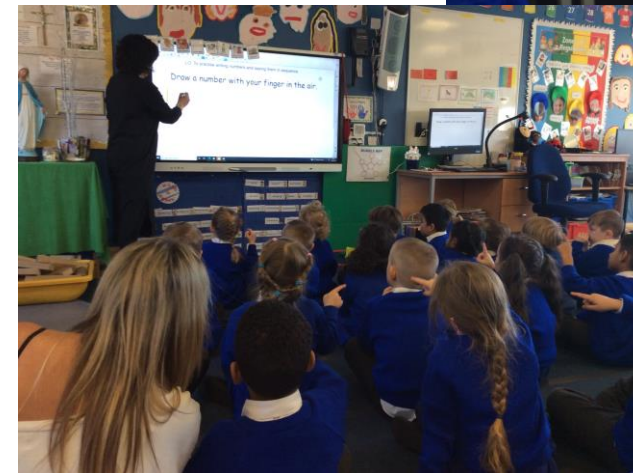
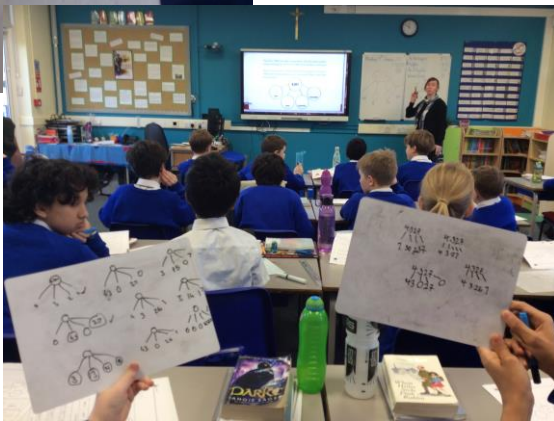
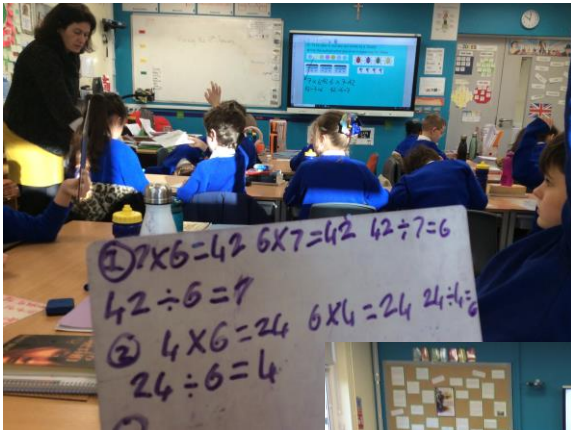


# Challenge in Maths at St Edmunds



At St Edmund's, we hold high expectations for all pupils as we believe that every child can succeed in mathematics.

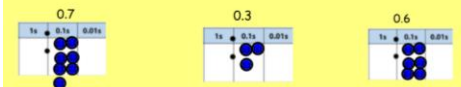
A whole class, mixed ability, teaching approach is adopted to avoid superficial, surface learning, to not cap any child, and to foster a deep, secure understanding of all the concepts taught.



We meet the needs of all learners though...

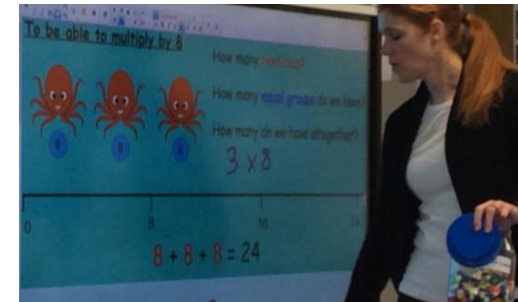
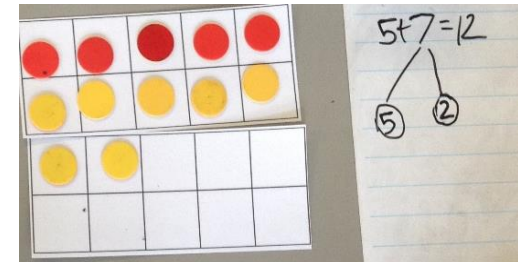
- Constant recap – of prior topics, of basic skills (bonds and multiplications) and last lesson's learning.
- Connections – making connections between prior knowledge and the skills they will need for the lesson.
- Questioning – getting the children to make connections and to explain their reasoning.
- Representations – to scaffold learning and to deepen understanding
- Resources – to support access eg. Providing the multiplications
- Well structured lessons with small step progression – this means the children are together, building on the previous slide so the next step doesn't feel too difficult.
- STEM Sentences – to scaffold the language and to draw out learning and generalisation.
- Providing immediate verbal feedback – though white board work and hot marking.
- Partner talk – this provides opportunities for children to check their answer, practice, orally rehearse, and verbally explain their reasoning.

