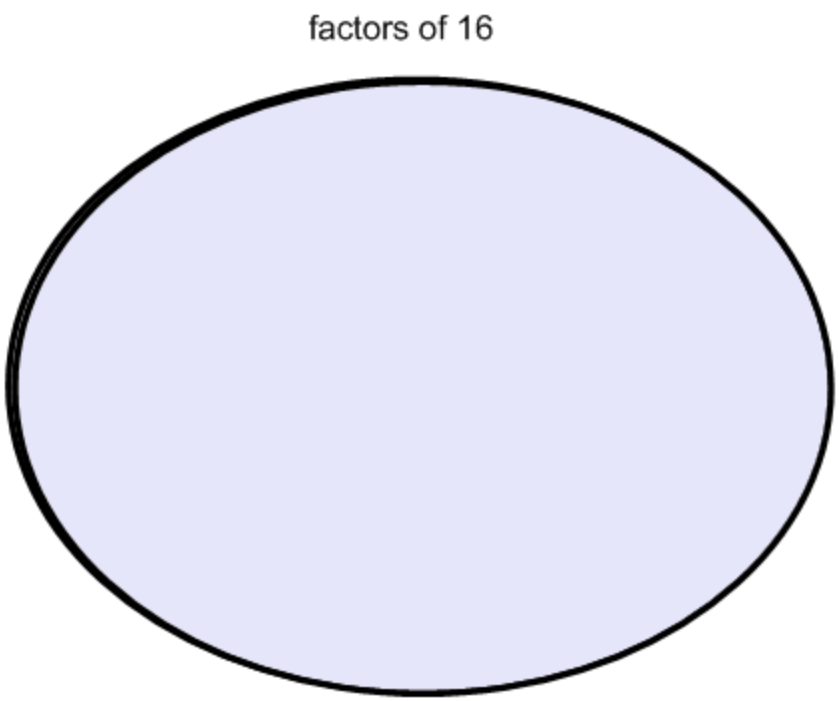
- (20 x 8) + (2 x 8)
- 22 x 2 x 2 x 2
- 44 x 4
- (8 x 20) + (8 x 2)

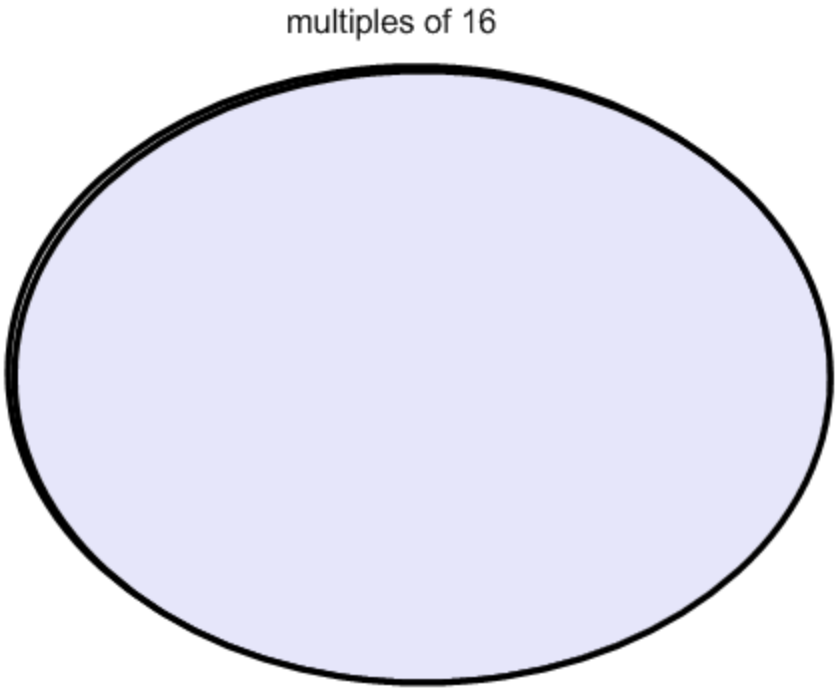
- 44 x 19

- (44 x 20) – (44 x 1)
- (10 x 44) + (9 x 44)

