

Autumn Scheme of Learning

Year 4

#MathsEveryoneCan

2019-20



	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12
Autumn	Number: Place Value				Number: Addition and Subtraction			Measurement: Length and Perimeter	Number: Multiplication and Division			Consolidation
Spring	Number: Multiplication and Division			Measurement: Area	Number: Fractions				Number: Decimals			Consolidation
Summer	Number: Decimals	Measurement: Money			Measurement: Time	Statistics	Geometry: Properties of Shape				Geometry: Position and Direction	Consolidation

**White
Rose
Maths**

Autumn - Block 2

Addition & Subtraction

Overview

Small Steps

NC Objectives

- ▶ Add and subtract 1s, 10s, 100s and 1,000s
- ▶ Add two 4-digit numbers – no exchange
- ▶ Add two 4-digit numbers – one exchange
- ▶ Add two 4-digit numbers – more than one exchange
- ▶ Subtract two 4-digit numbers – no exchange
- ▶ Subtract two 4-digit numbers – one exchange
- ▶ Subtract two 4-digit numbers – more than one exchange
- ▶ Efficient subtraction
- ▶ Estimate answers
- ▶ Checking strategies

Add and subtract numbers with up to 4 digits using the formal written methods of columnar addition and subtraction where appropriate.

Estimate and use inverse operations to check answers to a calculation.

Solve addition and subtraction two step problems in contexts, deciding which operations and methods to use and why.

1s, 10s, 100s, 1,000s

Notes and Guidance

Children build on prior learning of adding and subtracting hundreds, tens and ones. They are introduced to adding and subtracting thousands.

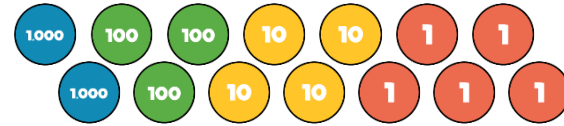
Children should use concrete representations (Base 10, place value counters etc.) before moving to abstract and mental methods.

Mathematical Talk

Can you represent the numbers using Base 10 and place value counters? What's the same about the representations? What's different?

If we are adding tens, are the digits in the tens column the only ones that change? Do the ones/hundreds/thousands ever change?

Varied Fluency



The number being represented is ____.

Add 3 thousands to the number. What do you have now?

Add 3 hundreds to the number. What do you have now?

Subtract 3 tens from the number. What do you have now?

Add 5 ones to the number. What do you have now?

Here is a number.

Thousands	Hundreds	Tens	Ones
5	3	8	2

Add 3 thousands to the number.

Subtract 4 thousands from the answer.

Subtract 2 ones.

Add 5 tens.

What number do you have now?

1s, 10s, 100s, 1,000s

Reasoning and Problem Solving

Which questions are easy?
Which questions are hard?

$$8,273 + 4 = \underline{\quad}$$

$$8,273 + 4 \text{ tens} = \underline{\quad}$$

$$8,273 - 500 = \underline{\quad}$$

$$8,273 - 5 \text{ thousands} = \underline{\quad}$$

Why are some easier than others?

$8,273 + 4$ and $8,273 - 5$ thousands are easier because you do not cross any boundaries. $8,723 + 4$ tens and $8,273 - 500$ are harder because you have to cross boundaries and make an exchange.

Mo says,

When I add hundreds to a number, only the hundreds column will change.



Is Mo correct? Explain your answer.

Mo is incorrect because when you add hundreds to a number and end up with more than ten hundreds, you have to make an exchange which also affects the thousands column.

Add Two 4-digit Numbers (1)

Notes and Guidance

Children use their understanding of addition of 3-digit numbers to add two 4-digit numbers with no exchange.

They use concrete equipment and a place value grid to support their understanding alongside column addition.

Mathematical Talk

How many ones are there altogether? Can we make an exchange? Why? (Repeat questions for other columns)

Is it more difficult to add 3-digit or 4-digit numbers without exchanging? Why?

How can you find the missing numbers? Do you need to add or subtract?

Varied Fluency

Use counters and a place value grid to calculate $242 + 213$

Use counters and a place value grid to calculate $3,242 + 2,213$

1,000s	100s	10s	1s
1000 1000 1000	100 100	10 10 10 10	1 1
1000 1000	100 100	10	1 1 1

Now calculate $3,242 + 213$ in the same way.
What is the same and what is different?

Work out the missing numbers.