I want to put these decimals in **ascending** order - what does ascending mean?

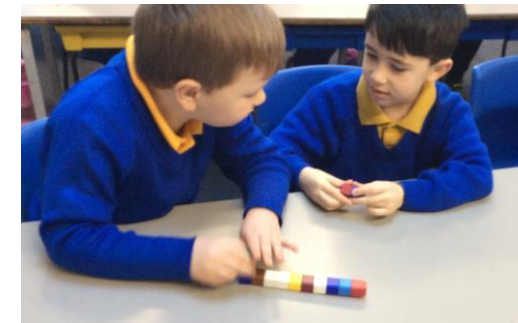


We can use our knowledge of **comparison** to help us order numbers.

To compare two numbers, we compare digits with the same place value, starting with the largest place-value digit.



\_\_\_ hundreds and \_\_\_ hundreds is equal to \_\_\_ hundreds.

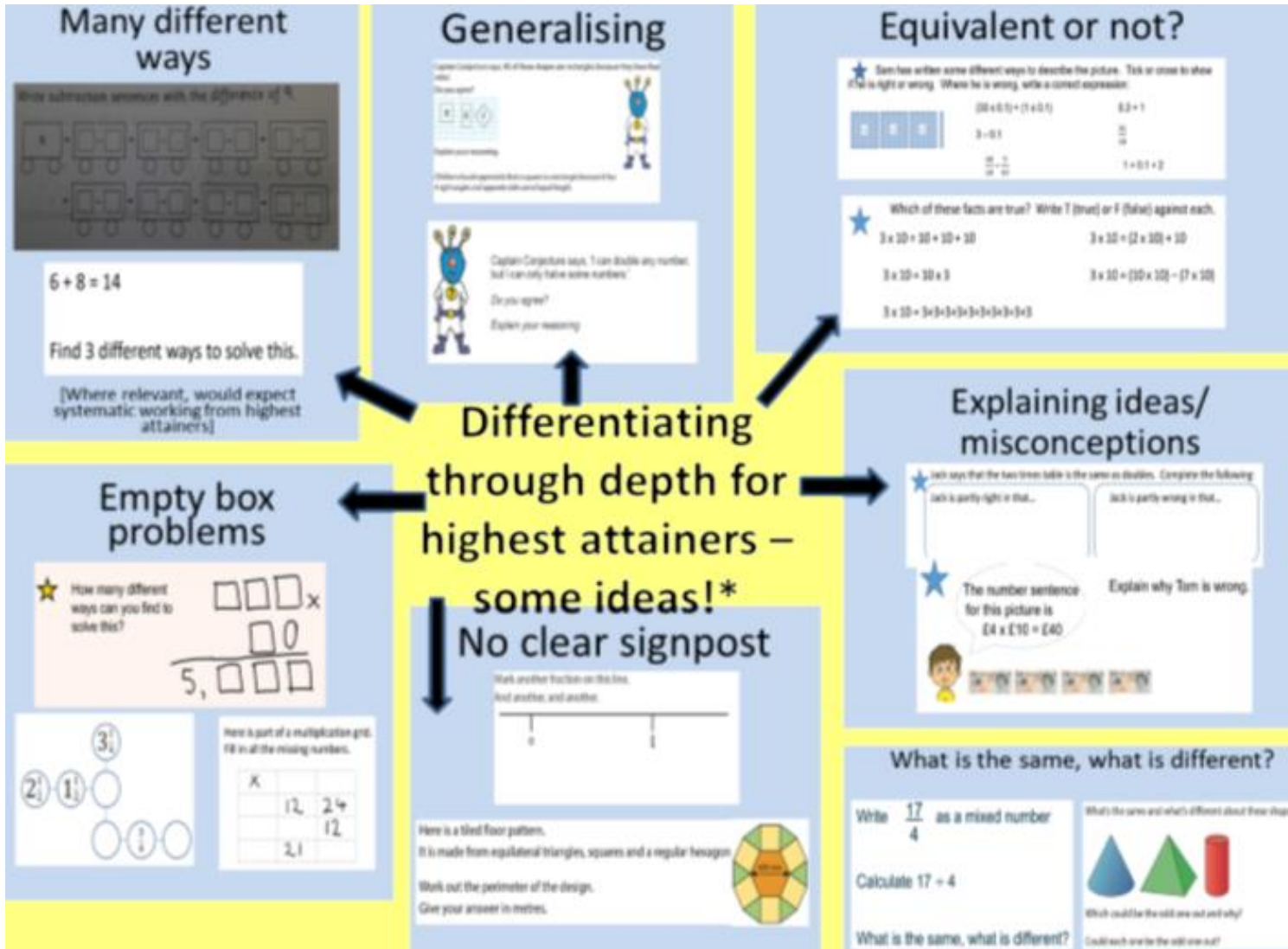


We support our lower attainers further by...

- Pre and post teaching
- Immediate intervention – highlighting which children need support within the lesson and giving them more input that lesson or at the beginning of the next lesson – this may be 1:1 or in a small group.
- Systematic structured interventions overseen by the SENDco – Catch Up Numeracy, Maths Seeds, Wave 3 Maths, 5 minute number box, Numicon Intervention Programme (KS2), Third space maths.







All children are challenged thought maths lessons in a variety both in the input and during independent practice. These ways include:

- Questioning – children explaining how they know, both orally and written.
- Variation – the children practice the same learning but in a different way. Children explaining their understanding in a different way
- Generalisations (If I know... then I know...)
- Equivalence
- Empty box problems
- No clear sign posting
- Identifying and explaining misconceptions.
- What is the same and what is different
