Autumn Block 2

Addition and subtraction

Small steps

Step 1	Apply number bonds within 10
Step 2	Add and subtract 1s
Step 3	Add and subtract 10s
Step 4	Add and subtract 100s
Step 5	Spot the pattern
Step 6	Add 1s across a 10
Step 7	Add 10s across a 100
Step 8	Subtract 1s across a10

Small steps

Step 9	Subtract 10s across a 100
Step 10	Make connections
Step 11	Add two numbers (no exchange)
Step 12	Subtract two numbers (no exchange)
Step 13	Add two numbers (across a 10)
Step 14	Add two numbers (across a 100)
Step 15	Subtract two numbers (across a 10)
Step 16	Subtract two numbers (across a 100)

Small steps

Step 17	Add 2-digit and 3-digit numbers
Step 18	Subtract a 2-digit number from a 3-digit number
Step 19	Complements to 100
Step 20	Estimate answers
Step 21	Inverse operations
Step 22	Make decisions

Apply number bonds within 10

Notes and guidance

In Year 2, children learnt to add and subtract two 2-digit numbers, including with exchanges. Throughout this block children build on that knowledge, working towards adding and subtracting 2-digit and 3-digit numbers with exchanges. To be successful with this, it is essential that children are confident in both using and applying their number bonds to and within 10 and this small step provides opportunity to consolidate this.

By the end of this small step, children should be more confident at recalling all the number bonds up to 10 in a variety of contexts. They will then apply this knowledge to number bonds to 100, for example: 3 + 2 = 5, so 30 + 20 = 50

Children use a variety of representations, including base 10, place value counters, double-sided counters, number lines, part-whole models and bar models.

Things to look out for

- Instead of recalling number facts, children may continue to rely on using fingers or manipulatives to add two numbers together.
- When using related facts of bonds to 10 to find bonds to 100, children may not increase all three numbers by a factor of 10

Key questions

- Which is the whole and which are the parts?
- What needs to be added to this part to make the whole?
- If you take this part from the whole, what will be left?
- Where would this number go in the part-whole model?
- What other number facts do you know if you know this?
- If you multiply both parts by 10 then add them together, what happens to the whole?

Possible sentence stems

- If the whole is ______ and one part is ______, then the other part is ______
- ______ + ______ = 10, so ______ + ______ = 100
- If I know that ______ + ______ = ______, then I also know …

National Curriculum links

- Add and subtract numbers mentally, including:
  - a 3-digit number and ones
  - a 3-digit number and tens
  - a 3-digit number and hundreds

Apply number bonds within 10

Key learning

- Annie has 9 double-sided counters.

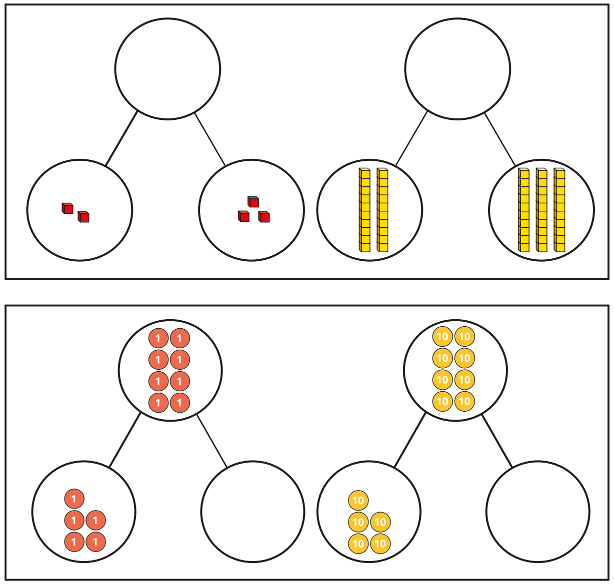
  

  She turns over one counter and sees the number fact 8 + 1 = 9

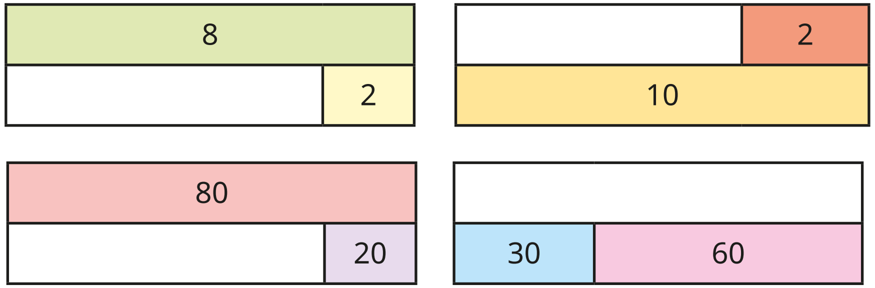
  What other number facts are there for the number 9?

- Complete each pair of part-whole models.

  Write a number sentence for each part-whole model.

- Complete the bar models.

  Write the fact family for each bar model.

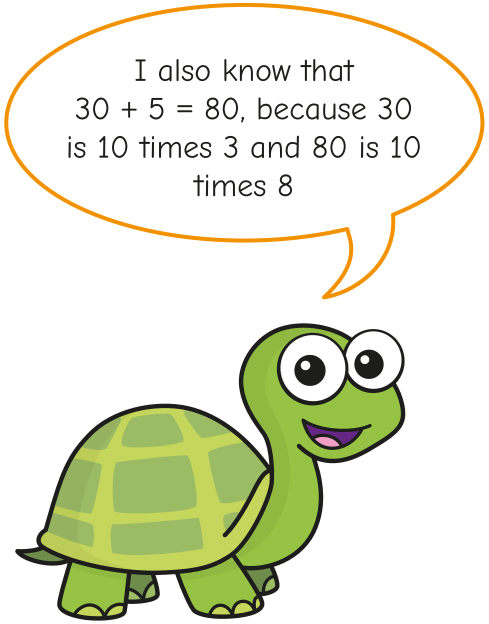
- Complete the addition facts.
  - 2 + ______ = 5
  - ______ + 4 = 7
  - ______ = 6 + 3
  - 4 + ______ = 9
  - 50 + 30 = ______
  - 70 = 20 + ______

  Write two subtraction facts for each addition fact.

Apply number bonds within 10

Reasoning and problem solving

Tiny knows that 3 + 5 = 8

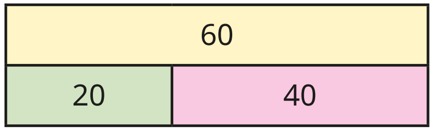


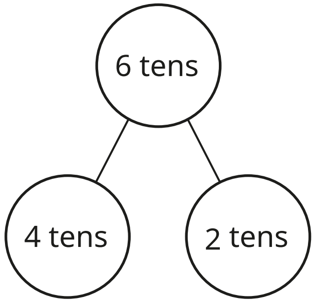
Is Tiny correct?

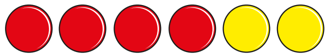
Explain your answer.

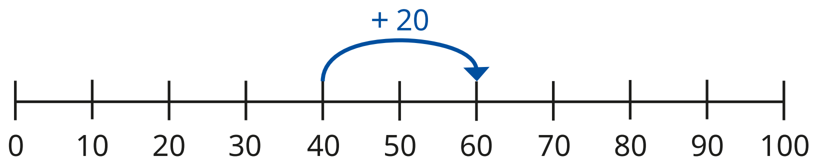
No

Which is the odd one out?









Explain your answer.

The odd one out is the counters.

Add and subtract 1s

Notes and guidance

In Year 2, children mentally added and subtracted 1s to and from a 2-digit number. In this small step, this skill is developed and extended to include 3-digit numbers.

At this stage of the block, there are no exchanges and therefore the tens and hundreds columns do not change. Using a place value chart alongside their calculations, children see that when 1s are added to or subtracted from a 3-digit number, the ones column changes every time.

Although the examples in this small step involve a change to the ones column only, it is worth asking the question, "Do you have enough ones to make an exchange?" This provides opportunity to reinforce the fact that 1 ten is made up of 10 ones, and since none of the ones columns in this step have more than 9 ones, there are no exchanges, so the tens and hundreds columns do not change.

Things to look out for

- Children may add to or subtract from the incorrect column in a number, for example 123 + 1 = 223
- Children may incorrectly adjust a known number fact when one number is increased by 1, for example 57 – 5 = 52, so 57 – 6 = 53; children may assume that because 5 has increased by 1, the answer should too.

Key questions

- What happens to any number when you add a 1-digit number?
- What happens to any number when you subtract a 1-digit number?
- Which columns change in a number when you add or subtract a 1-digit number?
- Will more than one column ever change?

Possible sentence stems

- ______ ones plus/minus ______ ones is equal to ______ ones.
- When adding or subtracting 1s to or from a number, the digit in the ______ column always changes.
- If I know 3 + 6 = 9, then I know that 123 + 6 = ______

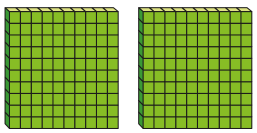
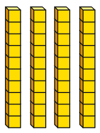
National Curriculum links

- Add and subtract numbers mentally, including:
  - a 3-digit number and ones
  - a 3-digit number and tens
  - a 3-digit number and hundreds

Add and subtract 1s

Key learning

- Use the place value charts to help you work out the calculations.
  - 243 + 5 = ______

Hundreds	Tens	Ones
		

  - 534 – 2 = ______

Hundreds	Tens	Ones
100 100 100 100 100	10 10 10	1 1 1 1

- Complete the table.

  One has been done for you.

– 3	Number	+ 3
290	293	296
	294	
	295	
	296	

- Continue the pattern.

258 = 251 + 7
257 = 251 + ______
256 = 251 + ______
255 = 251 + ______
254 = 251 + ______
253 = 251 + ______
252 = 251 + ______
251 = 251 + ______

Work with a partner.

Create your own pattern using a different number fact.

- Write <, > or = to compare each pair of number facts.

345 + 4 ◯ 349 – 5

825 + 3 ◯ 823 + 2

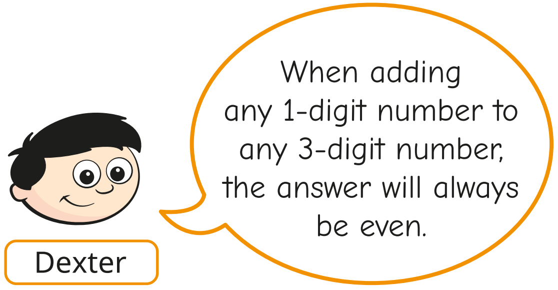
101 + 5 ◯ 109 – 2

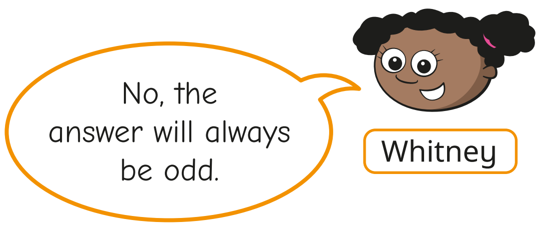
467 – 1 ◯ 467 – 2

Add and subtract 1s

Reasoning and problem solving

Dexter and Whitney are adding 1s.





Who do you agree with?

Explain your answer.

Both are incorrect.

Huan and Dani each have 252 stickers.

Huan is given an extra 6 stickers.

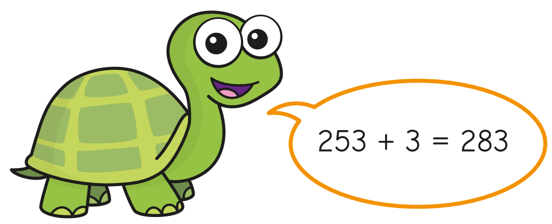
Dani is given an extra 7 stickers.

Who has more stickers?

Is there more than one way of working it out?

Dani

Tiny is working out an addition.



What mistake has Tiny made?

Tiny has added 3 tens instead of 3 ones.

Add and subtract 10s

Notes and guidance

Building on the small step in Year 2, when children added or subtracted 10s to and from a 2-digit number, children now extend this learning to 3-digit numbers. In this step, this does not require any crossing of the next or previous hundred.

Children use a range of models and representations, including place value charts, to explore the effect of adding or subtracting multiples of 10. Children should see that in these examples only the tens column changes, with the hundreds and ones columns remaining the same.

It is also important to highlight to children how they can use number bonds both to and within 10 to support this step. For example, 2 + 3 = 5, so 20 + 30 = 50. Using the language of "2 ones/tens plus 3 ones/tens is equal to 5 ones/tens" can support this.

Things to look out for

- Children may identify the incorrect place value column, particularly if using plain counters in a place value chart, for example 230 + 20 = 430 or 232
- Children may not understand placeholders, for example 736 – 30 = 706, not 76

Key questions

- What is the value of the digit ______ in the number ______?
- How many tens are there in ______?
- How many tens are you adding/subtracting?
- Will the value in the tens column increase or decrease? By how much?
- Which place value columns have changed/stayed the same?
- If you know 7 ones minus 3 ones is equal to 4 ones, then what is 7 tens minus 3 tens?
- What is the inverse of adding/subtracting ______?

Possible sentence stems

- There are ______ hundreds, ______ tens and ______ ones.
- ______ tens plus/minus ______ tens is equal to ______ tens.
- The tens column will increase/decrease by ______

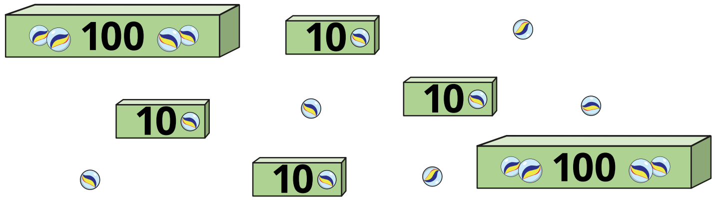
National Curriculum links

- Add and subtract numbers mentally, including:
  - a 3-digit number and ones
  - a 3-digit number and tens
  - a 3-digit number and hundreds

Add and subtract 10s

Key learning

- Aisha has some marbles.



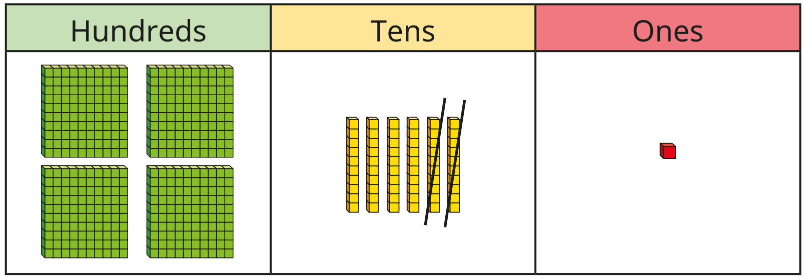
She buys 10 more marbles.