Multiplication

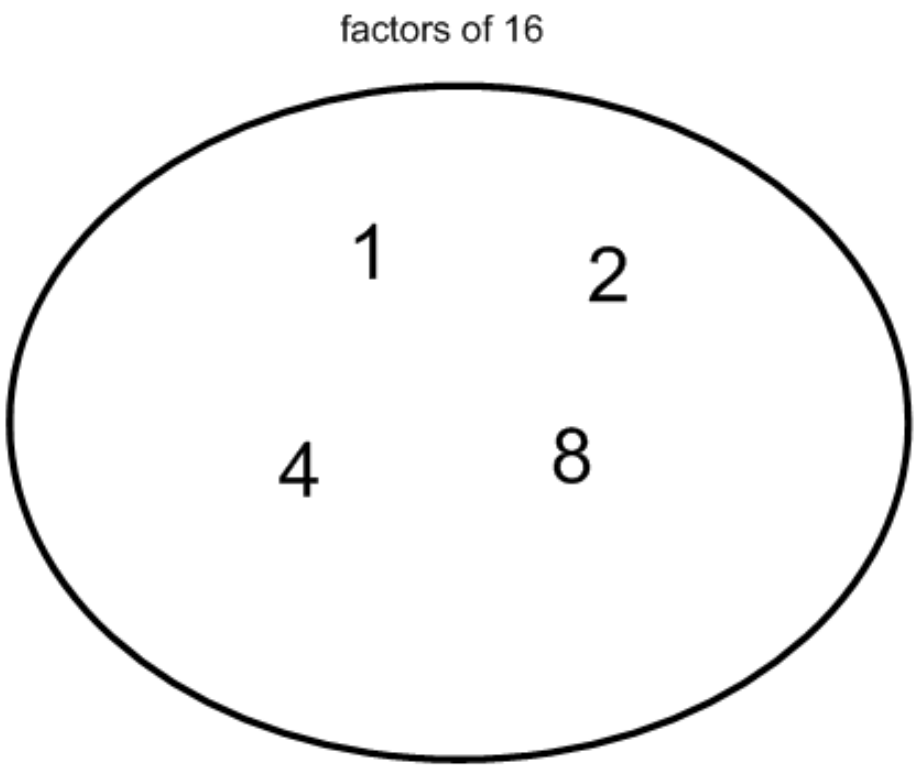


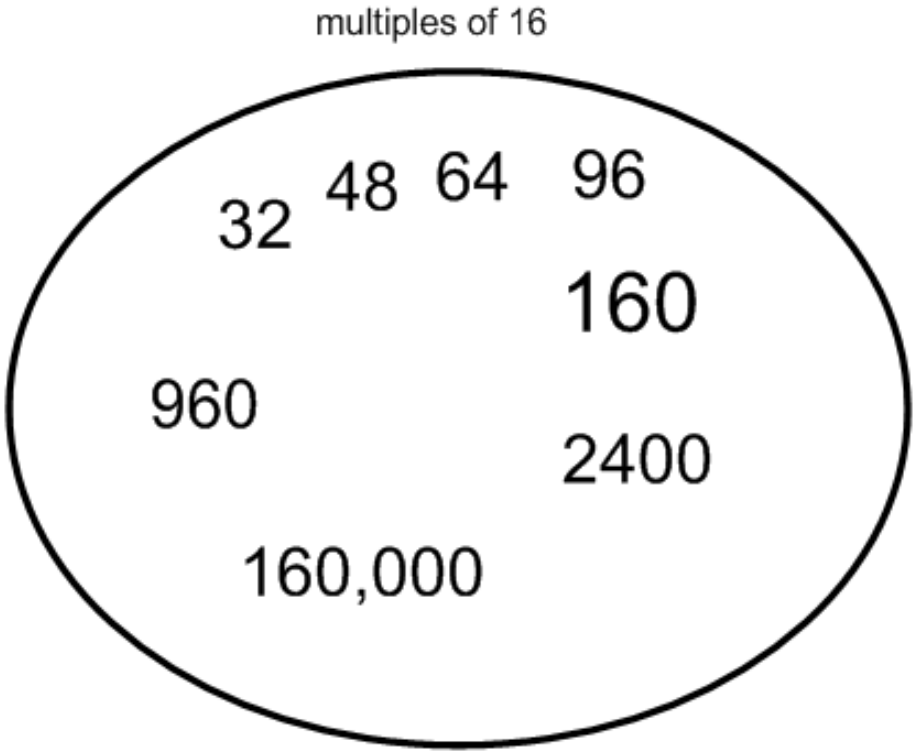




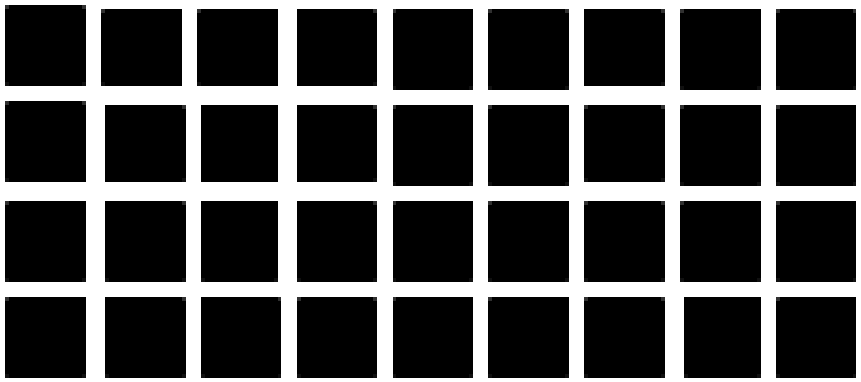
YOUR GO!
WITH YOUR LEARNING BUDDY FILL IN THE GAPS

