Autumn Block 2

Addition and subtraction

White Rose MATHS

Small steps

Step 1	Bonds to 10
Step 2	Fact families - addition and subtraction bonds within 20
Step 3	Related facts
Step 4	Bonds to 100 (tens)
Step 5	Add and subtract 1s
Step 6	Add by making 10
Step 7	Add three 1-digit numbers
Step 8	Add to the next 10

Small steps

Step 9	Add across a 10
Step 10	Subtract across 10
Step 11	Subtract from a 10
Step 12	Subtract a 1-digit number from a 2-digit number (across a 10)
Step 13	10 more, 10 less
Step 14	Add and subtract 10s
Step 15	Add two 2-digit numbers (not across a 10)
Step 16	Add two 2-digit numbers (across a 10)

Small steps

Step 17	Subtract two 2-digit numbers (not across a 10)
Step 18	Subtract two 2-digit numbers (across a 10)
Step 19	Mixed addition and subtraction
Step 20	Compare number sentences
Step 21	Missing number problems

Bonds to 10

Notes and guidance

In Year 1, children looked at number bonds both to and within 10 in detail. This small step provides the opportunity for children to revisit and consolidate this learning, with a specific focus on number bonds to 10. This learning is essential prerequisite knowledge for later in the block.

The use of concrete resources such as counters and ten frames, Rekenreks or even their fingers can support children in finding bonds for numbers within 10. While these manipulatives can be used to support children initially, they should ultimately become fluent in recalling their number bonds to 10, as this will improve their efficiency and reduce cognitive load when completing calculations with greater numbers later in this block.

Things to look out for

- Children may not use efficient strategies when working out an answer to a calculation. For example, when calculating 3 + 7, they may start at 3 and count on 7 rather than start at 7 and count on 3
- When counting on their fingers, children may count the starting number as the first finger, resulting in an incorrect answer.

Key questions

- How many _____ have you got?
- How many more do you need to make 10?
- What is the bond to 10 for _____?
- What number are you starting with?
- What do you need to add to make 10?
- If 4 + 5 = 9, what is the missing number in 4 + _____ = 10? How do you know?

Possible sentence stems

- If I have _____ counters, I need to add _____ more counters to make 10
- I need to add _____ to _____ to make 10

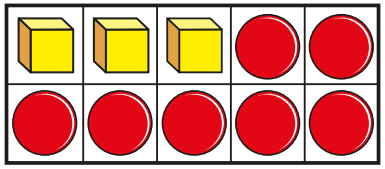
National Curriculum links

- Represent and use number bonds and related subtraction facts within 20 (Y1)
- Recall and use addition and subtraction facts to 20 fluently, and derive and use related facts up to 100

Bonds to 10

Key learning

- Here is a ten frame.



How many cubes are there?

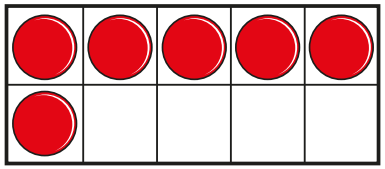
How many counters are there?

How many objects are there in total?

Complete the number sentence.

_____ + _____ = 10

- Sam puts some counters on a ten frame.



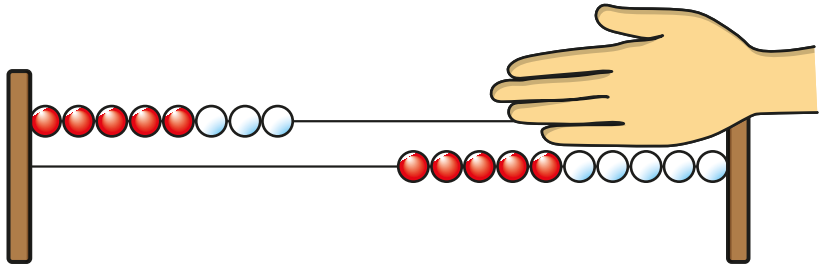
How many more counters does she need to fill the ten frame?

Write a number sentence to show the bond to 10

Give children red and yellow counters to fill a ten frame.

Ask them how many different ways they can do it, and to write a number sentence for each ten frame.

- Here is a Rekenrek.



How many beads is the hand covering?

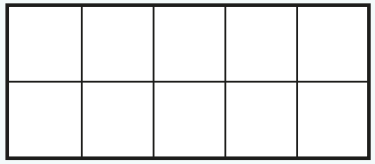
Write a number sentence to show the bond to 10

- Complete the number sentences.
  - 1 + _____ = 10
  - 10 = 6 + _____
  - _____ + 5 = 10
  - 10 = _____ + 0

Bonds to 10

Reasoning and problem solving

Start with an empty ten frame.



Ask children how many counters they need to make 10

Show 1 on the ten frame.