How many marbles does she have now?

How many marbles will Aisha have if she buys another:

- 20 marbles
- 30 marbles
- 40 marbles
- 50 marbles?

- Brett uses a place value chart and base 10 to work out 461 – 20

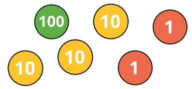
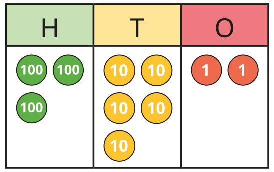


Use Brett's method to work out the subtractions.

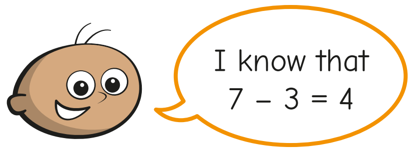
461 – 30	561 – 30	561 – 60

What do you notice?

- Complete the table.

– 10	Number	+ 10
		
		
		555

What would happen if the headings in the table changed to – 20 and + 20?

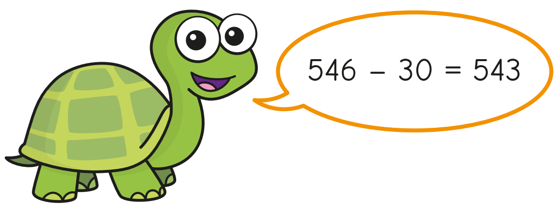
- 

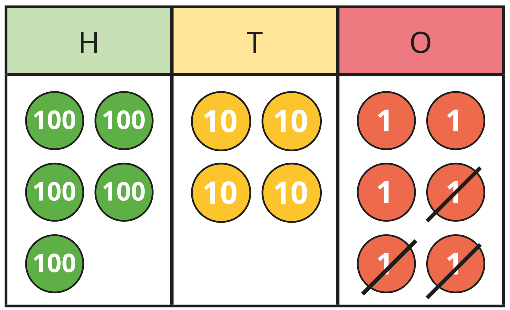
How can Tommy use this fact to work out 879 – 30?

Add and subtract 10s

Reasoning and problem solving

Tiny is working out a subtraction.





What mistake has Tiny made?

What is the correct answer?

Tiny has subtracted 3 ones rather than 3 tens.

516

Ron makes a 3-digit number using the digit cards.

5	7	9

Ron subtracts 50 from his 3-digit number.

What number could Ron have now?

529 547

709 745

907 925

Fill in the missing digits.

452 – __0 = 422

2__3 + 40 = 273

5__5 – 90 = 505

452 – 30 = 422

233 + 40 = 273

595 – 90 = 505

Add and subtract 100s

Notes and guidance

Building on the previous small steps, children now explore adding and subtracting multiples of 100. This will not require any crossing of the thousands.

Again, children use a range of models and representations, including place value charts, to explore the effect of adding or subtracting multiples of 100. Children recognise from the examples in this small step that only the hundreds place value column changes and the tens and ones columns remain the same.

It is also important to highlight to children how they can use number bonds to and within 10 to support in this step. For example, 8 – 5 = 3, so 800 – 500 = 300. Using the language of "8 ones/hundreds subtract 5 ones/hundreds is equal to 3 ones/hundreds" can support this.

Things to look out for

- Children may identify the incorrect place value column, particularly if using plain counters in a place value chart, for example 469 – 300 = 439 or 466
- If they are left with zero hundreds, for example 736 – 700, children may write 036. It is important to address why they do not require the leading zero.

Key questions

- What is the value of the digit ______ in the number ______?
- How many hundreds are there in ______?
- How many hundreds are you adding/subtracting?
- Will the value in the hundreds column increase or decrease? By how much?
- Which place value columns have changed/stayed the same?
- If you know 3 + 4 = 7, what is 300 + 400?
- What is the inverse of adding/subtracting ______?

Possible sentence stems

- There are ______ hundreds, ______ tens and ______ ones.
- ______ hundreds plus/minus ______ hundreds is equal to ______ hundreds.
- The hundreds column will increase/decrease by ______

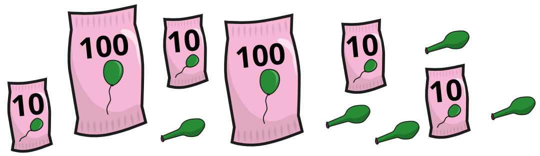
National Curriculum links

- Add and subtract numbers mentally, including:
  - a 3-digit number and ones
  - a 3-digit number and tens
  - a 3-digit number and hundreds

Add and subtract 100s

Key learning

- Kim has some balloons.



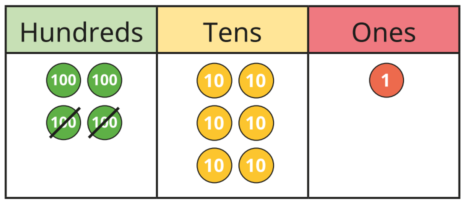
She buys 100 more balloons.

How many balloons does she have now?

How many balloons will Kim have if she buys another:

- 200 balloons
- 300 balloons
- 400 balloons
- 500 balloons?

- Filip uses place value counters and a chart to work out 461 – 200

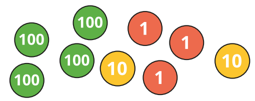
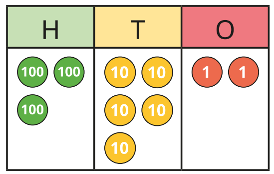


Use Filip's method to work out the subtractions.

461 – 300	561 – 300	561 – 500

What do you notice?

- Complete the table.

– 300	Number	+ 300
		
		
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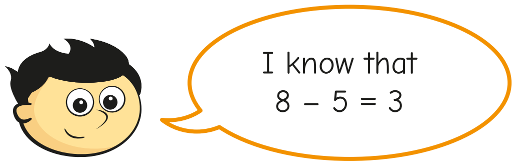
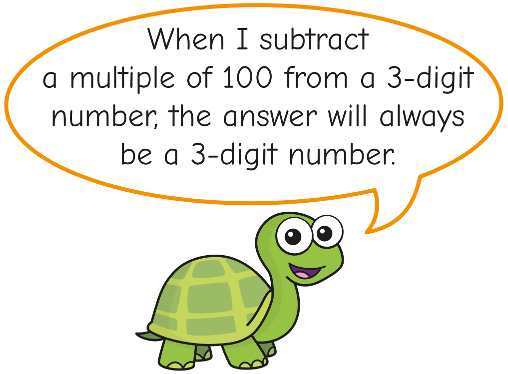


How can Jack use this fact to calculate 894 – 500?

Add and subtract 100s

Reasoning and problem solving



Do you agree with Tiny?

Explain your answer.

No

Write <, > or = to complete the statements.

976 – 300 ◯ 976 – 500

231 – 200 ◯ 231 + 100

642 – 300 ◯ 42 + 300

>

<

=

Start

378	+ 100	+ 200	– 200	+ 300
– 100	+ 300	– 500	+ 100	– 100
+ 500	– 300	+ 200	+ 200	– 100
– 200	+ 100	+ 100	– 100	+ 200
– 100	+ 300	– 500	+ 200	**778**

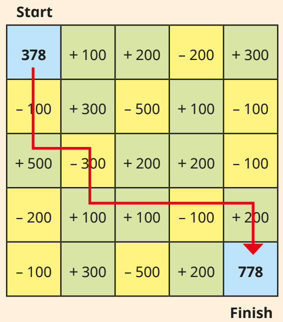
Finish

Find a path from the start to the finish so that your end number is 778

Is there more than one path?

What if the finish number is 578?

for example:



Spot the pattern

Notes and guidance

In this small step, children consolidate their learning from the previous three steps, exploring the effect of adding or subtracting 1s, 10s or 100s to or from any 3-digit number. As with the examples in previous steps, there are no exchanges.

Children explore what changes and what stays the same when adding multiples of 1, 10 or 100, for example: "If we add/subtract 10s, only the tens place value column changes." It is important to highlight why this is the case, by noting that the additions in this step always use bonds of less than 10, 100 or 1,000; in the subtractions, the digits in the number subtracted are always smaller than digits in the original number.

Children also explore performing multiple calculations to a starting number using a combination of the skills covered in the previous steps. Function machines are a useful representation.

Things to look out for

- Children may identify the incorrect place value column, particularly if using plain counters in a place value chart, for example 469 – 300 = 439 or 466
- Children need to be confident with placeholders left in columns after a subtraction, for example knowing that 736 – 30 = 706, not 76

Key questions

- What is the value of the digit ______ in the number ______?
- Will the value in the ones/tens/hundreds column increase or decrease? By how much?
- Which place value columns have changed/stayed the same? Why?
- If you know 3 + 4 = 7, what else do you know?
- What is the inverse of adding/subtracting ______?
- Will you get the same result if the operations are performed in a different order?

Possible sentence stems

- There are ______ hundreds, ______ tens and ______ ones.
- ______ ones/tens/hundreds plus/minus ______ ones/tens/hundreds is equal to ______ ones/tens/hundreds.
- The ones/tens/hundreds column will increase/decrease by ______

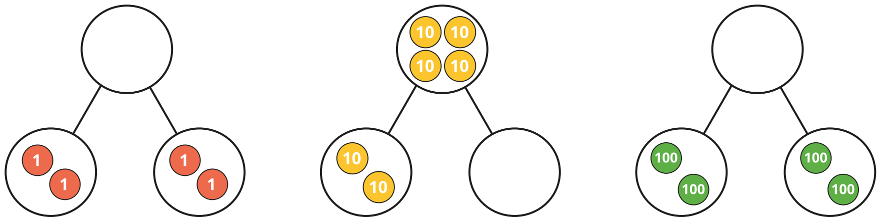
National Curriculum links

- Add and subtract numbers mentally, including:
  - a 3-digit number and ones
  - a 3-digit number and tens
  - a 3-digit number and hundreds

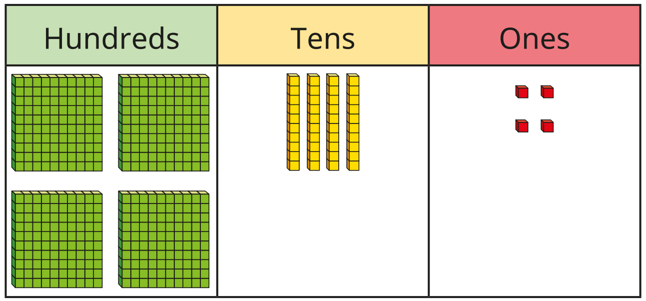
Spot the pattern

Key learning

- Complete the part whole models.



What do you notice?

- 

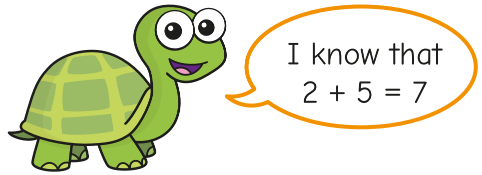
Use the place value chart to help you complete the number sentences.

▸ 444 + 3 = ______ ▸ 444 – 3 = ______

▸ 444 + 30 = ______ ▸ 444 – 30 = ______

▸ 444 + 300 = ______ ▸ 444 – 300 = ______

What do you notice? What stays the same and what changes?

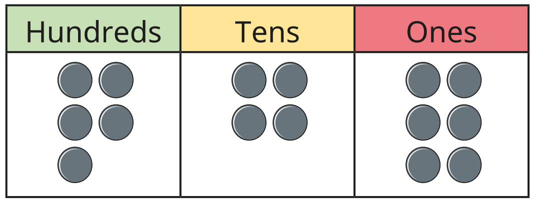
- 

Use Tiny's fact to complete the number sentences.

▸ 20 + 50 = ______ ▸ 500 + 200 = ______

▸ 7 – ______ = 2 ▸ 70 – ______ = 50

▸ 70 = ______ + 50 ▸ ______ = 700 – 200

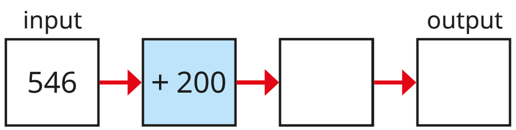
- 

Nijah adds 2 counters to the hundreds column.

She then takes 4 counters from the tens column.

What number does Nijah now have?

Complete the function machine to show Nijah's calculations.

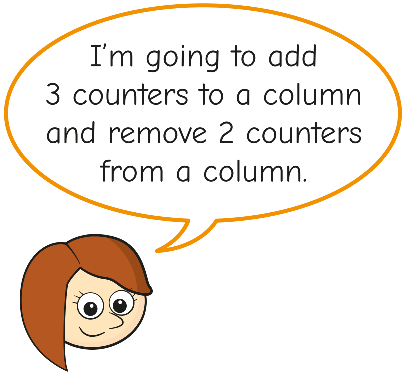


Spot the pattern

Reasoning and problem solving

Rosie makes this number in a place value chart.

Hundreds	Tens	Ones
100 100	10 10 10 10 10 10	1 1 1 1



What number could Rosie have now?

544 562 364
292 274 94
265 247 67

Complete the function machines.

input → – 20 → + 200 → output
□ → – 20 → + 200 → 375

426 → □ → □ → 129

714 → + 40 → – 100 → □ → □

Is there more than one way each set of machines can be completed?

195

+ 3, – 300 or – 300, + 3

for example: + 1, 655; + 20, 674

Add 1s across a 10

Notes and guidance

In Year 2 addition and subtraction, children explored strategies to add 1-digit numbers to a 2-digit number crossing 10. Children build on this to add a 1-digit number to a 3-digit number.

Children may initially rely on counting on in 1s, but the aim of this step is to build towards mental strategies for crossing the 10

It is vital that children are fluent in bonds to 10, so that they are able to identify the jump to the next multiple of 10. They also need to be fluent in their bonds within 10 to allow them to flexibly and efficiently partition numbers to work out how much further they need to jump from a multiple of 10

Number lines are a useful representation to model the process of jumping to and from the next multiple of 10

Things to look out for

- Children need to be able to identify the next multiple of 10
- Children may not be able to fluently partition a 1-digit number to work out how much further they need to jump from the multiple of 10
- Children may rely on counting on in 1s or using fingers, rather than using more efficient strategies to jump to and from the next multiple of 10

Key questions

- What is the next multiple of 10 after ______?
- How can you partition ______?
- What number do you add to ______ to make 10?
- What is the jump from ______ to the next multiple of 10?
- If ______ is a part/jump, what is the other part/jump ______?
- Which columns have changed/stayed the same?
- Which method do you prefer?