Multiplication





Multiplication



9 x 4 = 36

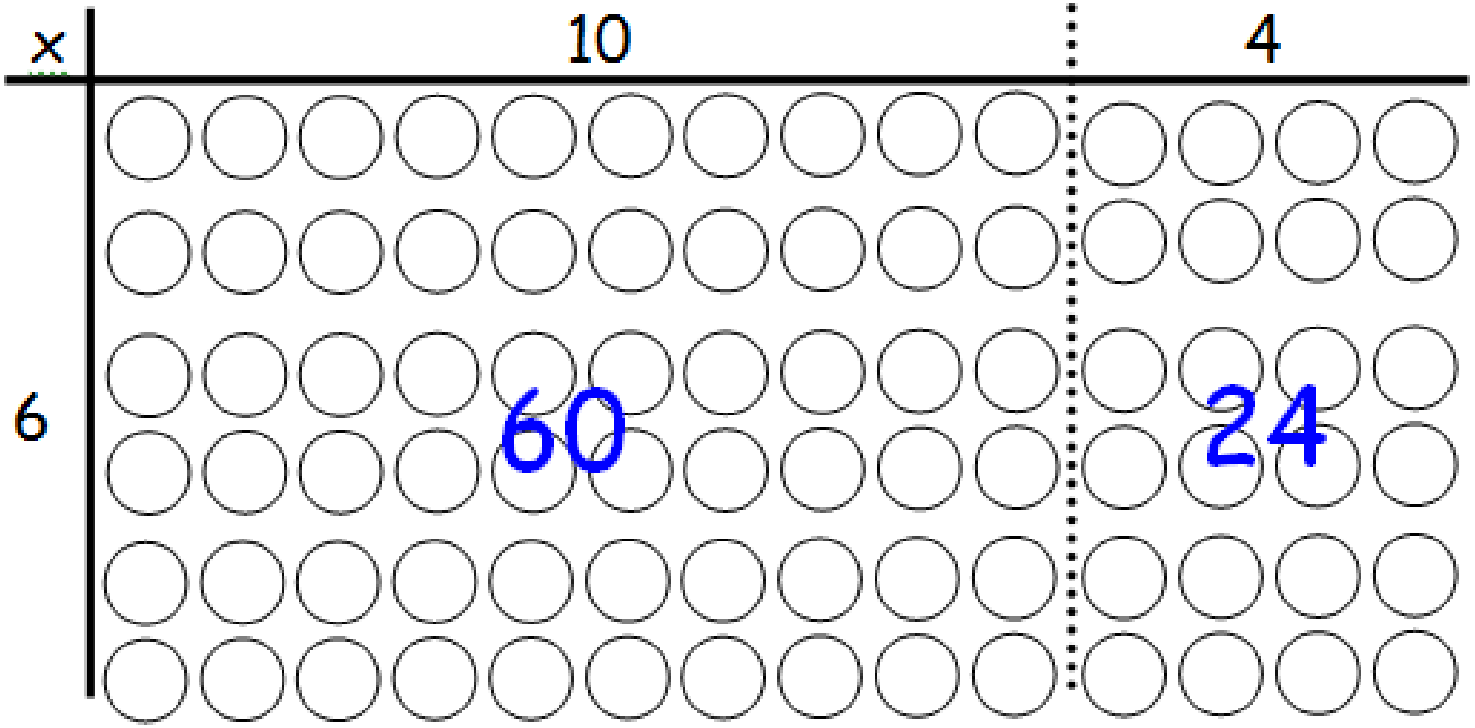
4 x 9 = 36

ARRAYS

□ x 5 = 20

3 x △ = 18

□ x ○ = 32


x
10
4
6
60
24

Y3

x	20	3
8	160	24

GRID METHOD

160
+ 24
184

23
x 8
184
1 2

23
x 8
24 (8x3)
160 (8x20)
184

Y5 1346 X 9

GRID METHOD

x	1000	300	40	6
9	9000	2700	360	54

9000
2700
+ 360
+ 54
12114
1 1

1 3 4 6
X 9
1 2 1 1 4
3 4 5

1 3 4 6
X 9
54 (9x6)
360 (9x40)
2700 (9x300)
9000 (9x1000)
1 2 1 1 4
3 4 5

GRID METHOD

24 X 16

	20	4
10	200	40
6	120	24

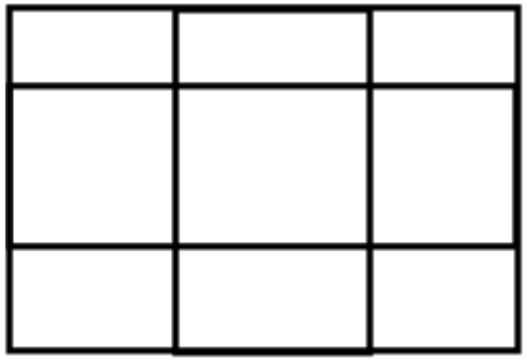
$$\begin{array}{r} 200 \\ 120 \\ 40 \\ 24 \\ \hline 384 \\ \hline \end{array} \quad +$$

$$\begin{array}{rl} 24 & \\ \times\ 16 & \\ \hline 24 & (6\times4) \\ 120 & (6\times20) \\ 40 & (10\times4) \\ 200 & (10\times20) \\ \hline 384 & \\ \hline \end{array}$$

$$\begin{array}{rl} 24 & \\ \times\ 16 & \\ \hline {}^{2}\ \ & \\ 144 & (6\times24) \\ 240 & (10\times24) \\ \hline 384 & \\ \hline \end{array}$$