- Pattern seeking

Jack's method:

Explain which method you would use and why.

both because the only difference is that Jack used Ten ones instead of base Ten. which is easier? *Rebecca*

Method

Please calculate the answer to  $225 - 8 = 218$

240  
+ 20

I think  $40 + 391$  is the odd one out because it doesn't need an exchange.

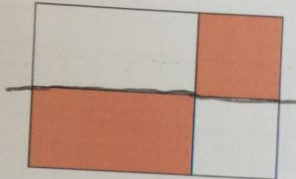
Sort these calculations into two groups. Justify your answer.

257 + 60 E  
70 + 637 E  
40 + 234 NE  
20 + 391 E

Super easy to sort.

E	NE
257 + 60	40 + 234
70 + 637	
20 + 391	

Rosie says the shaded part of the shape does not show a half because there are four parts, not two equal parts.



Do you agree? Explain why.

No because if you switch the squares around, it will be the same colour on each side

describe this word problem?

$\boxed{10 + 7}$

$7 \times 10$

$7 + 7 + 7 + 7 + 7 + 7 + 7 + 7 +$

$10 + 10 + 10 + 10 + 10 + 10 +$


Explain why.

It is  $10 + 7$  because it is a different number compared to the other numbers and it is the only one with a odd number and the other numbers have a even number and it is wrong the right answer is 70 also  $7 \times 10 =$  is 70 and that's correct you can do multiplication and repeated addition.

Children are encouraged to use precise and accurate mathematical vocabulary both verbally and in written work.

Annie has some gummy bears.

She circles half of them.