Possible sentence stems

- The next multiple of 10 after ______ is ______
- ______ can be partitioned into ______ and ______
- I need to add ______ to get to the next 10, and then add another ______

National Curriculum links

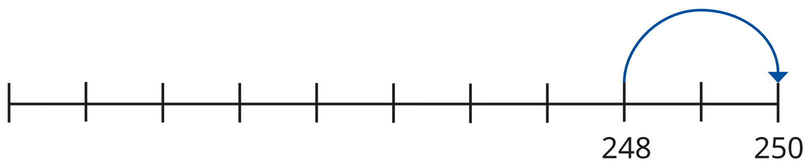
- Add and subtract numbers mentally, including:
  - a 3-digit number and ones
  - a 3-digit number and tens
  - a 3-digit number and hundreds

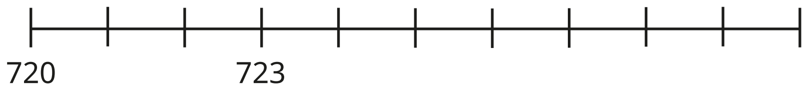
Add 1s across a 10

Key learning

- Work out the additions.
  - 237 + 1
  - 237 + 2
  - 237 + 3
  - 237 + 4
  - 237 + 5

- Use the number lines to find the jump to the next multiple of 10



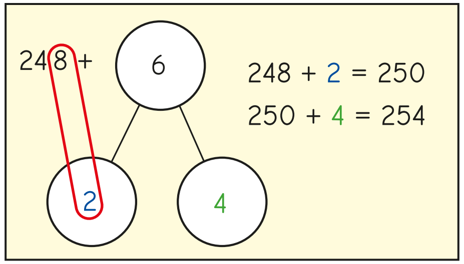


- Work out the additions.

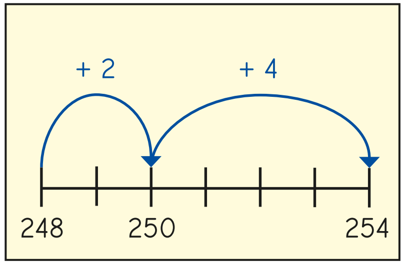
250 + 3	730 + 1	510 + 5
248 + 5	723 + 8	506 + 9

- Tom and Mo are working out 248 + 6

Tom



Mo



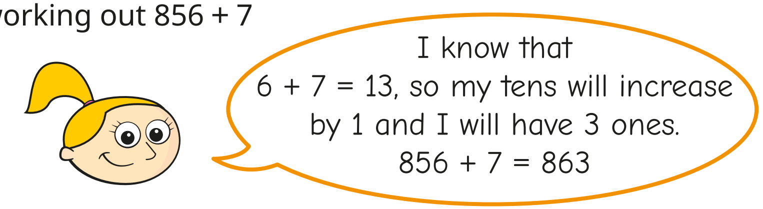
Talk about each method with a partner.

Whose method do you prefer?

Use that method to work out the additions.

248 + 9	638 + 3	579 + 6	589 + 4

- Eva is working out 856 + 7



Use Eva's method to work out the additions.

865 + 5	438 + 4	713 + 9	564 + 8

Add 1s across a 10

Reasoning and problem solving

Here are four digit cards.

2	5	7	9

Use three of the digits to complete the addition in as many different ways as you can.

3			+	

Find all the possible totals.

In which additions did you need to cross a 10?

totals without crossing:

359, 377, 397, 399

totals with crossing:

332, 334, 336, 361, 366, 381, 384, 402

Is the statement always, sometimes or never true?

> When 7 and 5 are added together in the ones column, the digit in the ones column of the answer will always be 2

Explain your answer.

always true, because 5 + 7 = 12

Which additions are harder to work out?

234 + 3	506 + 8
455 + 7	521 + 6

Talk about your answer with a partner.

multiple possible answers, e.g.

455 + 7 and 506 + 8, because they cross a 10

White Rose Maths

Add 10s across a 100

Notes and guidance

Children build on previous steps to add multiples of 10 to any 3-digit number where they are required to cross the next hundred. This small step focuses on mental strategies.

It is vital that children are fluent in their bonds to 100 so that they are able to identify the jump to the next multiple of 100. They also need to be fluent in their bonds within 100, for example 70 = 30 + 40, to allow them to efficiently and flexibly partition numbers to work out how much further they need to jump after reaching the next 100

It is important to explore with children which place value columns always/sometimes/never change when adding a multiple of 10

Things to look out for

- Children may find it difficult to add 10s over a hundred boundary.
- Children may need help to identify the next multiple of 100 and how far away it is.
- Children may not be able to fluently partition a multiple of 10 to work out how much further they need to jump from the next 100
- Children may omit the ones digit in the answer, for example writing 278 + 60 = 330

Key questions

- What is the next multiple of 100 after ______?
- How can you partition ______?
- What number do you add to ______ to make 100?
- If ______ is a part/jump, what is the other part/jump?
- Which columns have changed/stayed the same?
- Does the ______ column always/sometimes/never change?
- Which method is more efficient? Which method do you prefer?

Possible sentence stems

- ______ can be partitioned into ______ and ______
- The next multiple of 100 after ______ is ______
- I need to add ______ to cross the next 100, and then add another ______

National Curriculum links

- Add and subtract numbers mentally, including:
  - a 3-digit number and ones
  - a 3-digit number and tens
  - a 3-digit number and hundreds

Add 10s across a 100

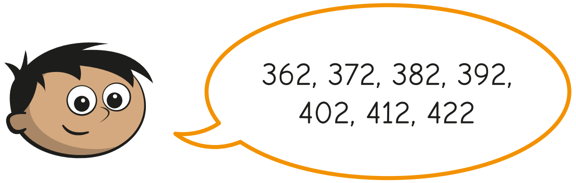
Key learning

- Complete the number tracks.

260	270		290			320	

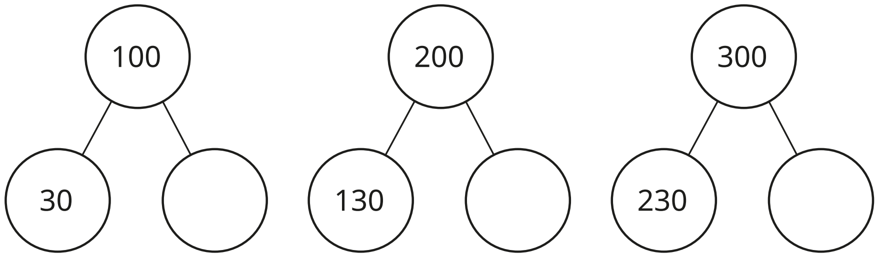
268		288	298				338

- Amir is working out 352 + 70 by counting on in 10s.



Use Amir's method to find 564 + 80

- Complete the part-whole models.

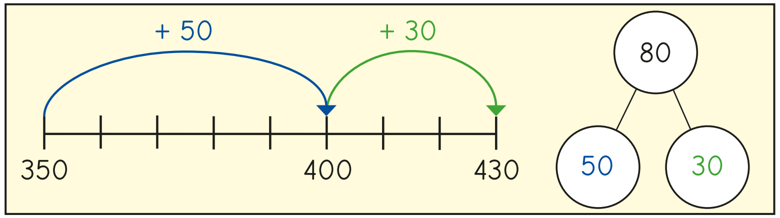


What do you notice?

- Find the missing numbers.

350 + ______ = 400	280 + ______ = 300	830 + ______ = 900
352 + ______ = 402	283 + ______ = 303	839 + ______ = 909

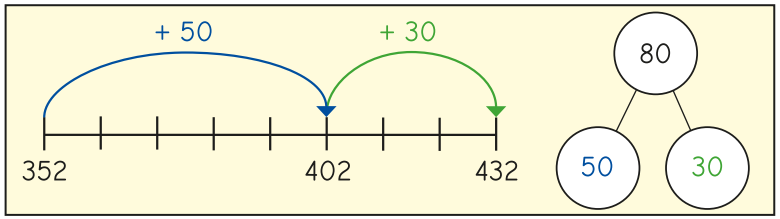
- Dora is working out 350 + 80



Use Dora's method to work out the additions.

240 + 80	690 + 80	690 + 40	90 + 830

- Scott uses a similar method to work out 352 + 80



Use Scott's method to work out the additions.

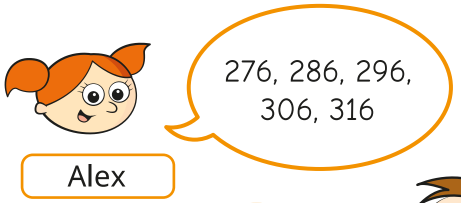
248 + 80	695 + 80	297 + 30	90 + 237

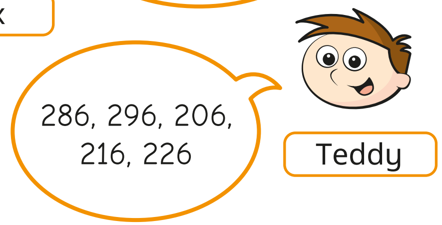
Add 10s across a 100

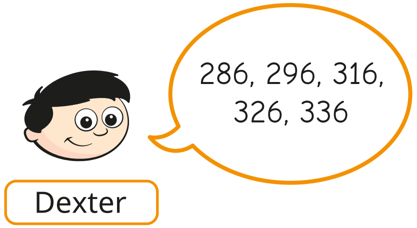
Reasoning and problem solving

Alex, Teddy and Dexter are working out 276 + 50 by counting on in 10s.

They have each made a different mistake.







What mistakes have they made?

What is the correct answer?

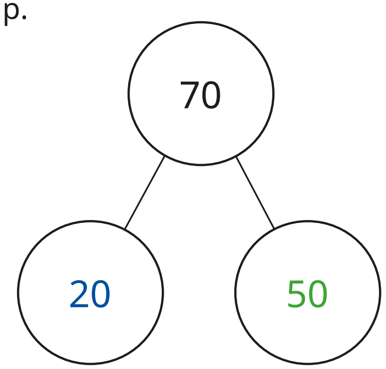
Alex has included 276, the start number.

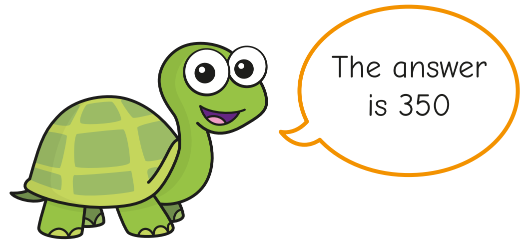
Teddy has not counted into the next hundred correctly.

Dexter has missed 306

326

Tiny is working out 284 + 70 using the part-whole model to help.





What mistake has Tiny made?

Work out the correct answer.

Tiny has partitioned 70 correctly and added the tens correctly, but has forgotten to include the ones.

354

Subtract 1s across a 10

Notes and guidance

In Year 2, children covered strategies to subtract a 1-digit number from a 2-digit number crossing a 10. Children build on this, working towards subtracting a 1-digit number from a 3-digit number. They focus on mental strategies for crossing a 10

Children may start by counting back in 1s, but it is important to try to move towards the more efficient strategy of jumping to and from the previous multiple of 10

Children need to be fluent in their recall of number bonds to 10 and in applying them, so that they can subtract from a multiple of 10, for example 10 – 3 = 7, so 480 – 3 = 477. They also need to be fluent in their bonds within 10 to allow them to efficiently and flexibly partition numbers to work out how much further they need to jump back from a multiple of 10

Things to look out for

- Children may not be able to fluently partition a 1-digit number to work out how much further they need to jump back from the multiple of 10
- Children may rely on counting back in 1s or using fingers, rather than using more efficient strategies to jump to the previous multiple of 10

Key questions

- What is the previous multiple of 10 before ______?
- How can you partition ______?
- What is the jump from ______ to the previous multiple of 10?
- If ______ is a part/jump, what is the other part/jump ______?
- Which columns have changed/stayed the same?
- Which method do you prefer?

Possible sentence stems

- The previous multiple of 10 before ______ is ______
- ______ can be partitioned into ______ and ______
- I need to subtract ______ to get to the previous multiple of 10, then subtract ______ more.

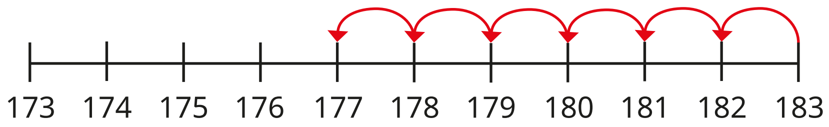
National Curriculum links

- Add and subtract numbers mentally, including:
  - a 3-digit number and ones
  - a 3-digit number and tens
  - a 3-digit number and hundreds

Subtract 1s across a 10

Key learning

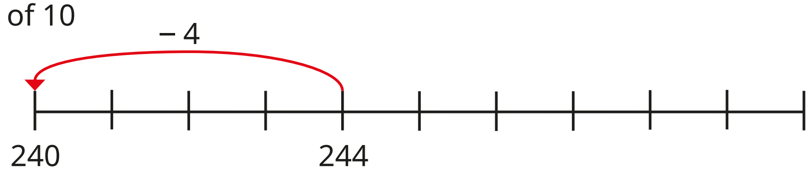
- Use the number line to work out 183 – 6

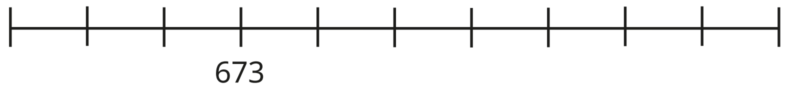


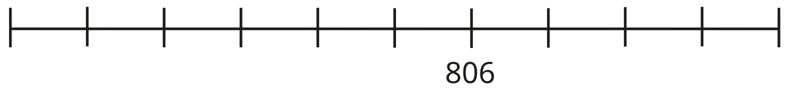
Use a number line to work out the subtractions.

683 – 6 | 623 – 6 | 481 – 7 | 682 – 5

- Use the number lines to find the jump to the previous multiple of 10





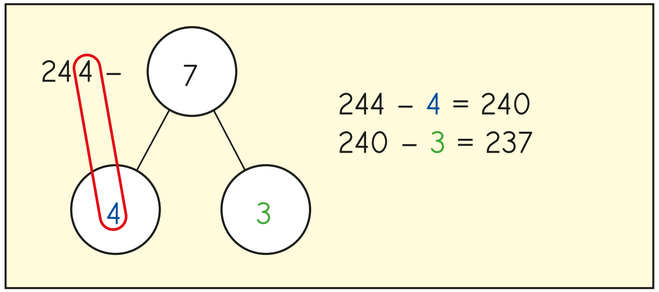


- Work out the subtractions.