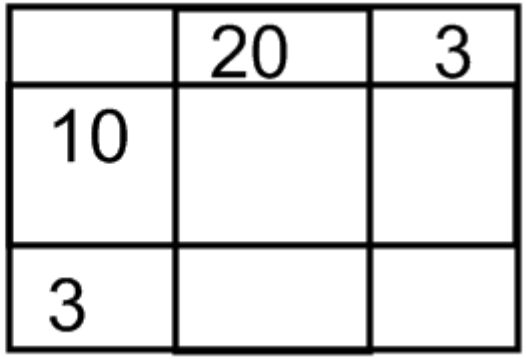
GRID METHOD

23 X 13



HAVE A GO AT THE GRID METHOD

23 X 13



- PARTITION FIRST

23 X 13

	20	3
10	200	30
3	60	9

200
60
30 +
9
299

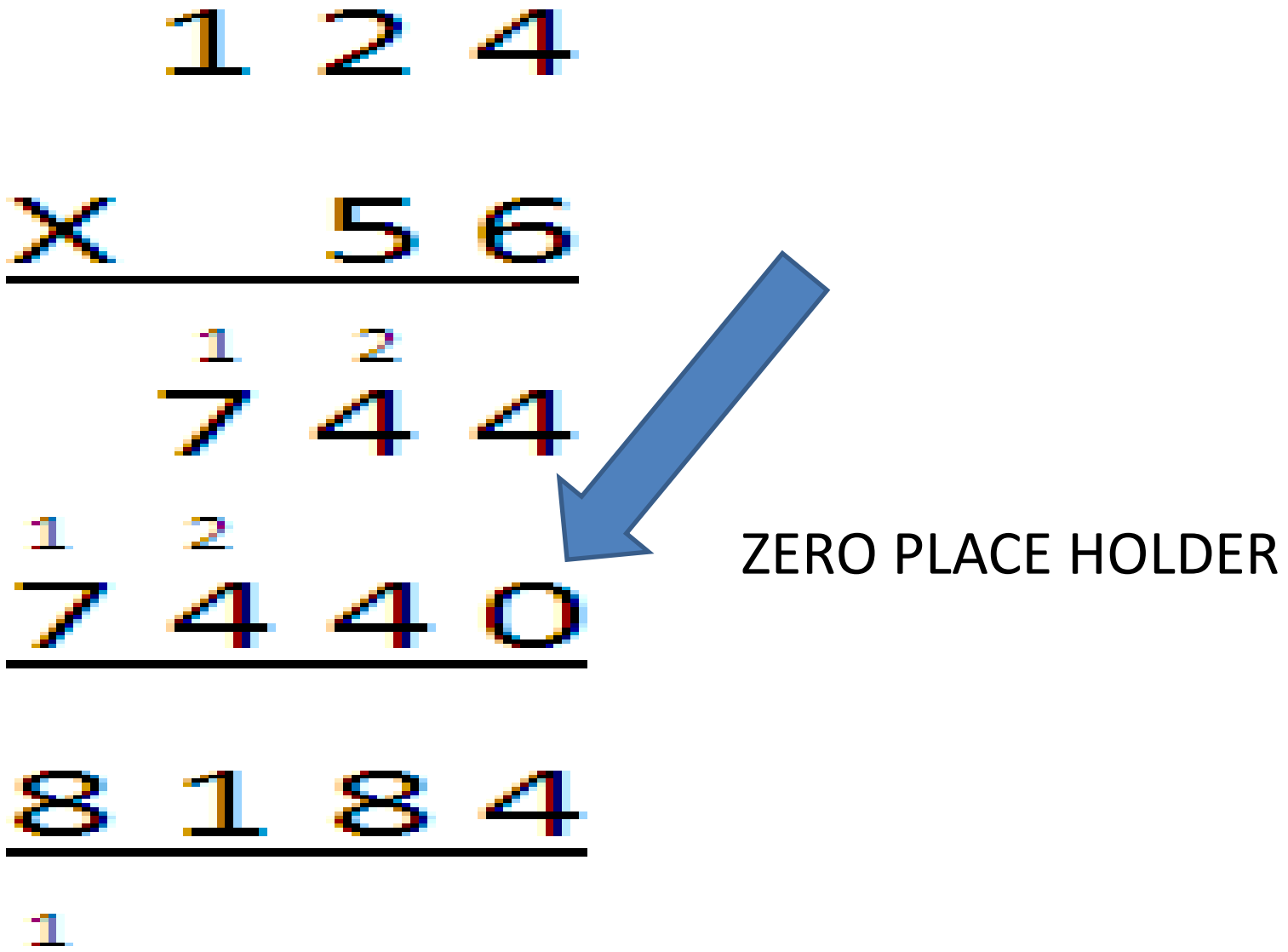
24 x 56

56

X 24

(4 x 56)

(20x 56)