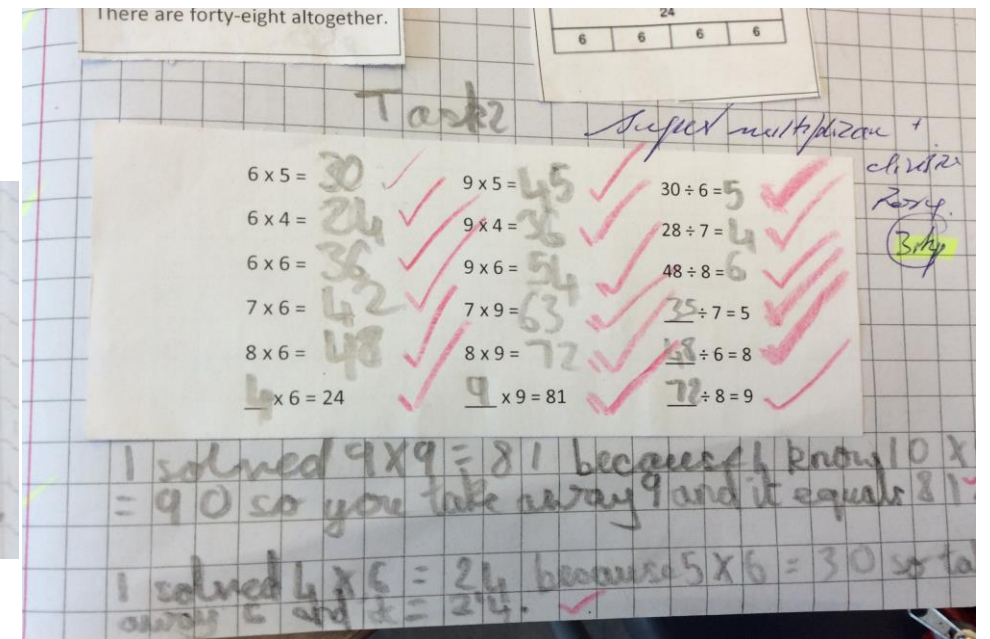
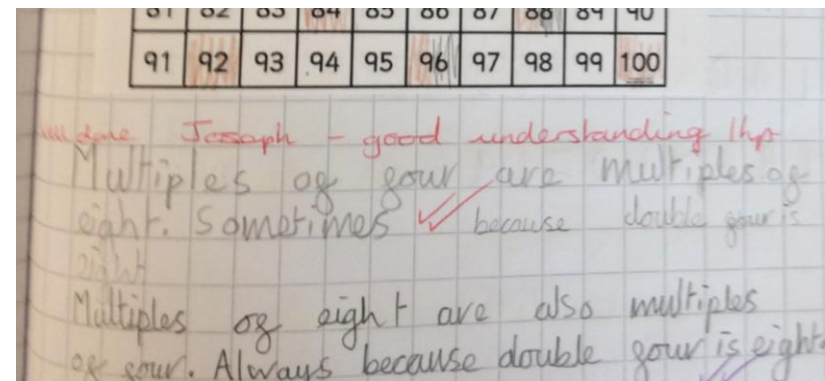
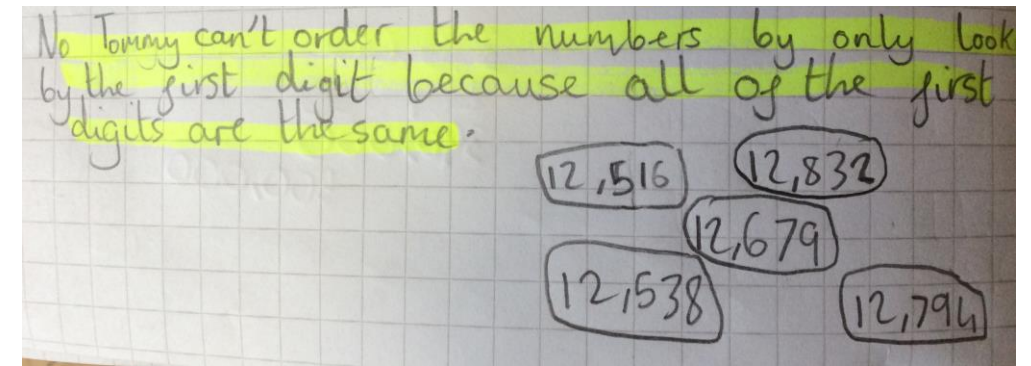
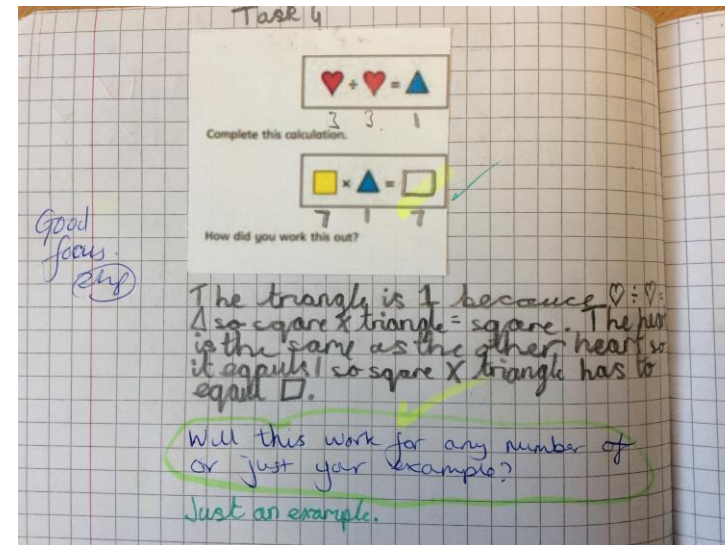
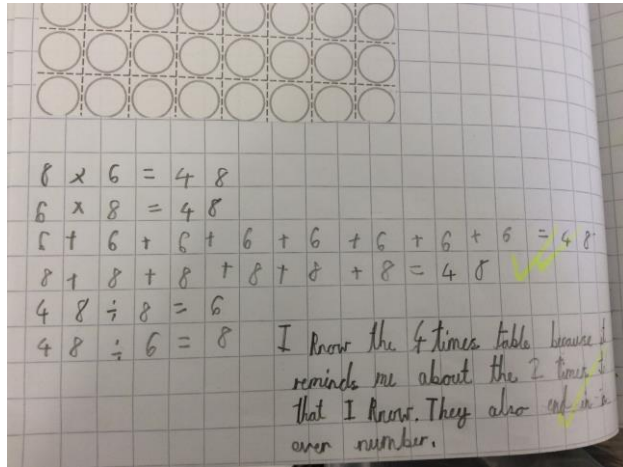