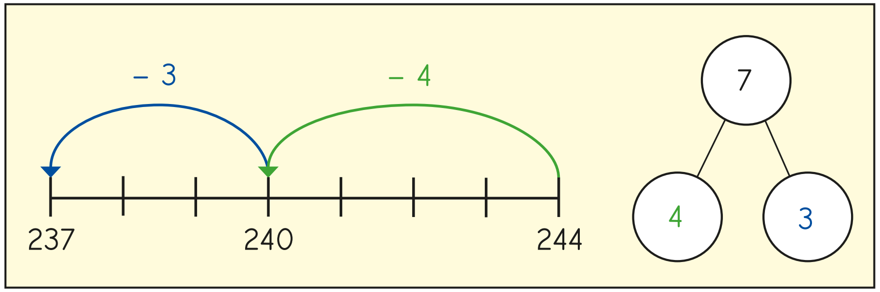
70 – 3 | 370 – 3 | 640 – 8 | 520 – 7

- Scott and Whitney are working out 244 – 7

Scott's method



Whitney's method



Whose method do you prefer?

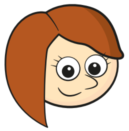
Use that method to work out the subtractions.

242 – 9 | 633 – 7 | 171 – 6 | 581 – 4

Subtract 1s across a 10

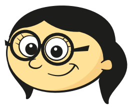
Reasoning and problem solving

Rosie, Annie and Ron are working out 234 – 9



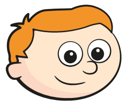
I started at 234 in my head and counted back in 1s.

Rosie



I subtracted 10 and then added 1 back on.

Annie



I jumped back 4 to the previous 10 and then jumped back 5 more.

Ron

Use each method to work out the answer.

Whose method do you prefer?

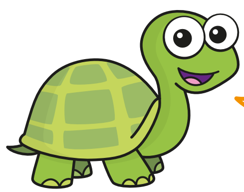
225

164

1 **2** **3** **4** **5**

6 **7** **8** **9**

Tiny is subtracting each of the 1-digit numbers from 164



I will need to cross a 10 five times.

Do you agree with Tiny?

Explain your answer.

Yes

Subtract 10s across a 100

Notes and guidance

Children extend their knowledge of subtracting 10s from any 3-digit number to include crossing a 100, using similar mental strategies to those covered in the previous small step.

Children may start by initially counting back in 10s, but it is important to try to move towards a more efficient strategy of jumping to and from the previous multiple of 100

Children need to be fluent in their bonds for multiples of 10 within 100 to allow them to efficiently and flexibly partition numbers to work out how much further they need to jump back from the multiple of 100, for example 50 = 30 + 20 and 40 + 10. Children also need to be fluent in their recall of number bonds to 100 and applying them so that they can subtract from a multiple of 100, for example 100 – 40 = 60, so 500 – 40 = 460 and 501 – 40 = 461

Things to look out for

- Children may not be able to fluently and flexibly partition a multiple of 10
- Children may rely on counting back in 10s, rather than using more efficient strategies.
- Children may forget to include the digit in the ones column in the answer, for example 732 – 50 = 680

Key questions

- What is the multiple of 100 before ______?
- How can you partition ______?
- What is the jump from ______ to the previous multiple of 100?
- If ______ is a part/jump, what is the other part/jump?
- Which columns have changed/stayed the same?
- Which method do you prefer? Which is more efficient?

Possible sentence stems

- The multiple of 100 before ______ is ______
- ______ can be partitioned into ______ and ______
- I need to subtract ______ to get to the previous multiple of 100, then subtract ______ more.

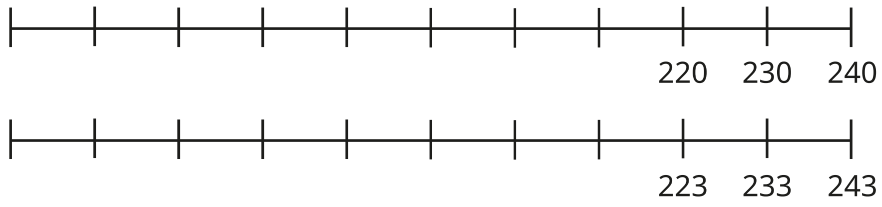
National Curriculum links

- Add and subtract numbers mentally, including:
  - a 3-digit number and ones
  - a 3-digit number and tens
  - a 3-digit number and hundreds

Subtract 10s across a 100

Key learning

- Complete the number lines by counting back in 10s.

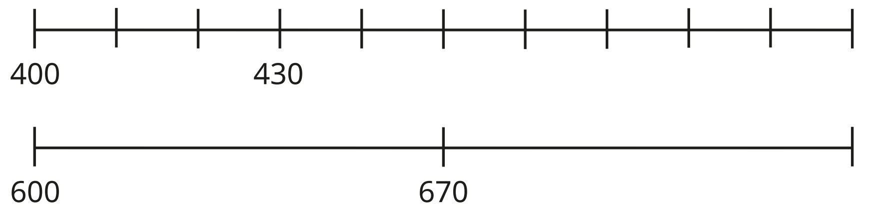


Use the number lines to work out the subtractions.

240 – 60	240 – 70	243 – 70	233 – 70

What do you notice?

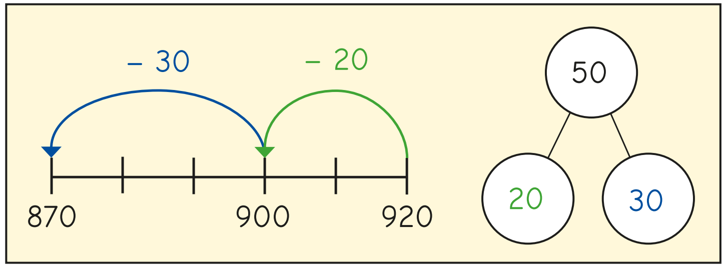
- Use the number lines to find the jump to the previous hundred.



- Work out the subtractions.

800 – 30	500 – 40	509 – 40	202 – 70

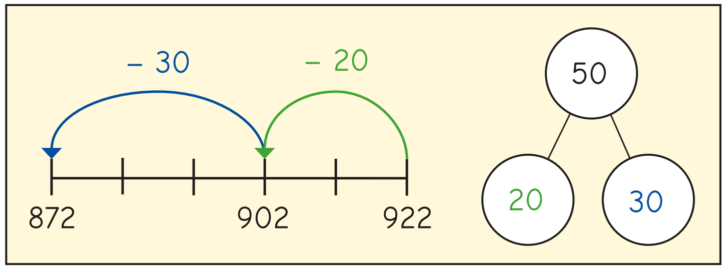
- Dani is working out 920 – 50



Use Dani’s method to work out the subtractions.

320 – 50	320 – 70	340 – 70	580 – 90

- Huan is working out 922 – 50



Use Huan’s method to work out the subtractions.

322 – 50	564 – 80	149 – 70	819 – 30

Subtract 10s across a 100

Reasoning and problem solving

What mistake has Tiny made?

Tiny has subtracted 5 ones rather than 5 tens.

Complete the sentences with "always", "sometimes" or "never".

When I subtract a multiple of 10 from a 3-digit number, the ones column _______ changes.

When I subtract a multiple of 10 from a 3-digit number, the tens column _______ changes.

When I subtract a multiple of 10 from a 3-digit number, the hundreds column _______ changes.

never

always

sometimes

Here are some digit cards.

2 5 6 8

Use the digit cards to complete the subtraction in as many different ways as you can.

☐ ☐ ☐ – ☐ 0

How many times did you need to cross a 100?

Talk about it with a partner.

12 solutions include crossing a 100

12 solutions do not include crossing a 100

Make connections

Notes and guidance

In this small step, children consolidate what they have learnt so far in this block by adding and subtracting 1s, 10s and 100s to/from 3-digit numbers, both with and without the need to cross a 10 or a 100

The focus is to develop number sense through explicitly exploring the connections between calculations. For example, if children know 5 + 7 = 12, then they also know that 12 – 5 = 7, 120 – 50 = 70 and 50 + 70 = 120

To support children in seeing these links, it is useful to use language such as "5 ones plus 7 ones is equal to 12 ones, so 5 tens plus 7 tens is equal to 12 tens." It is also vital that children have a strong understanding of the fact that 10 tens are equivalent to 1 hundred.

Things to look out for

- Children may not be confident with place value knowledge of 10 ones = 1 ten, 20 ones = 2 tens, 10 tens = 1 hundred and so on.
- Children may not be able to fluently and flexibly partition a multiple of 10 or 100
- Children may rely on counting on or back, or using written methods, rather than using more efficient strategies to jump to the next/previous multiple.

Key questions

- What is the multiple of 10/100 after ______?
- What is the multiple of 10/100 before ______?
- What is the jump from ______ to the next/previous multiple?
- If ______ is a part/jump, what is the other part/jump?
- Which columns have changed/stayed the same?
- Which method do you prefer? Which is more efficient?

Possible sentence stems

- ______ ones + ______ ones = ______ ones,
  so ______ ones – ______ ones = ______ ones
- ______ ones + ______ ones = ______ ones,
  so ______ tens + ______ tens = ______ tens

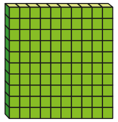
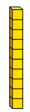
National Curriculum links

- Add and subtract numbers mentally, including:
  - a 3-digit number and ones
  - a 3-digit number and tens
  - a 3-digit number and hundreds

Make connections

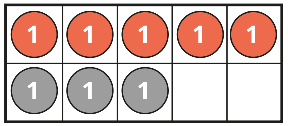
Key learning

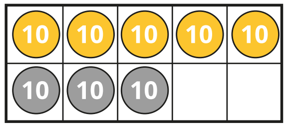
- Use base 10 to help you complete the sentences.

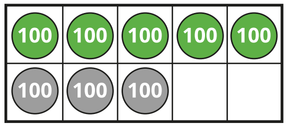
 = 1 hundred  = 1 ten  = 1 one

- ▸ 10 ones = ______ ten
- ▸ 20 ones = ______ tens
- ▸ 30 ones = ______ tens
- ▸ 10 tens = ______ hundred
- ▸ 40 tens = ______ hundreds
- ▸ ______ tens = 6 hundreds

- Complete the addition sentences.







- ▸ 5 ones + 3 ones = ______ ones   5 + 3 = ______
- ▸ 5 tens + 3 tens = ______ tens   50 + 30 = ______
- ▸ 5 hundreds + 3 hundreds = ______ hundreds   500 + 300 = ______

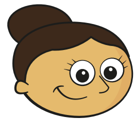
Write a subtraction number sentence for each ten frame.

- Use the number cards to complete the bar models.

7	8	15

70	80	150

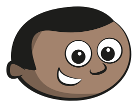

Write the fact family for each bar model.

- 

I know that 13 – 6 = 7,
so I also know that 23 – 6 = 17
and 33 – 6 = 27

Use Dora's fact to work out the subtractions.

130 – 60	530 – 60	830 – 70	834 – 70

- 

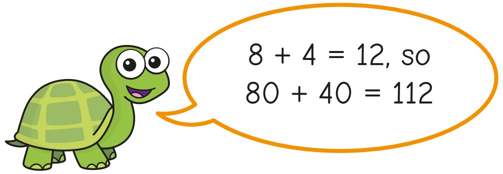
I know that 90
is 10 away from 100, so
240 + 90 = 240 + 100 – 10

Use Mo's method to work out the calculations.

246 + 90	24 + 9	324 + 9	240 – 90	888 – 9

Make connections

Reasoning and problem solving



Do you agree with Tiny?

Explain your answer.

No

What could the missing number be?

263 + 60 < 319 + ☐ < 434 – 80

Find all the possible solutions.

any number between 5 and 34

Which number sentence is incorrect?

5 + 7 = 12

120 = 50 + 70

12 ones – 7 ones = 5 ones

50 – 70 = 120

12 – 5 = 7

12 tens – 5 tens = 7 tens

Write the correct sentence.

50 – 70 = 120

120 – 70 = 50 or
120 – 50 = 70 or
50 + 70 = 120

Tiny is working out the addition.

600 + 400

What has Tiny done well?

How could Tiny's answer be improved?

Tiny has found the correct number of hundreds, but 10 hundred is equal to 1,000

Add two numbers (no exchange)

Notes and guidance

So far in this block, children have mentally added and subtracted 1s, 10s and 100s with 3-digit numbers. The focus now moves to written addition and subtraction. By the end of this small step, children will be able to add two numbers, either both 2-digit or both 3-digit, using the formal written method.

Children should be confident at placing 3-digit numbers into a place value chart before attempting to add and subtract numbers using the written method.

Base 10 and place value counters are used in a place value chart alongside the written method. No exchanges take place in this step, but it is a good idea to ask, "Do you have enough ones/tens to exchange for a ten/hundred?" as this will support their learning in future steps.

Things to look out for

- Children may not line the digits up correctly.
- Children may start adding from the hundreds or tens column, i.e. work from left to right – this will work in this small step, but should be avoided as it will not work when exchanges are required.
- Children may need help with placeholders when there are no tens or ones.

Key questions

- How can you represent the question using base 10?
- How can you put these numbers into a place value chart?
- Does it matter which columns you add together first?
- Do you have enough ones/tens to make an exchange?
- What do you put in the tens column if there are no tens?

Possible sentence stems

- ______ ones plus ______ ones is equal to ______ ones.
- ______ tens plus ______ tens is equal to ______ tens.
- ______ hundreds plus ______ hundreds is equal to ______ hundreds.
- ______ hundreds, ______ tens and ______ ones is equal to ______

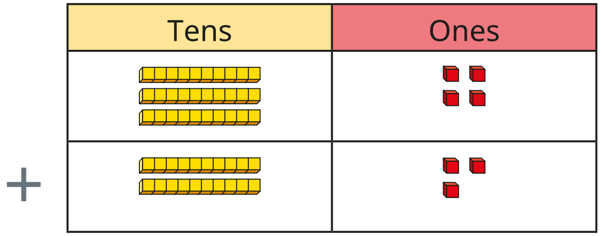
National Curriculum links

- Add and subtract numbers with up to three digits, using formal written methods of columnar addition and subtraction
- Solve problems, including missing number problems, using number facts, place value, and more complex addition and subtraction

Add two numbers (no exchange)

Key learning

- Find the sum of 34 and 23



	T	O
	3	4
+	2	3

- Find the sum of 345 and 432

	Hundreds	Tens	Ones
	100 100 100	10 10 10 10	1 1 1 1 1
+	100 100 100 100	10 10 10	1 1

	H	T	O
	3	4	5
+	4	3	2

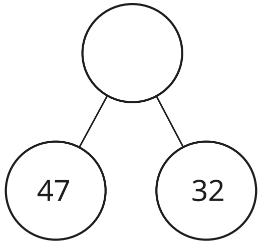
- Work out the additions.