	Th	H	T	O
	4	—	6	—
+	2	5	—	1
	—	7	8	9

Add Two 4-digit Numbers (1)

Reasoning and Problem Solving

Rosie adds 2 numbers together that total 4,444



Both numbers have 4 digits.

All the digits in both numbers are even.

What could the numbers be?
Prove it.
How many ways can you find?

Possible answers:

2,222 + 2,222
2,244 + 2,200
2,224 + 2,220
2,442 + 2,002
2,242 + 2,202
2,424 + 2,020
2,422 + 2,022
2,444 + 2,000

There are more possible pairs.
This includes 0 as an even number.
Discussion could be had around whether 0 is odd or even and why.

Two children completed the following calculation:

$$1,234 + 345$$



Dora

My answer is 1,589

My answer is 4,684



Alex

Both of the children have made a mistake in their calculations.
Calculate the actual answer to the question.
What mistakes did they make?

The actual answer is 1,579
Dora's mistake was a miscalculation for the 10s column, adding 30 and 40 to get 80 rather than 70
Alex's mistake was a place value error, placing the 3 hundred in the thousands column and following the calculation through incorrectly.

Add Two 4-digit Numbers (2)

Notes and Guidance

Children add two 4-digit numbers with one exchange. They use a place value grid to support understanding alongside column addition.

They explore exchanges as they occur in different place value columns and look for similarities/differences.

Mathematical Talk

How many ones do we have altogether? Can we make an exchange? Why? How many ones do we exchange for one ten? Do we have any ones remaining? (Repeat for other columns.)

Why is it important to line up the digits in the correct column when adding numbers with different amounts of digits?

Which columns are affected if there are more than ten tens altogether?

Varied Fluency

Rosie uses counters to find the total of 3,356 and 2,435

Th	H	T	O		Th	H	T	O
1000 1000 1000	100 100 100	10 10 10 10 10	1 1 1 1 1 1 1 1 1		3	3	5	6
1000 1000	100 100 100 100	10 10 10	1 1 1 1 1 1		+	2	4	3
						5	7	9
								1

Use Rosie's method to calculate:

$$3,356 + 2,437$$

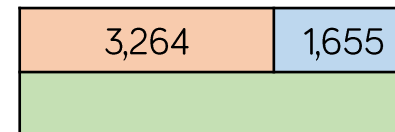
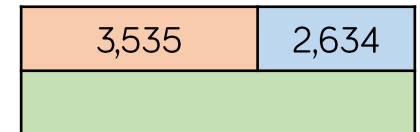
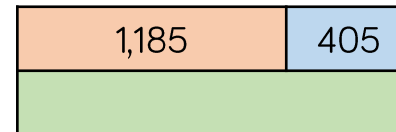
$$3,356 + 2,473$$

$$3,356 + 2,743$$

Dexter buys a laptop costing £1,265 and a mobile phone costing £492

How much do the laptop and the mobile phone cost altogether?

Complete the bar models.



Add Two 4-digit Numbers (2)

Reasoning and Problem Solving

What is the missing 4-digit number?

	Th	H	T	O
	—	—	—	—
+	6	3	9	5
	8	9	4	9

2,554

Annie, Mo and Alex are working out the solution to the calculation $6,374 + 2,823$

Annie's Strategy

$$6,000 + 2,000 = 8,000$$

$$300 + 800 = 1100$$

$$70 + 20 = 90$$

$$4 + 3 = 7$$

$$8,000 + 1100 + 90 + 7 = 9,197$$

Mo's Strategy

	6	3	7	4
+	2	8	2	3
	8	1	9	7

Alex's Strategy

	6	3	7	4
+	2	8	2	3
				7
			9	0
	1	1	0	0
	8	0	0	0
	9	1	9	7

Who is correct?

Alex is correct with 9,197

Annie has miscalculated $300 + 800$, forgetting to exchange a ten hundreds to make a thousand (showing 11 tens instead of 11 hundreds).

Mo has forgotten both to show and to add on the exchanged thousand.

Add Two 4-digit Numbers (3)

Notes and Guidance

Building on adding two 4-digit numbers with one exchange, children explore multiple exchanges within an addition.

Ensure children continue to use equipment alongside the written method to help secure understanding of why exchanges take place and how we record them.

Mathematical Talk

How many ones do we have altogether? Can we make an exchange? Why? How many ones do we exchange for one ten? How many ones are remaining? (Repeat for each column.)

Why do you have to add the digits from the right to the left, starting with the smallest place value column? Would the answer be the same if you went left to right?