How many gummy bears did she have at the start?

How do you know? *Doubled 8 8 is 16*



# Examples of children explaining their answers using mathematical language (2)



Children conjecture relationships and generalisations. They use these to prove their mathematical understanding.

If I know... then I know...

# Examples of children using variation to explain their understanding in a different way

Are these number sentences true or false?

$396 + 6 = 412$  T

$504 - 70 = 444$  F

$556 + 150 = 706$  T

Explain your thinking

Children practice the same learning but in a different way. This might be showing it in a different eg. Using concrete resources or a pictorial representation. This could also be putting it into a different context eg. Into a money context

Are these number sentences true or false?

$396 + 6 = 412$  false 402

$504 - 70 = 444$  false 544

$556 + 150 = 706$  true

Explain your thinking

1. False because you would have to add 10.  
 2. False because if the answer would be 444 it would be -60.  
 3. True because  $50 + 556$  is 604 + 100 = 706.

A class are solving multiplication problems using counters. One child arranges their counters like the diagram below.

The question is  $23 \times 3 =$

Is this the only way to represent this calculation? How many ways can you find?

This is not the only way to represent the calculation:

$$\begin{array}{r} 23 \\ \times 3 \\ \hline 69 \end{array}$$

$1150 \div 3 = 50 \div 4$

$$\begin{array}{r} 1150 \\ \div 3 \\ \hline 383 \text{ R } 1 \end{array}$$

How many gummy bears did she have at the start? 16

How do you know? it is 16 because  $8 + 8 = 16$

$$\begin{array}{c} 8 \\ \hline 8 \end{array}$$

If batteries come in packs of 3. How many packs do I need to buy to get 24 batteries?

If toy dinosaurs come in packs of 3. How many packs do I need to buy to get 48 batteries?

How could we express these problems as number sentences?

$3 \times 8 = 24$

$3 \times 16 = 48$

These calculations into two groups.

your answer.

$257 + 60 = 317$

$70 + 637 = 707$

$40 + 234 = 274$

$20 + 391 = 411$

$10 + 112 = 122$

change needed

$70 + 637 = 707$

$20 + 391 = 411$

$10 + 112 = 122$



# Examples of children identifying and explaining misconceptions

Task 2

Zane is calculating  $7,585 - 316$ .

7	5	8	5
-	3	1	6
4	4	2	5

Do you agree with Zane?  
Explain your answer.

No because he layed it out as  $7585 - 3160$   
it should look like this

7	5	8	5
-	0	3	1
7	2	7	1

How should it have looked?

Task 3

Children need to use mathematical language and previous knowledge to understand, then explain their thinking to show what would need to change in order for their to be a correct solution.

Task III

Ron says, "47 in Roman numerals is XXXXVII"  
Harry says, "47 in Roman numerals is LXVII"  
What mistake have they each made?

they are wrong!

Ron's mistake is you only aloud 3 of each Roman numeral

Harry's mistake is that X needs to be before the L so its 67.

Review activity

Ash says the place value grid below shows the number 342,513. Write out the mistake Ash has made and how he can correct it below.

M	HTh	TTh	Th	H	T	O
			3	4	2	5
						1
						3
						0

The mistake is there are no millions in that number & Ash also didn't put the ten in the tens column.

HTh	TTh	Th	H	T	O
10,000	10,000	1,000	100	10	1
100,000	10,000	1,000	100		1
100,000	10,000		100		1
	10,000		100		

Ash forgot to include a place holder.

Spot the mistake!

Calvin rounded 215678 to the nearest ten thousand and wrote 220678. Can you explain to Calvin what mistake he has made and why he has done it?