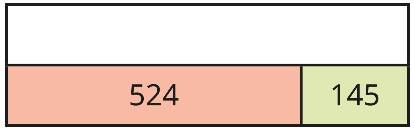
	T	O
	7	3
+	2	5

	H	T	O
	5	2	4
+	3	7	3

	H	T	O
	1	0	7
+	4	0	1

- Fill in the missing numbers.

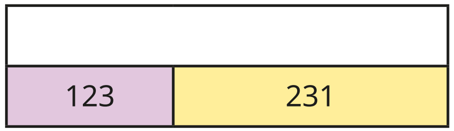




- Dora scores 123 points in a game.

  Ron scores 231 points in the same game.

  How many points do they score in total?



- 562 people go to a museum on Saturday.

  317 people go to the museum on Sunday.

  How many people altogether went to the museum at the weekend?

- The mass of a book is 145 g.

  A box is 230 g heavier than the book.

  What is the mass of the box?

Add two numbers (no exchange)

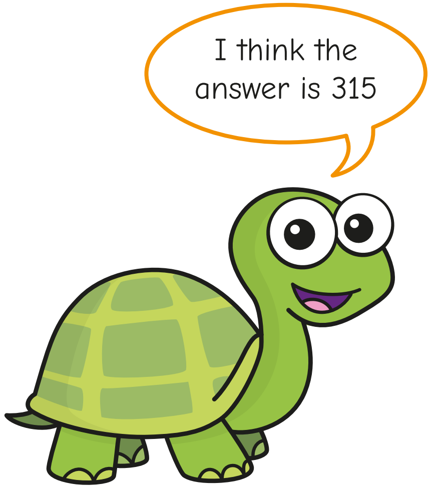
Reasoning and problem solving

Brett and Jack are playing a game.

Brett has 213 points.

Jack has 102 more points than Brett.

How many points do they have altogether?



What mistake has Tiny made?

528

Find the missing digits.

	2	3	+	4	5		=	6	7	9

What could the missing digits be?

	3	6	+		3	2	=	5	6	8

What could the missing digits be?

3	4	1	+	5	3		=	8	7	

2, 6

4, 1; 3, 2; 2, 3; 1, 4

1, 2; 2, 3; 3, 4; 4, 5; 5, 6; 6, 7; 7, 8; 8, 9

Subtract two numbers (no exchange)

Notes and guidance

In the previous step, children used base 10 and place value counters in place value charts to add two 2-digit or 3-digit numbers. In this small step, they explore subtraction of 2-digit numbers and 3-digit numbers.

It is important that children continue to work with concrete resources alongside the formal written method. When using concrete resources, the key difference in this step is that they do not need to make the number they are subtracting, but instead physically remove it from the representation of the number they are subtracting from.

There are no exchanges in this step, but it is still worth asking the children, "Do you need to make an exchange?" in order to support future learning. The next few small steps involve addition and subtraction where exchanges are necessary.

Things to look out for

- Children may make the number incorrectly with base 10 or place value counters in a place value chart.
- Children may not line the digits up correctly in the formal written method.
- Children may physically create the second number (that is being subtracted), which could lead to confusion.

Key questions

- How can you put this number into a place value chart?
- Do you need to make both numbers before you can subtract?
- Does it matter which column you subtract from first?
- Do you have enough ones/tens to subtract _______ ones/tens?
- Do you need to make an exchange?
- Does it matter which number you write at the top when using the column method for subtraction?

Possible sentence stems

- _______ ones/tens/hundreds minus _______ ones/tens/hundreds is equal to _______ ones/tens/hundreds.
- Now there are _______ hundreds, _______ tens and _______ ones. The answer is _______

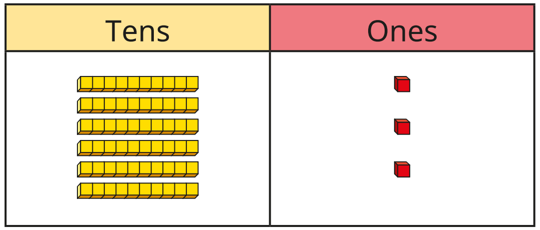
National Curriculum links

- Add and subtract numbers with up to three digits, using formal written methods of columnar addition and subtraction
- Solve problems, including missing number problems, using number facts, place value, and more complex addition and subtraction

Subtract two numbers (no exchange)

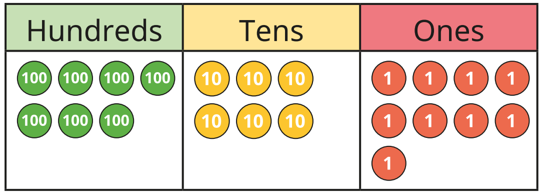
Key learning

- Work out 63 – 51



	T	O
	6	3
–	5	1

- Work out 769 – 147



	H	T	O
	7	6	9
–	1	4	7

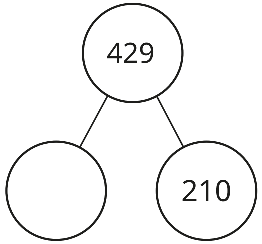
- Work out the subtractions.

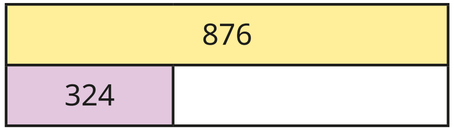
	T	O
	8	5
–	2	4

	H	T	O
	3	2	8
–	1	0	7

	H	T	O
	7	2	9
–	3	0	9

- Work out the missing numbers.

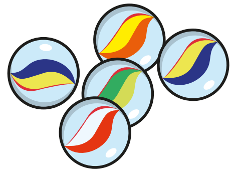




- Tom has 75 marbles.

  He gives 35 marbles to Amir.

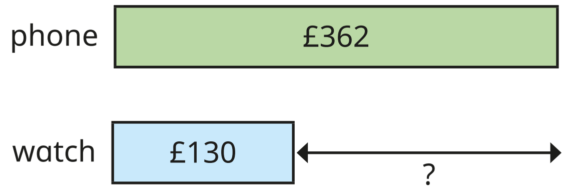
  How many marbles does Tom have left?



- A phone costs £362

  A watch costs £130

  How much more money does the phone cost than the watch?



  What is the total cost of the phone and the watch?

Subtract two numbers (no exchange)

Reasoning and problem solving

What could the missing digits in the subtraction be?

Find all the possible answers.

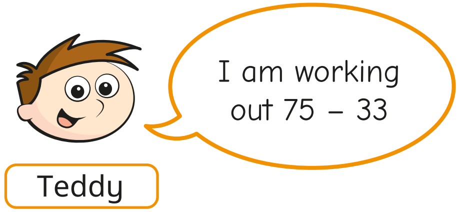
	H	T	O
	6	$\boxed{}$	6
−	2	$\boxed{}$	4
	4	2	2

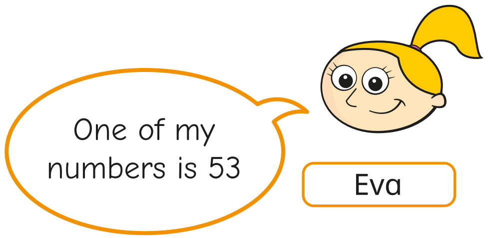
What is the pattern for the two missing digits?

Explain your answer.

9, 7; 8, 6; 7, 5; 6, 4;
5, 3; 4, 2; 3, 1; 2, 0

Teddy and Eva are both working out a subtraction.





Teddy's answer is double Eva's answer.

What could Eva's other number be?

Compare answers with a partner.

74 or 32

Add two numbers (across a 10)

Notes and guidance

Children have already used the formal written method to add and subtract 2- and 3-digit numbers with no exchanges. In this small step, they again add two numbers, but now with exchanges into the tens: when the ones are added together, they will (sometimes) total more than 9

Both numbers are made using base 10 or place value counters in a place value chart. Children need to begin adding in the ones column, working from right to left. The use of manipulatives helps children to understand that if they have 10 or more ones, they can exchange them for a ten, which is added to the tens column. Exchanging with base 10 in a place value chart alongside the formal written calculation helps children to understand the value of the 1 that has been added to the tens column in the written method.

Things to look out for

- Children may start adding from the hundreds or tens column, i.e. working from left to right.
- When two digits sum to more than 10, children may put this number in the ones column instead of exchanging 10 ones for 1 ten.
- Children may forget to add the ten that has been exchanged for 10 ones.

Key questions

- Does it matter which column's numbers you add together first?
- Do you have enough ones to make an exchange?
- Where do you put the ten that you made from exchanging 10 ones in your model?
- How can you show that you have exchanged 10 ones in your written calculation?

Possible sentence stems

- ______ ones + ______ ones = ______ ones
- If I have ______ ones, I can exchange them for ______ ten and ______ ones.
- I have ______ hundreds, ______ tens and ______ ones, so altogether I have ______

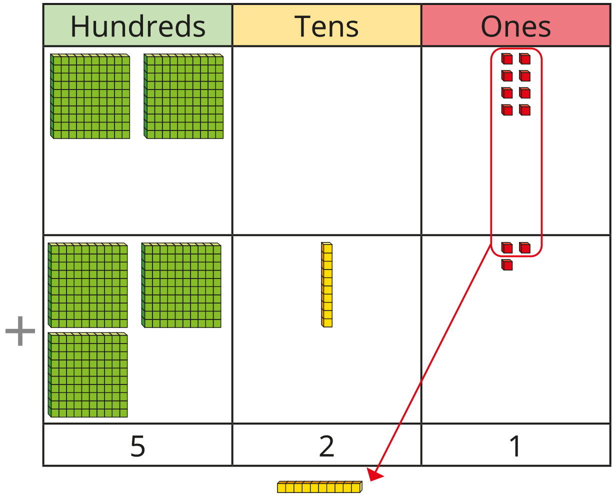
National Curriculum links

- Add and subtract numbers with up to three digits, using formal written methods of columnar addition and subtraction
- Solve problems, including missing number problems, using number facts, place value, and more complex addition and subtraction

Add two numbers (across a 10)

Key learning

- Dexter uses base 10 to work out 208 + 313



	H	T	O
	2	0	8
+	3	1	3
	5	2	1
		1	

Use Dexter's method to work out the additions.

345 + 437   365 + 126   328 + 517

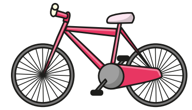
- Use place value counters to help you work out the additions.

	T	O
	6	4
+	2	8

	H	T	O
	7	1	9
+	1	5	3

	H	T	O
	5	6	1
+	2	1	9

- Scott cycles 204 miles in the first week of his summer holiday.



He cycles another 117 miles in the second week.

How many miles does he cycle in the first two weeks of his holiday?

- A tablet costs £329

  - A laptop costs £154 more than the tablet.

    How much does the laptop cost?

  - A TV costs £107 more than the laptop.

    How much does the TV cost?

- Fill in the missing digits.

	H	T	O
	2		3
+	1	6	
	3	7	0

Add two numbers (across a 10)

Reasoning and problem solving

Is the statement true or false?

In this calculation, there will be no tens in the answer, because there are no tens in the numbers being added together.

	H	T	O
	3	0	5
+	6	0	7

Explain your answer.

False

Tiny is working out 325 + 417

	H	T	O
	3	2	5
+	4	1	7
	7	3	12

Explain Tiny's mistake.

What is the correct answer?

742

Is the statement true or false?

If you add two numbers and there are enough ones to make an exchange, the answer will never have the digit 9 in the ones column.

Explain your answer.

True

Add two numbers (across a 100)

Notes and guidance

In Year 2, children added two 2-digit numbers, exchanging 10 ones for 1 ten. In the previous small step, they did the same with 3-digit numbers. In this small step, they exchange 10 tens for 1 hundred.

Children make both numbers using base 10 or place value counters. They need to begin adding in the ones column, working from right to left. After adding each column, ask whether they need to make an exchange. Seeing 10 tens physically swapped for 1 hundred, alongside the formal written method, will deepen children's understanding of this step.

The main focus is on exchanging into the hundreds column, but children should continue to check for any exchanges from the ones into the tens column.

Things to look out for

- Children may forget to add the hundred that has been exchanged for 10 tens.
- When an exchange is needed, writing the 1 (the 1 hundred that comes from exchanging 10 tens) in the incorrect place could cause confusion.
- If two exchanges are needed, children may struggle to know what each digit they have "carried" represents.

Key questions

- Does it matter which column you add together first?
- Do you have enough ones/tens to make an exchange?
- Where do you put the hundred that you made from exchanging 10 tens in your model?
- How can you show that you have exchanged 10 tens in your written calculation?

Possible sentence stems

- ______ tens + ______ tens = ______ tens
- If I have ______ tens, I can exchange them for ______ hundred and ______ tens.
- I have ______ hundreds, ______ tens and ______ ones, so altogether I have ______

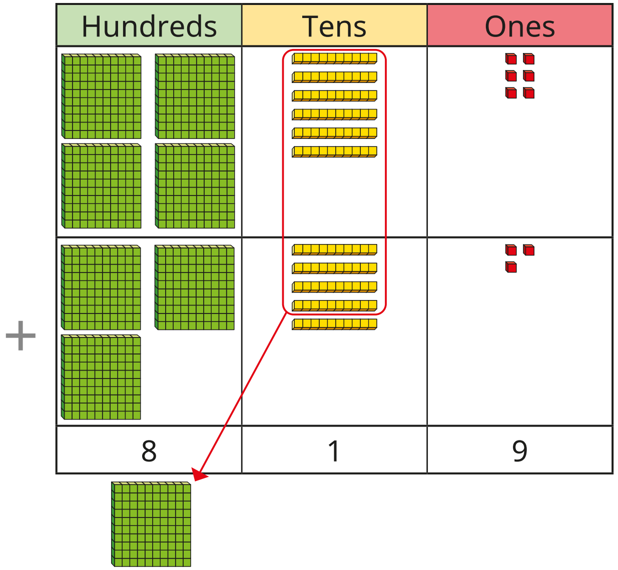
National Curriculum links

- Add and subtract numbers with up to three digits, using formal written methods of columnar addition and subtraction
- Solve problems, including missing number problems, using number facts, place value, and more complex addition and subtraction

Add two numbers (across a 100)

Key learning

- Nijah uses base 10 to work out 466 + 353



	H	T	O
	4	6	6
+	3	5	3
	8	1	9
	1		

Use Nijah's method to work out the additions.