What is different about the total of 4,844 and 2,156? Can you think of two other numbers where this would happen?

Varied Fluency

Use counters and a place value grid to calculate:

	5	9	3	4
+	2	2	4	6

	3	2	7	5
+	6	1	5	6

	1	7	7	2
+	2	2	5	0

Find the total of 4,844 and 2,156

Th	H	T	O
1000 1000 1000 1000	100 100 100 100 100 100 100 100	10 10 10 10	1 1 1 1
1000 1000	100	10 10 10 10 10	1 1 1 1 1 1

	4	8	4	4
+	2	1	5	6

Use <, > or = to make the statements correct.

3,456 + 789	<input type="radio"/>	1,810 + 2,436
2,829 + 1,901	<input type="radio"/>	2,312 + 2,418
7,542 + 1,858	<input type="radio"/>	902 + 8,496
1,818 + 1,999	<input type="radio"/>	3,110 + 707

Add Two 4-digit Numbers (3)

Reasoning and Problem Solving

Jack says,



When I add two numbers together I will only ever make up to one exchange in each column.

Do you agree?
Explain your reasoning.

Jack is correct. When adding any two numbers together, the maximum value in any given column will be 18 (e.g. 18 ones, 18 tens, 18 hundreds). This means that only one exchange can occur in each place value column. Children may explore what happens when more than two numbers are added together.

Complete:

	Th	H	T	O
	6	?	?	8
+	?	?	8	?
	9	3	2	5

Mo says that there is more than one possible answer for the missing numbers in the hundreds column.
Is he correct?
Explain your answer.

The solution shows the missing numbers for the ones, tens and thousands columns.

$$6, _38 + 2, _87$$

Mo is correct. The missing numbers in the hundreds column must total 1,200 (the additional 100 has been exchanged).

Possible answers include:
 $6,338 + 2,987$
 $6,438 + 2,887$

Subtract Two 4-digit Numbers (1)

Notes and Guidance

Building on their experiences in Year 3, children use their knowledge of subtracting using the formal column method to subtract two 4-digit numbers.

Children will focus on calculations with no exchanges, concentrating on the value of each digit.

Mathematical Talk





Do you need to make both numbers when you are subtracting with counters? Why?

Why is it important to always subtract the smallest place value column first?

How are your bar models different for the two problems? Can you use the written method to calculate the missing numbers?

Varied Fluency

Eva uses place value counters to calculate $3,454 - 1,224$

Th	H	T	O
			

	Th	H	T	O
	3	4	5	4
–	1	2	2	4
	2	2	3	0

Use Eva's method to calculate:

$$2,348 - 235 = \underline{\quad\quad\quad} \quad \underline{\quad\quad\quad} = 4,572 - 2,341$$

$$6,582 - 582 = \underline{\quad\quad\quad} \quad \underline{\quad\quad\quad} = 7,262 - 7,151$$

Use a bar model to represent each problem.

There are 3,597 boys and girls in a school.
2,182 are boys. How many are girls?

Car A travels 7,653 miles per year.
Car B travels 5,612 miles per year.
How much further does Car A travel than Car B per year?

Subtract Two 4-digit Numbers (1)

Reasoning and Problem Solving

Eva is performing a column subtraction with two four digit numbers.



The larger number has a digit total of 35

The smaller number has a digit total of 2

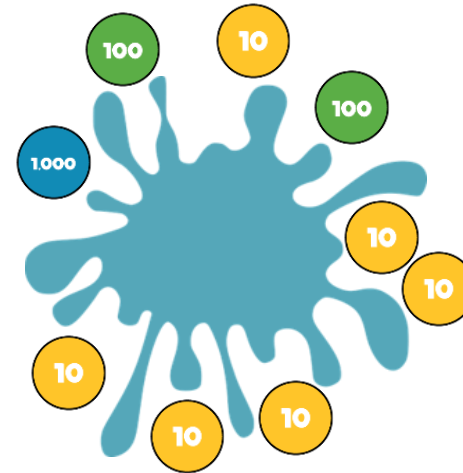
Use cards to help you find the numbers.

What could Eva's subtraction be?

How many different options can you find?