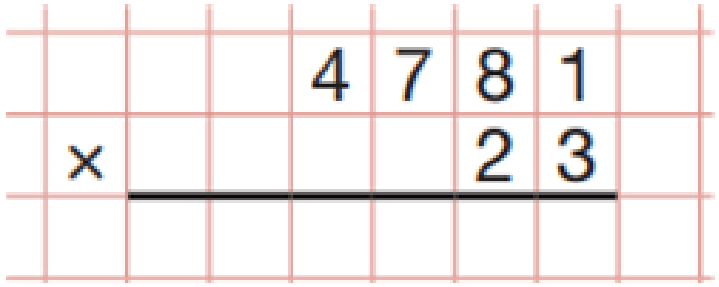

1 2 4
X 5 6
1 2
7 4 4
1 2
7 4 4 0
8 1 8 4
1
ZERO PLACE HOLDER

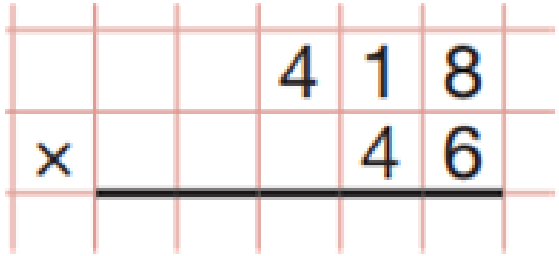
$30 \times 40 =$

$0.04 \div 10 =$

$0.9 \times 200 =$

$2{,}345 \times 1{,}000 =$

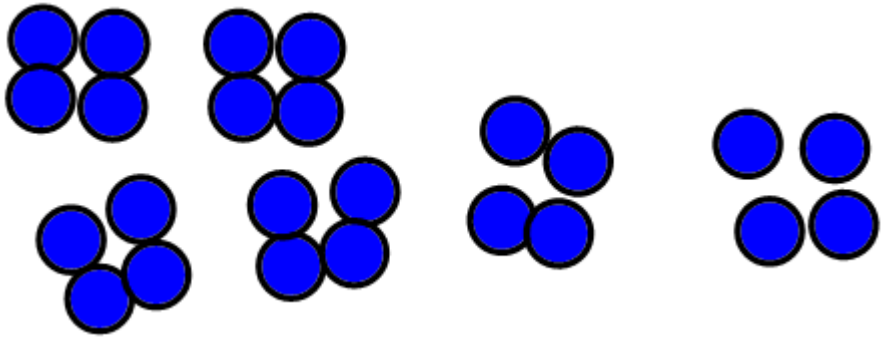




3 Write the missing numbers to make this **multiplication** grid correct.

×	□	□
9	63	54
□	56	48

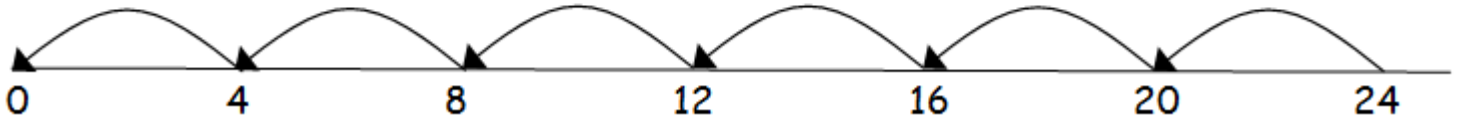
Division

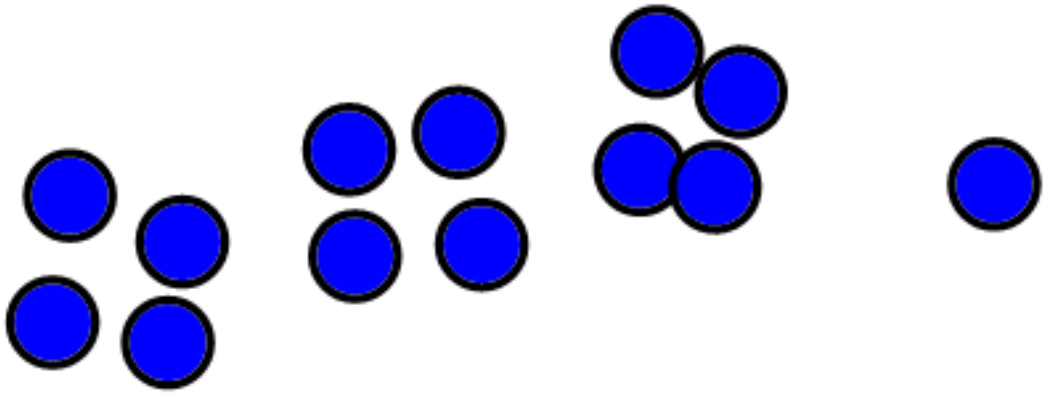


✓ **Repeated subtraction using a number line**

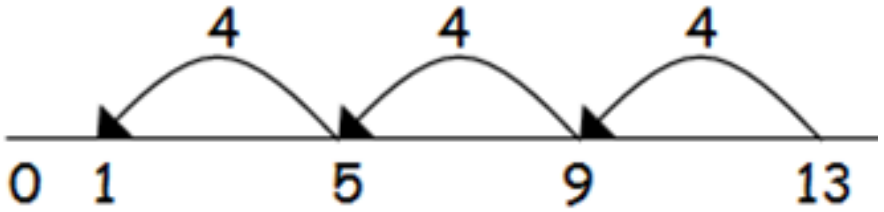
Children will use an empty number line to support their calculation.