	H	T	O
	2	8	4
+	1	3	5

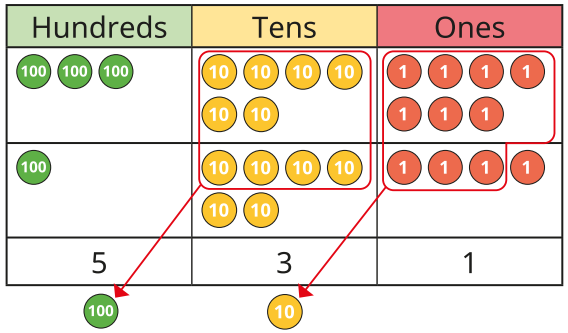
	H	T	O
	3	6	7
+	2	9	1

	H	T	O
	3	7	2
+	1	3	1

- Mrs Trent has £582 and Ms Rose has £136

  How much money do they have altogether?

- Ron uses place value counters to work out 367 + 164



	H	T	O
	3	6	7
+	1	6	4
	5	3	1
	1	1	

Use Ron's method to work out the additions.

	H	T	O
	2	5	6
+	1	8	3

	H	T	O
	6	2	5
+	2	9	4

	H	T	O
	3	5	3
+	2	4	7

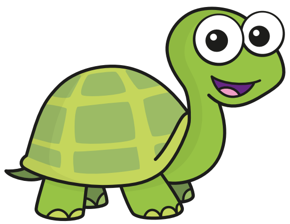
- Work out 784 + 156

  How is this calculation different from 780 + 156?

Add two numbers (across a 100)

Reasoning and problem solving

Tiny has completed an addition.

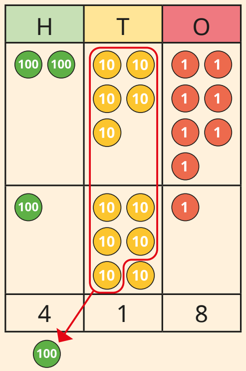


		H	T	O
		2	5	7
	+	1	6	1
		3	1	8

Is Tiny correct?

Explain your answer using base 10 or place value counters.

No



What could the missing digits be?

	H	T	O
	4		3
+	1		5
	6		8

Explain your answer.

various possible answers, e.g. (from top to bottom)

5, 6, 1

3, 9, 2

Is the statement true or false?

When adding 245 to 356 there will not be an exchange in the tens column because there are only 9 tens.

Talk about your answer with a partner.

False

Subtract two numbers (across a 10)

Notes and guidance

So far in this block, children have completed the formal written method for addition with exchanges in both the tens and hundreds columns. They now move on to the written method for subtraction with exchanges. In Year 2, they subtracted a 2-digit number from a 2-digit number, exchanging 1 ten for 10 ones. In this small step, they subtract both 2- and 3-digit numbers, exchanging 1 ten for 10 ones.

As with addition in the previous steps, they use base 10 alongside the written calculation, but for subtraction they only need to make the number being subtracted from. For each calculation, prompt children to think about whether they need to make an exchange or not, and why.

Things to look out for

- When using base 10, children may create both numbers and simply remove the second number, leaving the original number unchanged.
- Children may find the difference between the two digits in a column instead of subtracting the second digit from the first, for example 1 – 3 becomes 3 – 1
- When no tens are left in a number due to an exchange, children may not know what to put in the tens column.

Key questions

- How can you show this question using base 10?
- Can you subtract 2 ones from 5 ones?
- Can you subtract 5 ones from 2 ones?
- Do you need to make an exchange?
- How can you show an exchange using base 10 or place value counters?
- How can you show an exchange using the written method?

Possible sentence stems

- ______ ones subtract ______ ones is equal to ______ ones.
- I will exchange 1 ten for ______ ones.
- Now I have ______ hundreds, ______ tens and ______ ones.
  The answer is ______

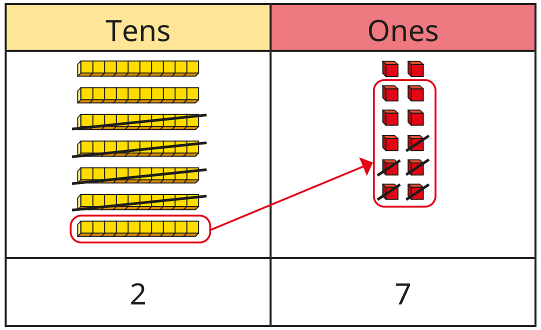
National Curriculum links

- Add and subtract numbers with up to three digits, using formal written methods of columnar addition and subtraction
- Solve problems, including missing number problems, using number facts, place value, and more complex addition and subtraction

Subtract two numbers (across a 10)

Key learning

- Annie uses base 10 to work out 72 – 45



	T	O
	$^{6}\cancel{7}$	$^{1}2$
–	4	5
	2	7

Use Annie's method to work out the subtractions.

	T	O
	6	2
–	1	8

	H	T	O
	3	2	5
–	1	1	9

	H	T	O
	3	2	1
–	2	0	3

- Tommy has £258

  He spends £139 on a new bike.

  How much money does he have left?

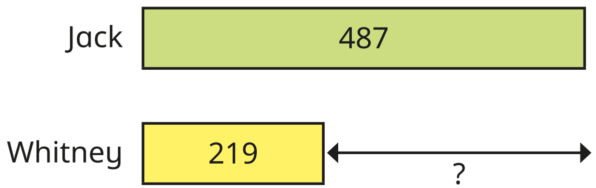
  Draw a bar model to help you solve the problem.

- Jack and Whitney are playing a game.

  Jack scores 487 points.

  Whitney scores 219 points.

  How many more points has Jack scored than Whitney?



  How many points have they scored in total?

- What are the missing digits in the subtractions?

	H	T	O
	4	$^{6}\cancel{7}$	$^{1}6$
–	2	4	$\boxed{}$
	2	2	8

	H	T	O
	7	4	$\boxed{}$
–	$\boxed{}$	2	5
	5	1	6

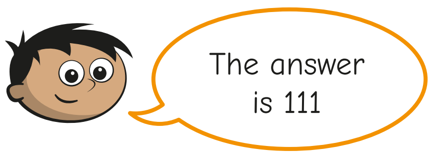
	H	T	O
	4	1	8
–	3	0	$\boxed{}$
	1	$\boxed{}$	9

Subtract two numbers (across a 10)

Reasoning and problem solving

Amir is working out 215 – 106

		H	T	O	
		2	1	5	
	–	1	0	6	
		1	1	1	

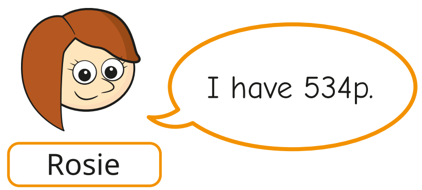


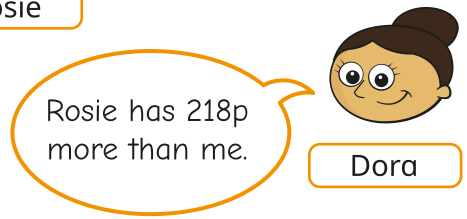
What mistake has Amir made?

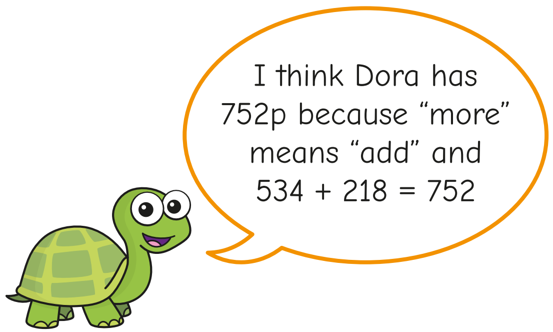
What is the correct answer?

Amir has subtracted the 5 from the 6 in the ones column.

109







Is Tiny correct?

Explain your answer using a bar model.

No

Rosie has 218p more, so Dora has 218p less.

Subtract two numbers (across a 100)

Notes and guidance

This small step will be children's first experience of subtraction across a 100, and they will use base 10 and place value counters to represent calculations alongside the written method. At each step of the subtraction, children should be asking whether they need to make an exchange.

This will be the first time children have seen multiple subtraction exchanges in the same calculation and extra care should be taken when modelling this. At this stage, both numbers are 3-digit numbers. In this small step, avoid subtracting from a number with no tens (causing an exchange from the hundreds down to the ones) as this will be covered later in the block.

Things to look out for

- When using base 10, children may create both numbers and simply remove the second number, leaving the original number unchanged.
- Children may find the difference between the two digits in a column instead of subtracting the second digit from the first, for example 1 – 3 becomes 3 – 1
- Children need to take extra care when two exchanges are happening in the same calculation. They may write digits in the wrong column.

Key questions

- How can you show this question using base 10?
- Can you subtract 2 tens from 5 tens?
- Can you subtract 5 tens from 2 tens?
- Do you need to make an exchange?
- How can you show an exchange from the hundreds using base 10?
- How can you show an exchange from the hundreds using the written method?

Possible sentence stems

- ______ tens subtract ______ tens is equal to ______
- I will exchange 1 hundred to make ______ tens.
- Now there are ______ hundreds, ______ tens and ______ ones.
  The answer is ______

National Curriculum links

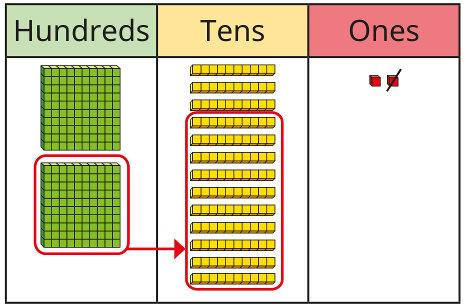
- Add and subtract numbers with up to three digits, using formal written methods of columnar addition and subtraction
- Solve problems, including missing number problems, using number facts, place value, and more complex addition and subtraction

Subtract two numbers (across a 100)

Key learning

- Dani has started working out 232 – 141

  Complete the calculation.



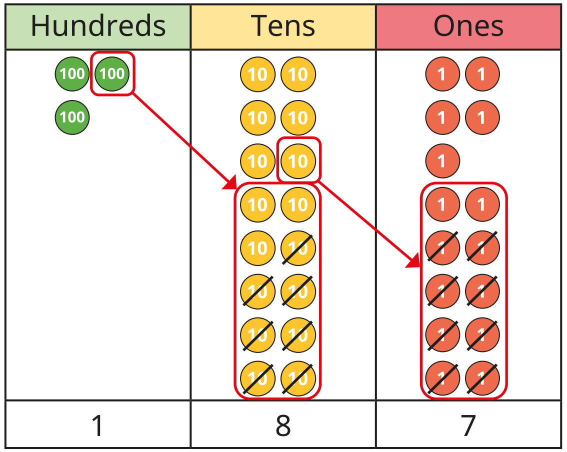
	H	T	O
	~~2~~ 1	13	2
–	1	4	1
			1

Use Dani's method to work out the subtractions.

428 – 153	354 – 281	685 – 294	407 – 123

- Tom is using place value counters to work out 365 – 178

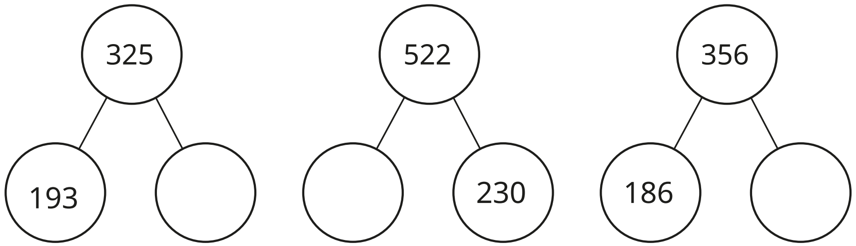
  He needs to make two exchanges.



	H	T	O
	~~3~~ 2	~~6~~ 15	~~5~~ 15
–	1	7	8
	1	8	7

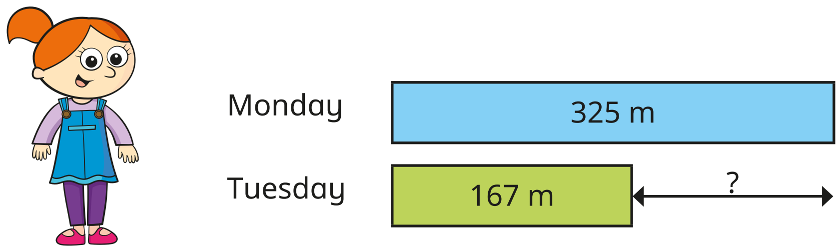
Use this method to work out 435 – 159

- Complete the part-whole models.



- Alex walks 325 m on Monday and 167 m on Tuesday.

  How much further does she walk on Monday?



Subtract two numbers (across a 100)

Reasoning and problem solving

Is the statement true or false?

> In this calculation, there will be 1 hundred in the answer because 3 hundreds subtract 2 hundreds is equal to 1 hundred.

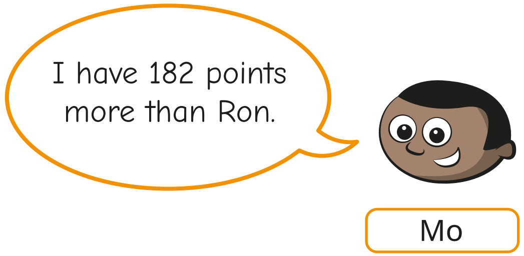
Hundreds	Tens	Ones
100 100 100	10	1 1 1 1 1

	H	T	O
	3	1	5
−	2	2	1

Explain your answer.

False

Annie, Mo and Ron are playing a game.



How many points does Ron have?

92

Add 2-digit and 3-digit numbers

Notes and guidance

Children should now be confident with the formal written method of addition of numbers with up to three digits and exchanges taking place from the ones and the tens. So far in this block, the numbers have all been both 2-digit or both 3-digit numbers. In this small step, children add a 2-digit number to a 3-digit number.

The different sizes of numbers can sometimes confuse children, especially when lining up the digits in place value columns. Some children may find it helpful to write a zero placeholder in the absence of any hundreds.

As before, the written calculation is done alongside concrete representations. When forming the 2-digit number with concrete resources, make sure children do not assume the greatest digit is in the hundreds column.

Things to look out for

- Children may line up the 2-digit number incorrectly below the 3-digit number, placing tens in line with the hundreds column.
- Children may be confused by a zero or no digit in any place value column.

Key questions

- How can you show this question using base 10/place value counters?
- How can you write this calculation using the formal written method?
- Have you put all the digits in the correct columns?
- Do you need to make an exchange?
- What could you write in the hundreds column if there are no hundreds?