$9998 - 1100 = 8898$
 $9998 - 1010 = 8988$
 $9998 - 1001 = 8997$
 $9998 - 2000 = 7998$
 $9989 - 1100 = 8889$
 $9989 - 1010 = 8979$
 $9989 - 1001 = 8988$
 $9989 - 2000 = 7989$
 $9899 - 1100 = 8799$
 $9899 - 1010 = 8889$
 $9899 - 1001 = 8898$
 $9899 - 2000 = 7899$
 $8999 - 1100 = 7899$
 $8999 - 1010 = 7889$
 $8999 - 1001 = 7998$
 $8999 - 2000 = 6999$

There are counters to the value of 3,470 on the table but some have been covered by the splat.



What is the total of the counters covered?
How many different ways can you make the missing total?

$3470 - 1260 = 2210$

Possible answers include:

- two 1000s, two 100s and one 10
- twenty-two 100s and one 10
- twenty-two 100s and ten 1s

Subtract Two 4-digit Numbers (2)

Notes and Guidance

Building on their experiences in Year 3, children use their knowledge of subtracting using the formal column method to subtract two 4-digit numbers.

Children explore subtractions where there is one exchange. They use place value counters to model the exchange and match this with the written column method.

Mathematical Talk

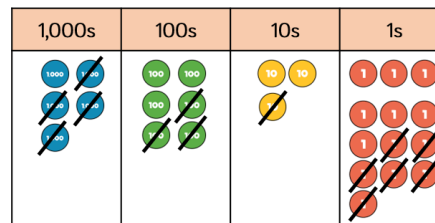
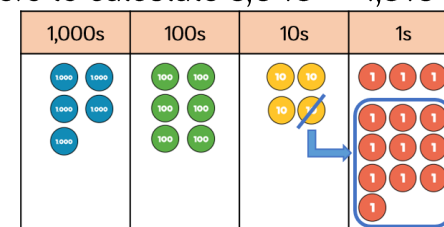
When do we need to exchange in a subtraction?
How do we indicate the exchange on the written method?

How many bars are you going to use in your bar model?
Can you find out how many tokens Mo has?
Can you find out how many tokens they have altogether?

Can you create your own scenario for a friend to represent?

Varied Fluency

Dexter is using place value counters to calculate $5,643 - 4,316$



	Th	H	T	O
	5	6	3	1
–	4	3	1	6
	1	3	2	7

Use Dexter's method to calculate:

$$4,721 - 3,605 = \quad 4,721 - 3,650 = \quad 4,172 - 3,650 =$$

Dora and Mo are collecting book tokens.
Dora has collected 1,452 tokens.
Mo has collected 621 tokens fewer than Dora.

Represent this scenario on a bar model.
What can you find out?

Subtract Two 4-digit Numbers (2)

Reasoning and Problem Solving



1,235 people go on a school trip.

There are 1,179 children and 27 teachers.
The rest are parents.

How many parents are there?

Explain your method to a friend.

Add children and
teachers together
first.

$$1,179 + 27 = 1,206$$

Subtract this from
total number of
people.

$$1,235 - 1,206 = 29$$

29 parents.

Find the missing numbers that could go
into the spaces.

Give reasons for your answers.

$$\underline{\quad} - 1,345 = 4\underline{\quad}6$$

What is the greatest number that could go
in the first space?

What is the smallest?

How many possible answers could you
have?

What is the pattern between the
numbers?

What method did you use?

Possible answers:

1,751 and 0
1,761 and 10
1,771 and 20
1,781 and 30
1,791 and 40
1,801 and 50
1,811 and 60
1,821 and 70
1,831 and 80
1,841 and 90
1,841 is the
greatest
1,751 is the
smallest.

There are 10
possible answers.
Both numbers
increase by 10

Subtract Two 4-digit Numbers (3)

Notes and Guidance

Children explore what happens when a subtraction has more than one exchange. They can continue to use manipulatives to support their understanding. Some children may feel confident calculating with a written method.

Encourage children to continue to explain their working to ensure they have a secure understanding of exchange within 4-digits numbers

Mathematical Talk

When do we need to exchange within a column subtraction?

What happens if there is a zero in the next column? How do we exchange?

Can you use place value counters or Base 10 to support your understanding?

How can you find the missing 4-digit number? Are you going to add or subtract?

Varied Fluency

Use place value counters and the column method to calculate:

$$5,783 - 844$$

$$1,205 - 398$$

$$6,737 - 759$$

$$2,037 - 889$$

$$8,252 - 6,560$$

$$2,037 - 1,589$$

A shop has 8,435 magazines.
367 are sold in the morning and 579 are sold in the afternoon.

How many magazines are left?

8,435		
367	579	?

There are ____ magazines left.