24 ÷ 4 = 6



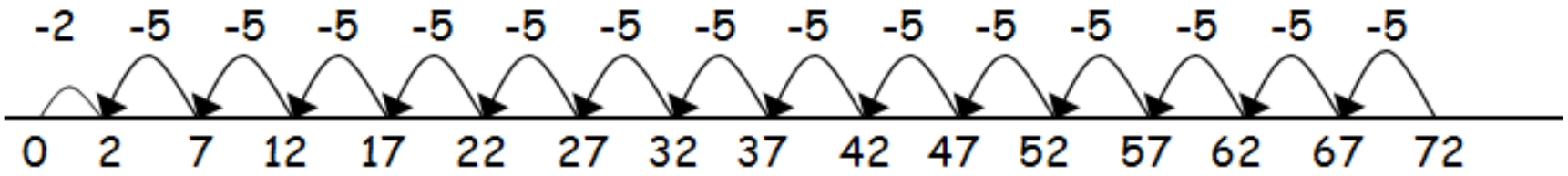


13 ÷ 4 = 3 r 1

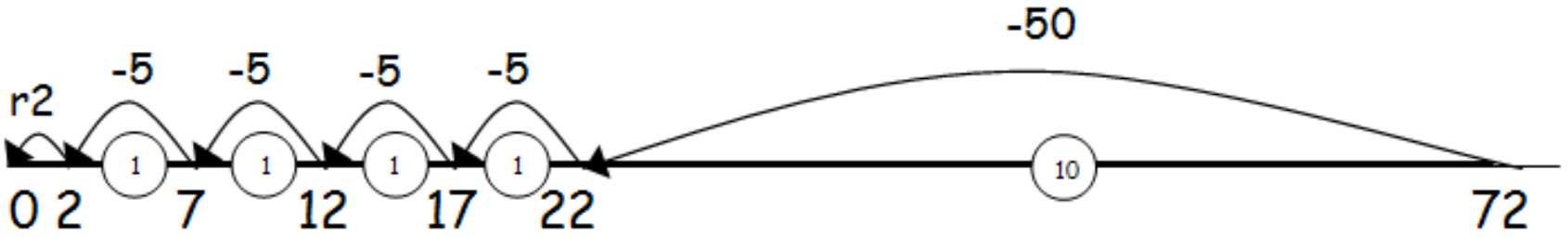


- This is fine for smaller numbers…

72 ÷ 5



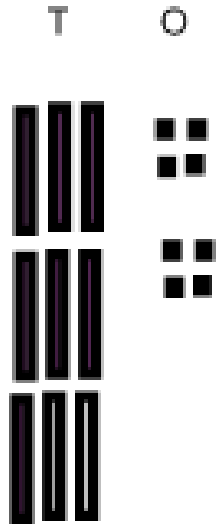
Moving onto chunking on a number line:



FORMAL DIVISION

$$\begin{array}{r} 1\ 4 \\ 7\overline{)9\ ^{2}8} \end{array}$$

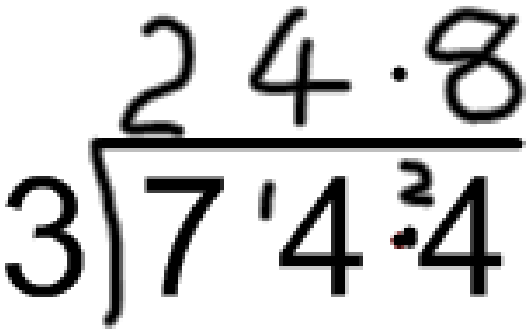
FORMAL DIVISION



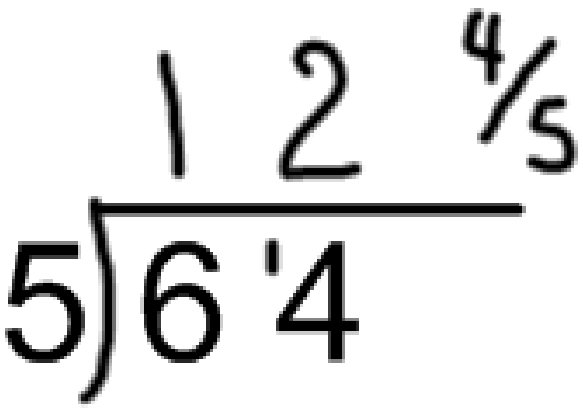
- Using or drawing dienes

REPEATED SUBTRACTION/ CHUNKING

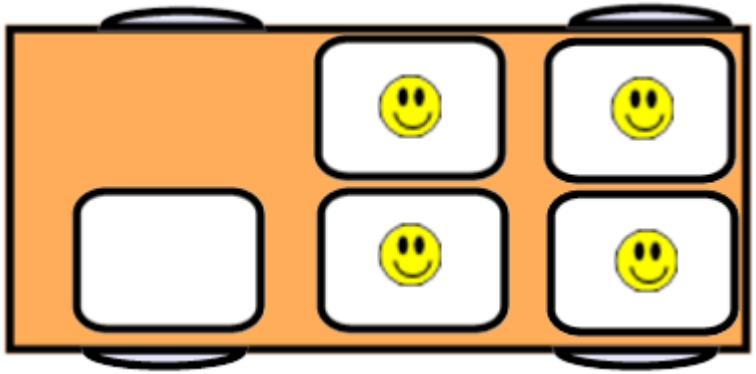
$$
\begin{array}{rl}
3\overline{)72} & \\
-\underline{30} & (10 \times 3) \\
42 & \\
\underline{30} & (10 \times 3) \\
12 & \\
\underline{12} & (4 \times 3) \\
0 &
\end{array}
$$