Possible sentence stems

- _____ hundreds added to _____ hundreds is equal to _____ hundreds.
- I put _____ in the _____ column because …

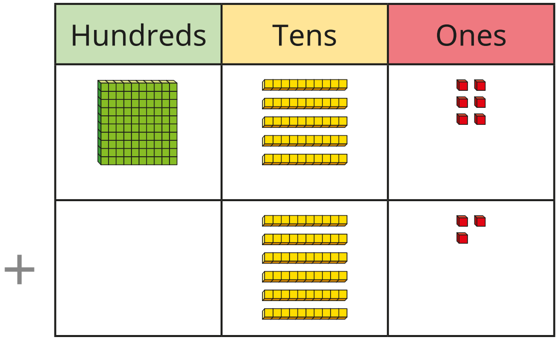
National Curriculum links

- Add and subtract numbers with up to three digits, using formal written methods of columnar addition and subtraction
- Solve problems, including missing number problems, using number facts, place value, and more complex addition and subtraction

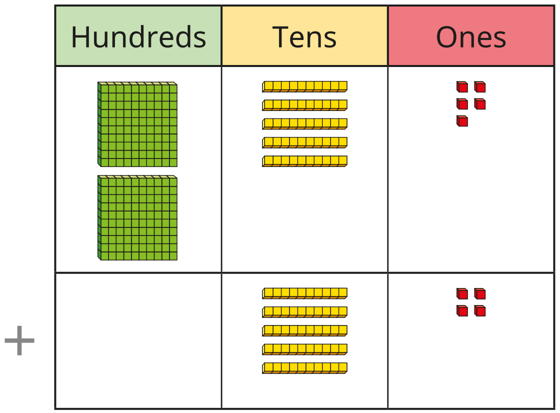
Add 2-digit and 3-digit numbers

Key learning

- Work out the additions.



		H	T	O	
		1	5	6	
	+		6	3	



		H	T	O	
		2	5	5	
	+		5	4	

- Work out the additions.

537 + 82	434 + 49	58 + 365	19 + 799

- Complete the bar models.

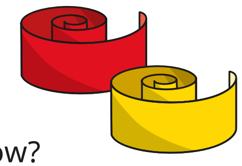
532	81

246	95

- Kim has 132 cm of ribbon.

  Her teacher gives her another 83 cm.

  What total length of ribbon does Kim have now?



- Tom has £283 and Esther has £68

  How much money do they have altogether?

- Nijah scores 376 points in a game.

  Scott scores 53 more points than Nijah.

  How many points do they score altogether?

- The mass of a mango is 175 g.

  An apple is 106 g lighter than the mango.

  What is the total mass of the mango and the apple?

Add 2-digit and 3-digit numbers

Reasoning and problem solving

Which addition is the odd one out?

336 + 80	556 + 60
533 + 80	586 + 80

Explain your answer.

Children could choose any card with correct justification.

In jug A there is 261 ml of juice.

In jug B there is 143 ml of juice.

In jug C there is 89 ml of juice.

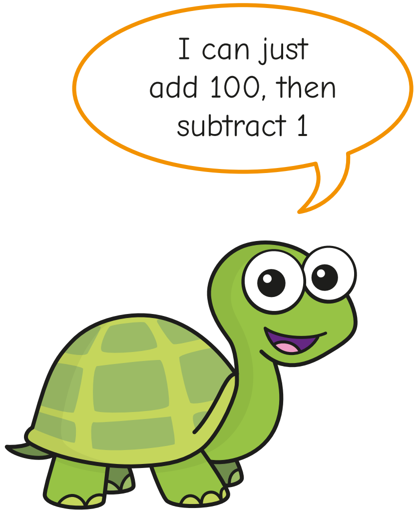
All the juice is poured into jug D.

How much juice is there in jug D?

In which order did you add them?

493 ml

Tiny is working out 546 + 99



Is Tiny correct?

Does this always work for adding 99?

How could Tiny use this method to add 98?

Yes

It will always work because 99 is one less than 100

To add 98, Tiny could add 100, then subtract 2

Subtract a 2-digit number from a 3-digit number

Notes and guidance

Children should now be confident with the formal written method of subtraction of numbers with up to three digits and exchanges from the tens and hundreds. So far when subtracting in this block, the numbers have all been both 2-digit or both 3-digit numbers. In this small step, children subtract 2-digit numbers from 3-digit numbers.

The different sizes of numbers can sometimes confuse children, especially when lining up the digits in place value columns. Some children may find it helpful to write a zero placeholder.

This step will also be the first time that children exchange from the hundreds column to the ones column in a two-part exchange because there are no tens in the original number. Make sure children exchange 1 hundred for 10 tens before exchanging one of those tens for 10 ones.

Things to look out for

- Children may line up the 2-digit number incorrectly below the 3-digit number, placing tens in line with the hundreds column.
- When an exchange is needed from the tens, but there are no tens, children may try to exchange directly from the hundreds to the ones.

Key questions

- How can you show this question using base 10?
- How can you write this calculation using the formal written method?
- Have you put all the digits in the correct columns?
- Do you need to make an exchange?
- If you cannot exchange from the tens, what should you do?
- What could you write in the hundreds column if there are no hundreds?

Possible sentence stems

- ______ hundreds subtract ______ hundreds is equal to ______
- I will exchange 1 hundred for ______ tens, then 1 ten for ______ ones.

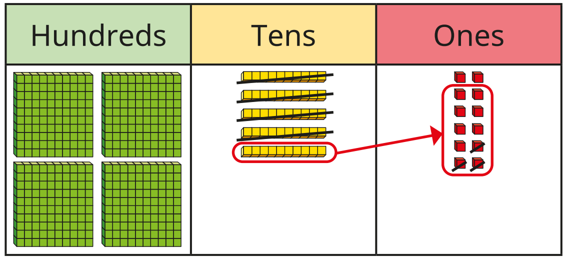
National Curriculum links

- Add and subtract numbers with up to three digits, using formal written methods of columnar addition and subtraction
- Solve problems, including missing number problems, using number facts, place value, and more complex addition and subtraction

Subtract a 2-digit number from a 3-digit number

Key learning

- Teddy uses base 10 to work out 452 – 43



	H	T	O
	4	$^{4}\cancel{5}$	$^{1}2$
–		4	3
	4	0	9

Use Teddy's method to work out the subtractions.

243 – 28 | 354 – 62 | 564 – 75 | 153 – 64

- Write <, > or = to compare the number sentences.

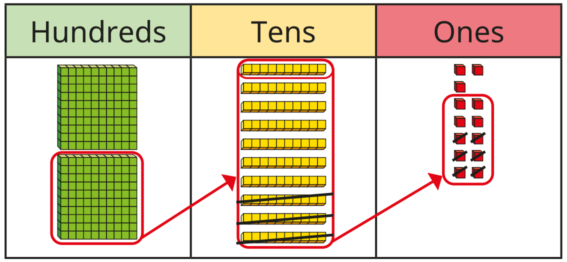
301 ◯ 327 – 28

522 – 131 ◯ 522 – 31

375 – 93 ◯ 324 – 51

243 – 58 ◯ 253 – 68

- Eva uses base 10 to work out 203 – 36



	H	T	O
	$^{1}\cancel{2}$	$^{\cancel{1}9}\cancel{0}$	$^{1}3$
–		3	6
	1	6	7

Talk to a partner about Eva's method.

Use this method to work out the subtractions.

305 – 56 | 708 – 69 | 804 – 89 | 401 – 42

- Jack is 135 cm tall.

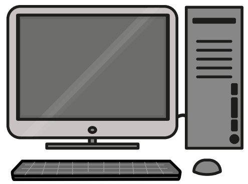
  Rosie is 27 cm shorter than Jack.

  How tall is Rosie?

- A computer costs £558

  Mrs Singh has £89

  How much more money does Mrs Singh need to buy the computer?

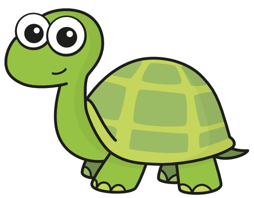


Subtract a 2-digit number from a 3-digit number

Reasoning and problem solving

Tiny is working out 526 – 31

		H	T	O	
		5	2	6	
	–	3	1		
		2	1	6	



Explain the mistake Tiny has made.

Find the correct answer.

Tiny has not put the 31 in the correct columns.

495

What are the missing digits?

13__ – 52 = 85

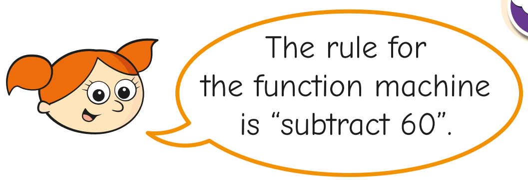
334 – __2 = 292

545 = 6__8 – 73

7

4

1



input		output
567 →		→ 497

Is Alex correct?

Explain your answer.

No

Complements to 100

Notes and guidance

In this small step, children focus on fluently finding complements to 100

Previously in this block and in Year 2, children covered number bonds for ones to 10 and tens to 100, and this understanding can support finding complements to 100

A common misconception when finding a complement to 100 is to think that the ones digits bond to 10 and the tens digits bond to 100, which leads to a total of 110 rather than 100, for example 36 + 74. Using a hundred square can help children to avoid this misconception and to identify that they actually need to find a bond to 10 and a bond to 90. A number line can also support the development of efficient mental strategies to find complements to 100

This small step provides a good opportunity to recap prior learning on money, specifically the fact that there are 100p in £1

Things to look out for

- Children need to be able to fluently recall bonds to 10 and multiples of 10
- Children may find a bond to 10 and a bond to 100 and then add them together, leading to a total of 110

Key questions

- How many squares are there altogether? How do you know?
- How many full rows of each colour are there?
- What do you notice about the row with both colours in it?
- What do you notice about the total of the tens?
- What do you notice about the total of the ones?
- What is the jump to the next multiple of 10?
- What is the jump to 100?

Possible sentence stems

- I add ______ to get to the next 10, then ______ to get to 100
- This means ______ is the complement to 100 of ______
- ______ plus ______ is equal to 100

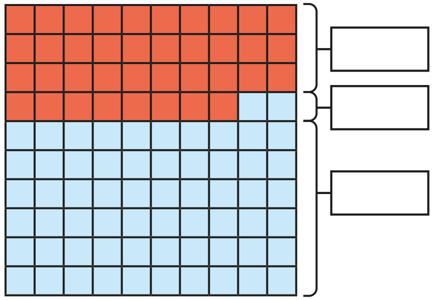
National Curriculum links

- Add and subtract numbers mentally, including:
  - a 3-digit number and ones
  - a 3-digit number and tens
  - a 3-digit number and hundreds

Complements to 100

Key learning

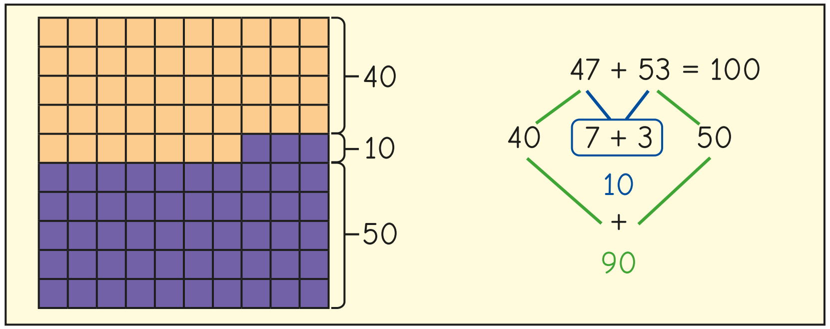
- Fill in the totals for the hundred square.



Use the hundred square to complete the number sentence.

38 + 62 = ______ + ______ + ______ = ______

- Dexter uses a hundred square to show that 47 + 53 = 100

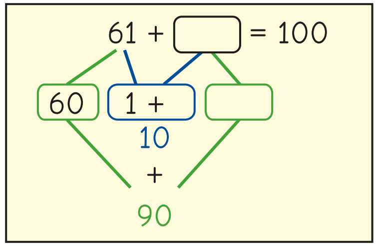


Use Dexter's method to show that the total of each addition is 100

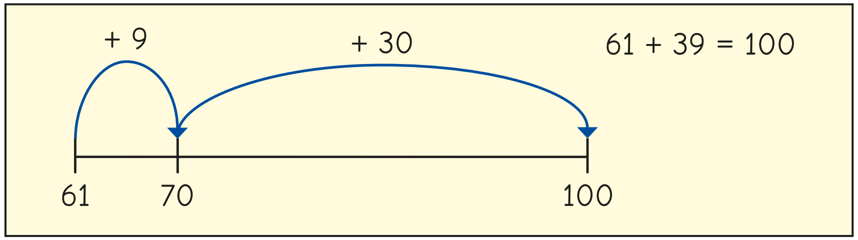
| 32 + 68 | 19 + 81 | 76 + 24 |

- Rosie is finding the complement of 61 to 100

Complete her workings.



Tommy uses a number line to find the complement of 61 to 100



Whose method do you prefer?

Use that method to find the complement of 58 to 100

- Complete the complements to 100
  - 84 + 1___
  - 35 + ___5
  - ___7 + 53
  - 26 + ______

- A carpenter has a plank of wood that is 100 cm long.

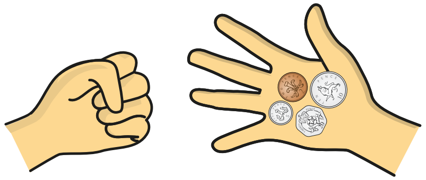
She cuts off a piece of wood that is 39 cm long.

What length of wood is left?

Complements to 100

Reasoning and problem solving

Annie has £1 in total in her hands.



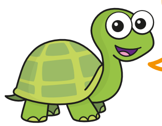
What coins could be in Annie's closed hand?

for example:

50p, 10p, 2p, 1p

The total is 63p.

Tiny is trying to work out the complement of 74 to 100



What mistake has Tiny made?

What is the correct answer?

26

Sort the additions into the table.

32 + 78	83 + 17	55 + 55	49 + 16
66 + 34	91 + 19	52 + 47	7 + 93

Bond to 100	Not a bond to 100

Explain your thinking to a partner.

Bond to 100	Not a bond to 100	
83 + 17	32 + 78	91 + 19
66 + 34	55 + 55	52 + 47
7 + 93	49 + 16	

Estimate answers

Notes and guidance

Although children have not explicitly been introduced to rounding, they have explored estimating the position of numbers on number lines in both Year 2 and Year 3 and will use this knowledge to support the learning in this small step.

Discuss with children why estimates are important, particularly in real-life situations such as population statistics. They allow us to quickly and easily get an idea of what an answer should be near to, or if an already calculated answer is appropriate.

It is important to discuss whether an actual answer will be greater or less than an estimate. For example, 33 + 54 may be estimated as 30 + 50, and we would expect the precise answer to be greater than the estimate because the actual numbers from the calculation are both greater than the "near numbers" used in the estimate.