Find the missing 4-digit number.

	Th	H	T	O
	?	?	?	?
+	4	6	7	8
	7	4	3	1

Subtract Two 4-digit Numbers (3)

Reasoning and Problem Solving

Amir and Tommy solve a problem.

When I subtract 546 from 3,232 my answer is 2,714



Amir

Tommy is correct.

Amir is incorrect because he did not exchange, he just found the difference between the numbers in the columns instead.



Tommy

When I subtract 546 from 3,232 my answer is 2,686

Who is correct?
Explain your reasoning.
Why is one of the answers wrong?

There were 2,114 visitors to the museum on Saturday.
650 more people visited the museum on Saturday than on Sunday.



Altogether how many people visited the museum over the two days?

What do you need to do first to solve this problem?

First you need to find the number of visitors on Sunday which is
 $2,114 - 650 = 1,464$

Then you need to add Saturday's visitors to that number to solve the problem.
 $1,464 + 2,114 = 3,578$

Efficient Subtraction

Notes and Guidance

Children use their understanding of column subtraction and mental methods to find the most efficient methods of subtraction.

They compare the different methods of subtraction and discuss whether they would partition, take away or find the difference.

Mathematical Talk

Is the column method always the most efficient method?
When we find the difference, what happens if we take one off each number? Is the difference the same? How does this help us when subtracting large numbers?
When is it more efficient to count on rather than use the column method?
Can you represent your subtraction in a part-whole model or a bar model?

Varied Fluency

Ron, Rosie and Dexter are calculating $7,000 - 3,582$

Here are their methods:

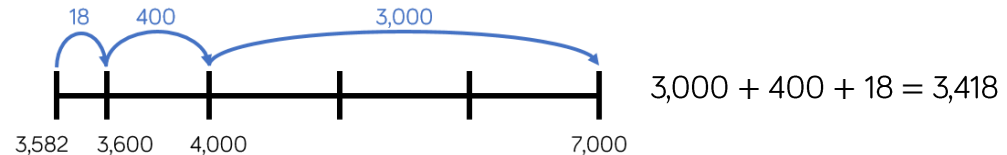
Ron

	Th	H	T	O
	⁶ 7	⁹ 0	⁹ 0	¹ 0
–	3	5	8	2
	3	4	1	8

Rosie

	Th	H	T	O
	6	9	9	9
–	3	5	8	1
	3	4	1	8

Dexter

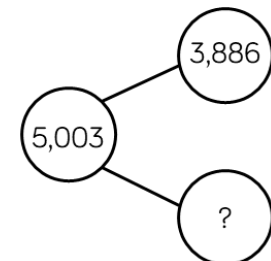


Whose method is most efficient?

Use the different methods to calculate $4,000 - 2,831$

Find the missing numbers.
What methods did you use?

3,465
2,980 ?



Efficient Subtraction

Reasoning and Problem Solving

Amir has £1,000



He buys a scooter for £345 and a skateboard for £110

How much money does he have left?

Show 3 different methods of finding the answer.

Explain how you completed each one.

Which is the most effective method?

Children should use the three methods demonstrated in the varied fluency section to get an answer of £545

Look at each pair of calculations.
Which one out of each pair has the same difference as $2,450 - 1,830$?

$$2,451 - 1,831$$

$$2,451 - 1,829$$

$$2,500 - 1,880$$

$$2,500 - 1,780$$

$$2,449 - 1,829$$

$$2,449 - 1,831$$

When is it useful to use difference to solve subtractions?

$2,451 - 1,831$
Added one to each number.
 $2,500 - 1,880$
Added 50 to both numbers.
 $2,449 - 1,829$
Subtracted one from each number.

The difference is 620

Estimate Answers

Notes and Guidance

In this step, children use their knowledge of rounding to estimate answers for calculations and word problems.

They build on their understanding of near numbers in Year 3 to make sensible estimates.

Mathematical Talk

When in real life would we use an estimate?

Why should an estimate be quick?

Why have you rounded to the nearest 10/100/1,000?

Varied Fluency

 Match the calculations with a good estimate.

$$345 + 1,234$$

$$3,000 + 6,000$$

$$2,985 + 6,325$$


$$3,500 + 1,200$$

$$3,541 + 1,179$$

$$350 + 1,200$$

$$2,135 + 6,292$$

$$2,000 + 6,000$$


 Alex is estimating the answer to $3,625 + 4,277$.
She rounds the numbers to the nearest thousand, hundred and ten to give different estimates. Complete her working.