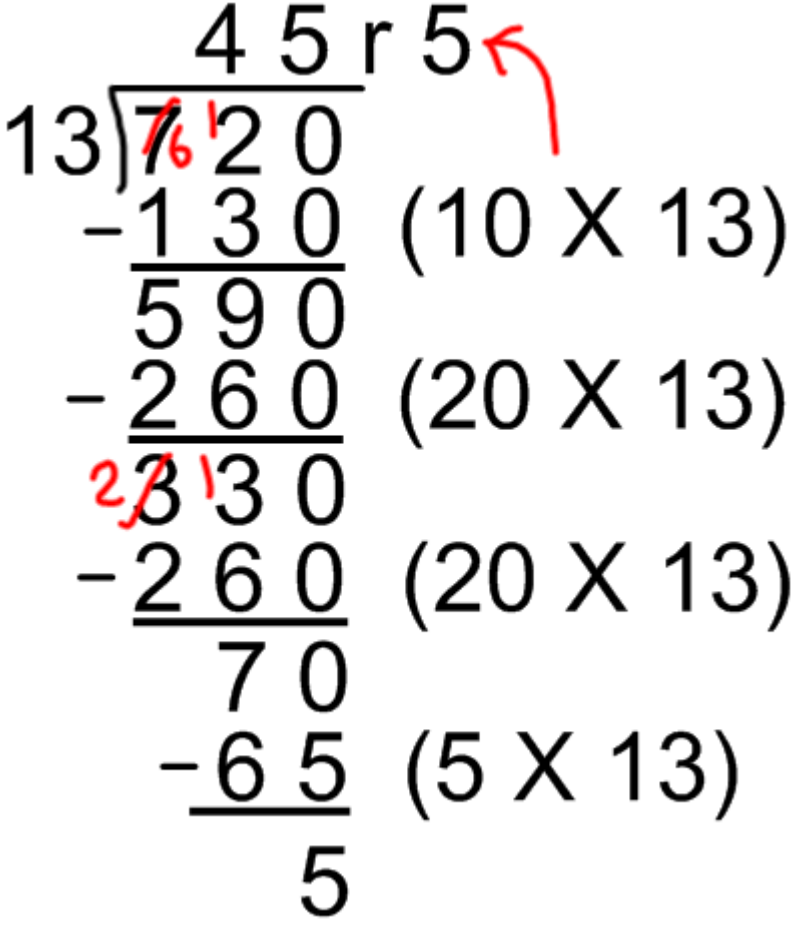
- Using decimals to deal with remainders



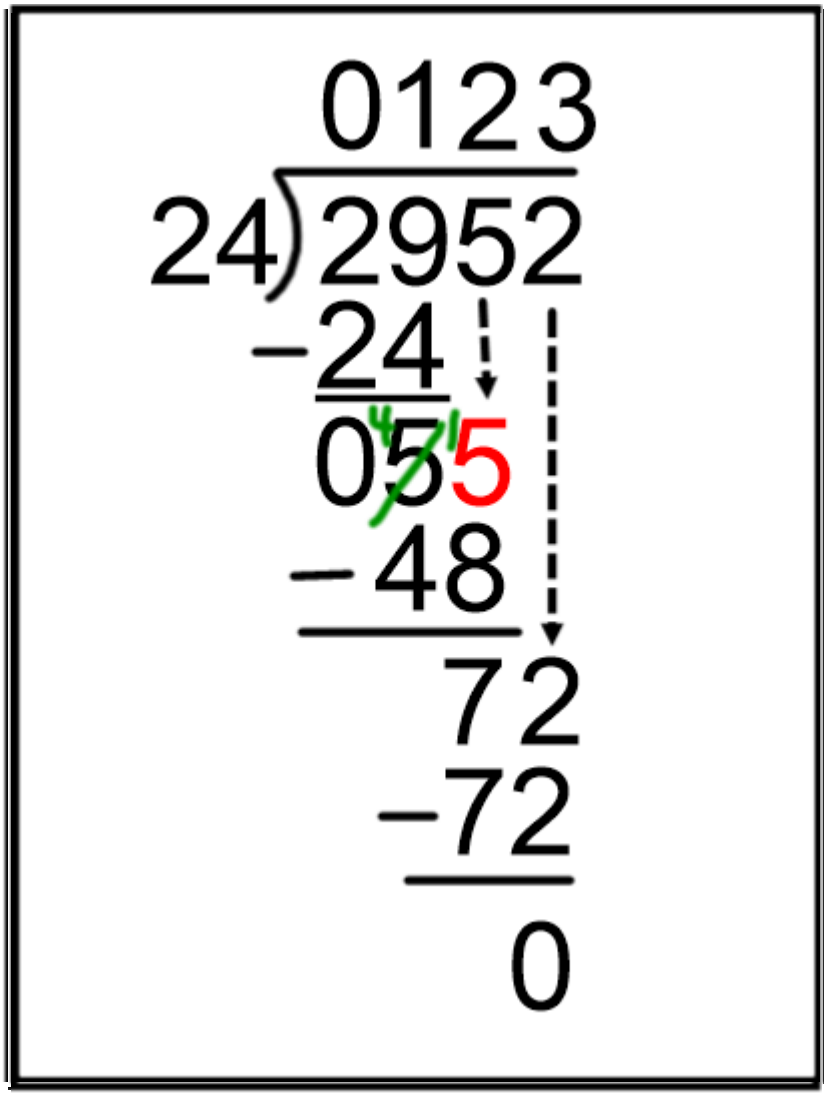
- Expressing the remainder as a fraction