Things to look out for

- Children may need support to identify the multiples of 10 or 100 either side of a number and to decide which multiple a number is closer to.
- Children may not always use the most appropriate values when estimating.

Key questions

- What are the multiples of 10/100 before and after ______?
- Where would ______ be on this number line?
- Which multiple is ______ closer to?
- How far from ______ is ______?
- Which calculation is easier/quicker to perform?
- Which calculations can you do mentally?
- Why do we use estimates?
- Is the estimate less than or greater than the actual answer? Why?

Possible sentence stems

- ______ is near to ______
- The estimated answer will be less/greater than the actual answer because …

National Curriculum links

- Estimate the answer to a calculation and use inverse operations to check answers

Estimate answers

Key learning

- Use the number lines to help you complete the sentences.

60 62 70

62 is closer to ______ than ______

800 840 900

840 is closer to ______ than ______

478

478 is closer to ______ than ______

- Work out the calculations.

  - 80 + 30 | 78 + 33
  - 700 – 500 | 670 – 480
  - 200 + 100 | 240 + 120 | 237 + 118

In each set, which calculation was easiest to work out?

- Tommy is estimating the answer to 482 – 194

482 is close to 500
194 is close to 200
500 – 200 = 300

Use Tommy's method to estimate the answers to the calculations.

132 + 724	561 – 289	909 – 375	443 + 459

- Mr Hall has £560

Estimate whether Mr Hall can afford to buy both the laptop and the printer.

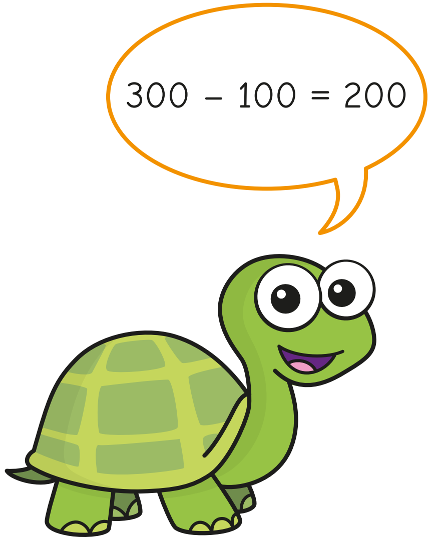
- Write < or > to complete the statements.

27 ◯ 30	27 + 49 ◯ 30 + 50
44 ◯ 40	44 + 72 ◯ 40 + 70
132 ◯ 130	400 – 132 ◯ 400 – 130
138 ◯ 140	400 – 138 ◯ 400 – 140

Estimate answers

Reasoning and problem solving

Tiny is estimating the answer to 382 – 114



Find a better estimate.

Work out 382 – 114

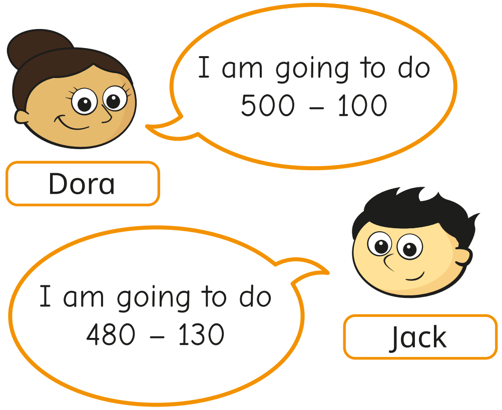
Which estimate is closer to the exact answer?

400 – 100 = 300, as 382 is closer to 400 than 300

268

400 – 100 = 300

Dora and Jack are estimating the answer to 476 – 128



Work out each estimate.

Whose estimate is easier to work out?

Work out 476 – 128

Whose estimate is closer to the actual answer?

Dora: 400
Jack: 350

352

Jack's estimate

Inverse operations

Notes and guidance

In this small step, children explore the inverse relationship between addition and subtraction and how both relate to the part-whole structure.

In addition to part-whole models, bar models are excellent for highlighting these relationships. It is important to draw children's attention to the fact that they can perform two different subtractions as the inverse to an addition, due to addition's commutative property, but there is only one possible addition as the inverse to a subtraction.

Building on the previous small step, where children began to look at strategies to check answers using estimation, they can now use inverse operations as another method of checking, rather than simply redoing the same calculation and potentially repeating the same error.

Things to look out for

- Children may mix up the wholes and the parts.
- Children may subtract a part from a part rather than a part from the whole.
- When asked to check an answer, children may just repeat the same calculation instead of using the inverse operation.

Key questions

- What do you notice about the part-whole models?
- What are the two parts? What is the whole?
- What does "inverse" mean?
- What is the inverse of add/subtract ______?
- What does commutative mean?
- Is addition/subtraction commutative?
- What estimate could you use to check?

Possible sentence stems

- If ______ is a part and ______ is a part, then ______ is the whole.
- If ______ is the whole and ______ is a part, then ______ is the other part.
- The inverse of ______ is ______

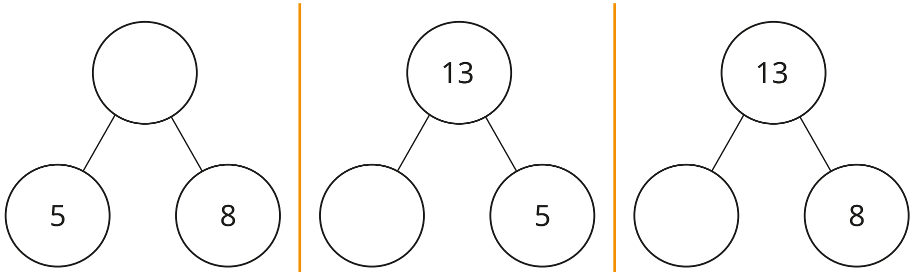
National Curriculum links

- Estimate the answer to a calculation and use inverse operations to check answers

Inverse operations

Key learning

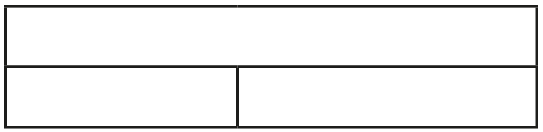
- Complete the part-whole models and number sentences.



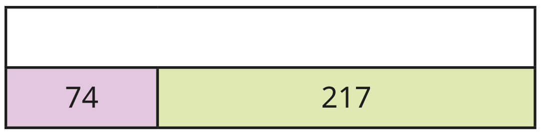
5 + 8 = ______ 13 − 5 = ______ 13 − 8 = ______

What do you notice?

- Complete the bar model for 561 − 236 = 325

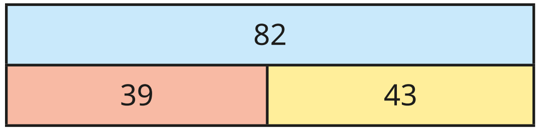


- Find the whole.



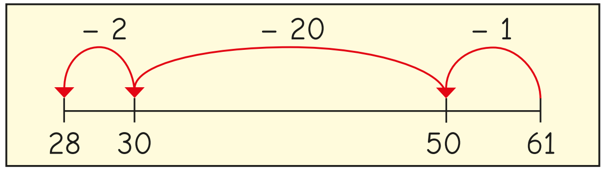
Write the fact family for the bar model.

- Dani works out 39 + 43 = 82



What two subtractions could Dani do to check her answer?

- Tiny uses a number line to work out 61 − 23



What addition could Tiny do to check the answer?

Find Tiny's mistake and correct it.

- Brett has answered this problem.
  - What two subtractions could Brett do to check his answer?
  - Work out the subtractions to check Brett's answer.
  - What estimate could Brett also use to check his answer?

> Mr Rose is 198 cm tall.
>
> Mrs Rose is 145 cm tall.
>
> What is their combined height?
>
> 343 cm

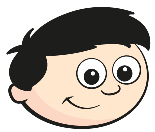
White Rose Maths

Inverse operations

Reasoning and problem solving

Aisha works out 83 – 47 and gets the answer 36

That is incorrect.
I did the inverse to check.
83 + 36 = 119



Dexter

What mistake has Dexter made?

Complete an inverse operation to check that Aisha's answer is correct.

What estimate could Aisha and Dexter use to check their answers?

Dexter added the whole and a part, instead of adding the two parts, 47 and 36

47 + 36 = 83

80 – 50 = 30

Here are some calculations.

112 + 125	362 + 125	200 – 100	362 – 125
362 – 237	200 + 300	237 – 112	125 – 112
130 + 240	237 + 362	300 – 100	240 – 130

Which calculations can be used to check 125 + 237?

Which calculations can be used to check 237 – 125?

What could the other calculations be used to check?

check for 125 + 237:
362 – 125
362 – 237
130 + 240

check for 237 – 125:
112 + 125
200 – 100
237 – 112
240 – 130

Make decisions

Notes and guidance

This small step provides the opportunity to consolidate and bring together all the learning from this block. Children are asked to make decisions about what operation and what method is appropriate to solve a problem.

Word problems, including mult-step problems, can be used to assess whether children are able to successfully identify the correct operation and information to use. Bar models can be an excellent tool to support children in this process, encouraging children to think about what is the whole and what are the parts.

It is also important to encourage children to make decisions around what is the most appropriate method to find an answer once the correct operation has been identified. The skills developed in the previous small steps should be revisited for children to check their answers.

Things to look out for

- Children may select the incorrect operation.
- Children may need support to identify the first step in a multi-step problem.
- Children may use written methods when mental methods would be more appropriate.

Key questions

- Do you know the whole?
- What parts do you know?
- Which operation do you need to use?
- Can you use a mental method or do you need to use a written one?
- Which method is more efficient?
- What does this arrow represent on the bar model?
- Where is the whole/total on the bar model?
- What is the first step you need to do?
- Do you have to complete the calculations in a specific order?

Possible sentence stems

- _______ is a part and _______ is a part, so I need to _______
- _______ is the whole and _______ is a part, so I need to _______

National Curriculum links

- Solve problems, including missing number problems, using number facts, place value, and more complex addition and subtraction

Make decisions

Key learning

- A machine packs 86 boxes on Saturday.

  Another 57 boxes are packed on Sunday.

  How many boxes are packed altogether?

  Draw a bar model to match the problem.

- There are 86 boxes in a factory.

  57 boxes are sent to a shop.

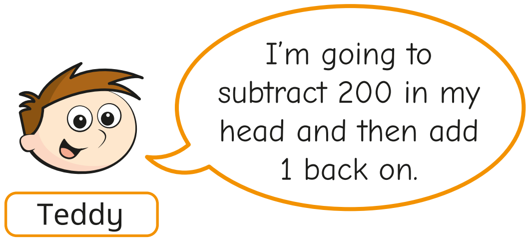
  How many boxes are left in the factory?

  Draw a bar model to match the problem.

- Kim and Teddy are working out 436 – 199

Kim's workings

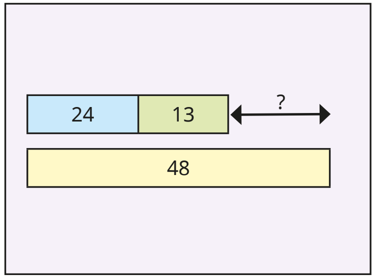
		H	T	O	
		4	3	6	
	–	1	9	9	



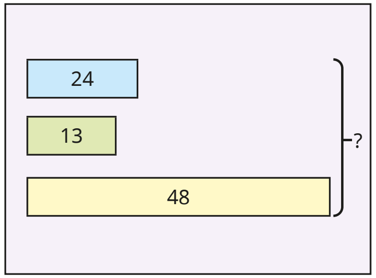
Use both methods to work out the answer.

Whose method is more efficient?

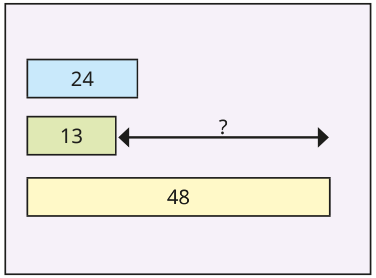
- Match the bar models to the problems.



Esther has 24 stickers.
Filip has 13 stickers.
Tom has 48 stickers.
How many stickers do they have altogether?



Esther has 24 stickers.
Filip has 13 stickers.
Tom has 48 stickers.
How many more stickers does Tom have than Esther and Filip combined?



Esther has 24 stickers.
Filip has 13 stickers.
Tom has 48 stickers.
Find the difference between Filip and Tom's numbers of stickers.

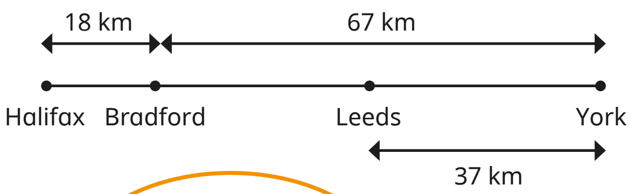
Solve each problem.

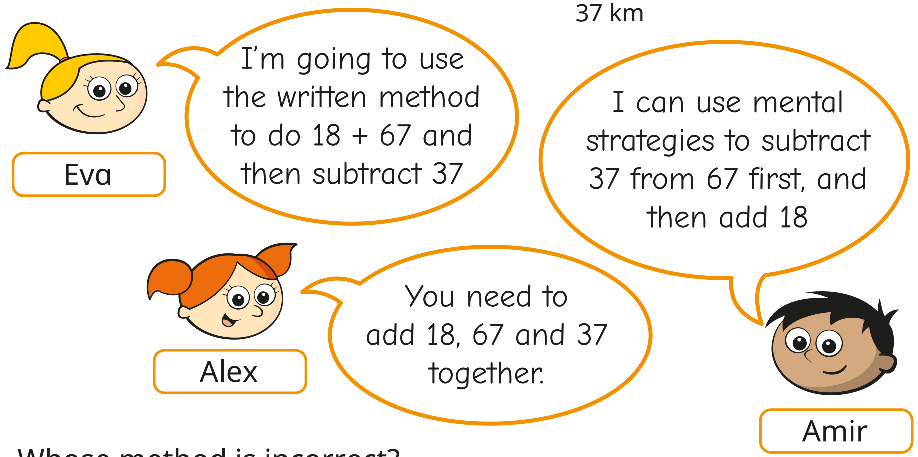
What else could you work out?

Make decisions

Reasoning and problem solving

Eva, Alex and Amir want to find the distance from Halifax to Leeds.





Whose method is incorrect?

What is the distance from Halifax to Leeds?

Alex's	48 km

0 1 2 3 4

5 6 7 8 9

+ −

☐ ☐ ☐ ☐ ☐ ☐ =

Use the cards to create additions and subtractions that give an answer between 200 and 300

Compare answers with a partner.

various possible answers, e.g.

152 + 98   315 – 40   179 + 47   324 – 78