Original calculation: $3,625 + 4,277 = \underline{\hspace{2cm}}$

Round to nearest thousands: $4,000 + 4,000 = \underline{\hspace{2cm}}$

Round to nearest hundreds: $3,600 + \underline{\hspace{1cm}} = \underline{\hspace{2cm}}$

Round to nearest tens: $\underline{\hspace{1cm}} + \underline{\hspace{1cm}} = \underline{\hspace{2cm}}$

 Decide whether to round to the nearest 10, 100 or 1,000 and estimate the answers to the calculations.

$$4,623 + 3,421$$

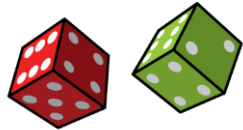
$$9,732 - 6,489$$

$$8,934 - 1,187$$

Estimate Answers

Reasoning and Problem Solving

Game



The aim of the game is to get a number as close to 5,000 as possible.

Each child rolls a 1-6 die and chooses where to put the number on their grid.

Once they have each filled their grid, they add up their totals to see who is the closest.

	Th	H	T	O
	?	?	?	?
+	?	?	?	?

The aim of the game can be changed, i.e. make the smallest/largest possible total etc. Dice with more faces could also be used.

The estimated answer to a calculation is 3,400

The numbers in the calculation were rounded to the nearest 100 to find an estimate.

What could the numbers be in the original calculation?

Use the number cards and + or – to make three calculations with an estimated answer of 2,500

1,295

1,120

4,002

1,489

3,812

1,449

Possible answers include

$$2,343 + 1,089 =$$

$$4,730 - 1,304 =$$

$$3,812 - 1,295 \\ (3,800 - 1,300 = 2,500)$$

$$4,002 - 1,489 \\ (4,000 - 1,500 = 2,500)$$

$$1,449 + 1,120 \\ (1,400 + 1,100 = 2,500)$$

Checking Strategies

Notes and Guidance

Children explore ways of checking to see if an answer is correct by using inverse operations.

Checking using inverse is to be encouraged so that children are using a different method and not just potentially repeating an error, for example, if they add in a different order.

Mathematical Talk

How can you tell if your answer is sensible?

What is the inverse of addition?

What is the inverse of subtraction?

Varied Fluency

$$2,300 + 4,560 = 6,860$$

Use a subtraction to check the answer to the addition.
Is there more than one subtraction we can do to check the answer?

If we know $3,450 + 4,520 = 7,970$, what other addition and subtraction facts do we know?

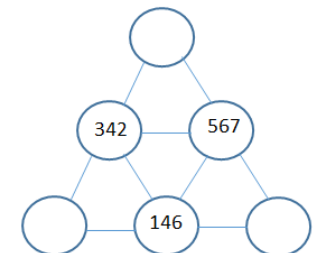
$$\underline{\quad} + \underline{\quad} = \underline{\quad}$$

$$\underline{\quad} - \underline{\quad} = \underline{\quad}$$

$$\underline{\quad} - \underline{\quad} = \underline{\quad}$$

Does the equal sign have to go at the end? Could we write an addition or subtraction with the equals sign at the beginning?
How many more facts can you write now?

Complete the pyramid.
Which calculations do you use to find the missing numbers?
Which strategies do you use to check your calculations?



Checking Strategies

Reasoning and Problem Solving

Here is a number sentence.

$$350 + 278 + 250$$

Add the numbers in different orders to find the answer.

Is one order of adding easier? Why?

Create a rule when adding more than one number of what to look for in a number.

I completed an addition and then used the inverse to check my calculation. When I checked my calculation, the answer was 3,800

One of the other numbers was 5,200
What could the calculation be?

$$\underline{\quad} + \underline{\quad} = \underline{\quad}$$

$$\underline{\quad} - \underline{\quad} = 3,800$$

It is easier to add 350 and 250 to make 600 and then add on 278 to make 878. We can look for making number bonds to 10, 100 or 1,000 to make a calculation easier.

Possible answers:

$$5,200 - 1,400 = 3,800$$

$$9,000 - 5,200 = 3,800$$

In the number square below, each horizontal row and vertical column adds up to 1,200

Find the missing numbers.

Is there more than one option?

897		
		832
	762	

Check the rows and columns using the inverse and adding the numbers in different orders.

There are many correct answers.

Top row missing boxes need to total 303

Middle row total 368

Bottom row total 438

897	270	33
200	168	832
103	762	335