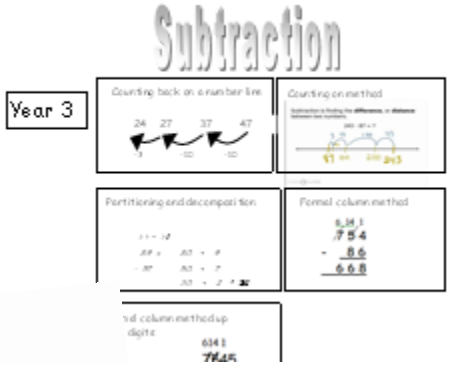


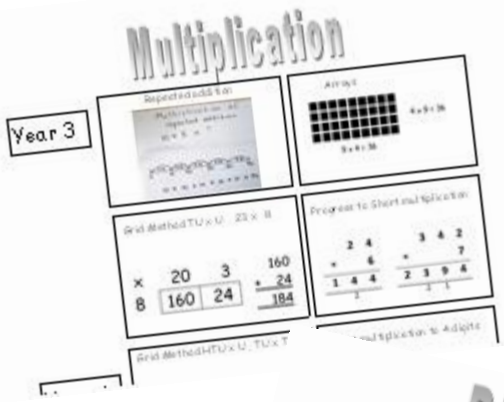
REPEATED SUBTRACTION/ CHUNKING

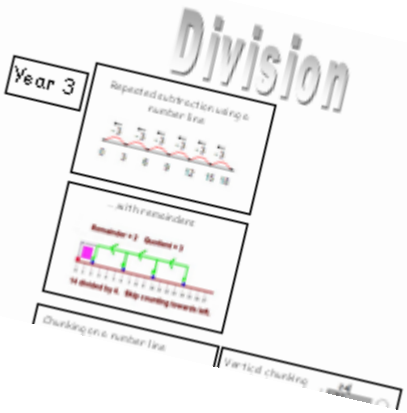


Formal long division









Busbridge Junior School
Calculations Guidance

Contents

Introduction p.1
Addition p.2
Subtraction p.4
Multiplication p.8
Division p.12

A flow chart, summarising the progression in calculation, can be found in the accompanying document 'Calculations Guidance Annex'.

Introduction

Curriculum 2014 is based on the principles of **fluency** (rapid and accurate recall and sound conceptual understanding), **reasoning** (the ability to develop a line of inquiry, generalise and justify/prove their solution using mathematical language) and **solving problems** with an ability to break problems down into simple steps.

The ability to use appropriate, written methods to add, subtract, multiply and divide, are fundamental to achieving these goals and underpin a sound knowledge of mathematics. This document sets out the progression of methods taught in our school to assist children in developing these skills.

The guidance reflects standards that we would expect the majority of children to achieve at various stages of their school life. However, the transition between stages should not be hurried as not all children will be ready to move on to the next stage at the same time. For those children requiring greater challenge, complete mastery of a concept will support deeper learning and an ability to manage more complex problems, rather than rapidly progressing through the stages.

The progression outlined in this guidance is aimed at providing children with an in-depth knowledge of the four operations, helping them to identify the relationships between them, and ways in which they relate to other mathematical concepts. It is essential that children develop an understanding of how each operation works, as opposed to merely learning methods by rote. The use of representational equipment (such as Cuisenaire rods and Numicon) and images (such as arrays and number lines) greatly assist in reinforcing and deepening such understanding.

Cuisenaire Rods

Numicon

Dienes

ANSWERS

Cuisinaire Rods

Numicon

Dienes

partitioning

37 + 46

30 + 40 = 70
7 + 6 = 13
37 + 46 = 83

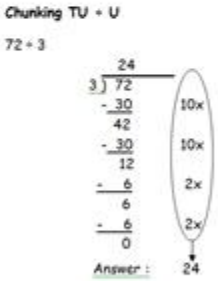
array

grid method

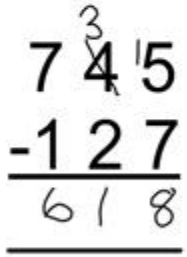
x	70	2
30	2100	60
8	560	16

prosecco

chunking



exchanging



partitioning exchanging numicon prosecco grid method

cuisinaire rods dienes chunking array

Thank you for coming