He has rounded the ten thousand right but he needs to round the 100's 10's and 10's column too. He has done it because he was to help to round to 10,000 so he was not asked to needs to have a multiple of 10,000.

# Examples of presenting the question in different ways (conceptual variation)

What is the value of each digit in 729?

hundreds	tens	ones
7	2	9

729 = 7 hundreds + 2 tens + 9 ones

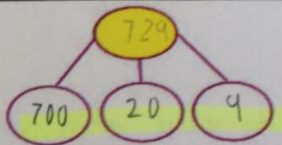
729 = 700 + 20 + 9



The value of the digit 7 is 700

The value of the digit 2 is 20

The value of the digit 9 is 9

We write 729 in words as Seven Hundred and Twenty nine



1,000 more	Number	1,000 less
4000	3,000	2000
4124		2124
2124		124
7094	6,094	5094
10888	9,888	8888
6,221	5221	4221
9599	8599	7,599

This requires children to understand that there can be different variations of the same question. The children can then make connections between these different representations.

200 + 600 - make it with the blocks

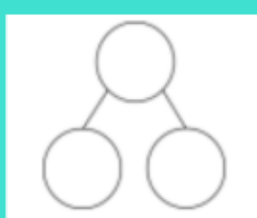
Draw it

Write it

\_\_\_ hundreds and \_\_\_ hundreds is equal to \_\_\_ hundreds.

---

Part-Whole



Number Sentence

\_\_\_ + \_\_\_ = \_\_\_

Task 2

Roman numerals	numeral	words
VII	7 ✓	Seven ✓
XVII ✓	17 ✓	Seventeen ✓
XXVII ✓	27 ✓	twenty-seven ✓
XXIX ✓	29 ✓	twenty-nine ✓
XLIX ✓	49 ✓	forty-nine ✓
LXVII ✓	67 ✓	sixty-seven ✓
XCVIII ✓	98 ✓	ninty-eight ✓



# Examples of Empty box problems

This is a grid with 5 four-digit numbers in ascending order.  
Some of the digits are missing.  
You have the following digit cards to complete the grid.

6		4	3
6	8	6	3
7	0	7	8
9	1	0	5

Digit cards: 8, 5, 6, 3, 9, 1, 7

Review activity  
• 'How many ways can you arrange these digit cards so that the inequality is true?'  
4 5 6  
5 8 0 0 0 < 5 0 0 0

Handwritten solutions:

$$\begin{aligned}
 548000 &< 556000 \\
 558000 &< 564000 \\
 517000 &< 520000 \\
 520000 &< 530000 \\
 560000 &< 570000
 \end{aligned}$$

Complete the subtractions:

A)  $17 - 6 = //$  C)  $13 - 2 = //$   
 B)  $18 - 7 = //$  D)  $16 - 5 = //$

What do you notice?

Use this to fill in the missing numbers.

$17 - \boxed{6} = 11$   $19 - \boxed{8} = 11$

Complete the additions.

a)

6	4	1	1	7
+	2	5	8	1
8	9	9	2	6

b)

6	4	1	9	2
+	2	5	8	7
8	9	9	2	6

Task 3  
1/2 km @ 5000m ✓

Complete the missing measurements so each gives a total distance of 2 km.

Handwritten solutions:

$$\begin{aligned}
 1600 \text{ m} + 250 \text{ m} + 50 \text{ m} &= 2000 \text{ m} \\
 1250 \text{ m} + 750 \text{ m} &= 2000 \text{ m} \\
 \frac{1}{2} \text{ km} + \frac{1}{4} \text{ km} + \frac{3}{4} \text{ km} &= 2 \text{ km}
 \end{aligned}$$

Calculate the missing digits. What do you notice?

5	2	2	4	7	?
+	3	?	5	9	0
9	0	?	3	?	2

Handwritten note: I noticed that they are all eight ✓

Children need to apply prior knowledge and problem solving strategies in order to find a systematic and fluent approach to find the missing component.



# Examples of application to other areas of the curriculum

1/2 km @ 5000m ✓  
Task 3

Complete the missing measurements so each gives a total distance of 2 km.

Try this again

1600 m + 250 m + 50 m = 2 km (2000m)

1250 m + 750 m = 2 km

1/2 km + 1/4 km + 3/4 km = 2 km

1600  
+ 250  
+ 50  
-----  
2000

1250  
+ 750  
-----  
2000

1/2 km  
+ 1/4 km  
+ 3/4 km  
-----  
2 km

Linking measure to fractions