Ask children, again, how many counters are needed to make 10

Work systematically with the children to find all the number bonds to 10

Encourage fluent recall rather than counting, and write a number sentence for each bond.

Ask children if any of the number sentences show the same number bond.

Children should notice that, for example, 4 + 6 and 6 + 4 are the same number bond.

Jo has made a number using counters.

I need 4 more counters to make 10

What number has Jo made?

How do you know?

6

Tiny is finding bonds to 10

$1 + \boxed{0} = 10$

Explain the mistake Tiny has made.

What is the missing number?

9

Fact families – addition and subtraction bonds within 20

Notes and guidance

Building on the previous small step, children look at number bonds to and within 20. Links should be made to number bonds to 10, so that children recognise how knowing these bonds supports this learning.

As in the previous step, the use of concrete resources can support children in initially identifying bonds to a given number. While recall will ultimately improve efficiency, it is less essential for children to be able to automatically recall these bonds. Instead, they should have the strategies required to work them out quickly.

Children looked at fact families in Year 1 and these are reintroduced here to write the addition and subtraction statements for number bonds. This is a good opportunity to remind children of the commutative property of addition. While they should know the effect commutativity has, they do not need to be able to describe it in these words.

Things to look out for

- Children may assume that as addition is commutative, then subtraction must also be commutative.
- Some children may think that because 4 + 6 = 10, they can add 10 to each number to give 14 + 16 = 20

Key questions

- How many _____ have you got?
- How many more do you need to make _____?
- What is the bond to _____ for _____?
- What number are you starting with?
- What do you need to add to make _____?
- If 4 + 5 = 9, what is the missing number in 14 + _____ = 19? How do you know?

Possible sentence stems

- If I have _____ counters, I need to add _____ more counters to make _____
- I need to add _____ to _____ to make _____

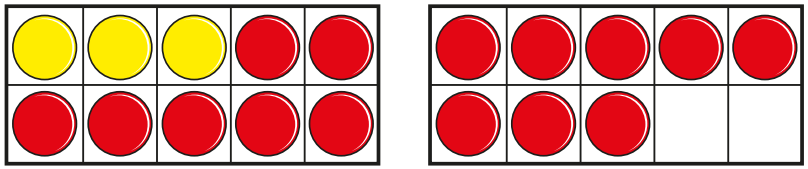
National Curriculum links

- Represent and use number bonds and related subtraction facts within 20 (Y1)
- Recall and use addition and subtraction facts to 20 fluently, and derive and use related facts up to 100

Fact families – addition and subtraction bonds within 20

Key learning

- Here is a number shown on ten frames.



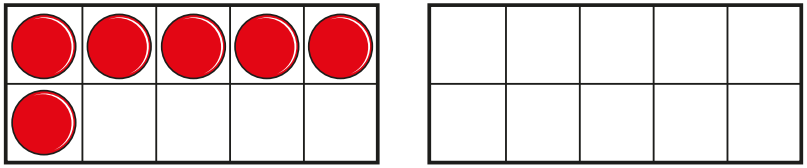
Complete the fact family to match the ten frames.

_____ + _____ = 18 18 – _____ = _____

_____ + _____ = 18 18 – _____ = _____

Can you write any of the facts another way?

- Ann puts some counters on a ten frame.

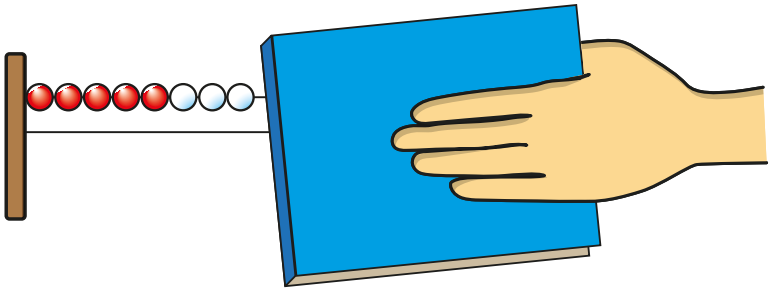


How many more counters does Ann need to make 20?

Write a number sentence to show the bond to 20

Write the fact family for the number sentence.

- Here is a Rekenrek.



How many beads are covered?

Write a number sentence to show the bond to 20

Write the fact family.

As a class, use a Rekenrek to find bonds to 20

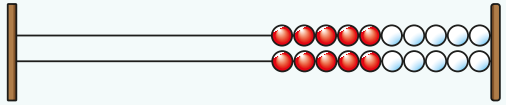
Ask children how many different bonds they can find, and to write a fact family for each bond.

- Complete the number sentences.
  - 13 + _____ = 15
  - _____ + 16 = 18
  - 20 = 11 + _____
  - 12 = _____ + 0

Fact families – addition and subtraction bonds within 20

Reasoning and problem solving

Start with a Rekenrek in the ready position.



Ask children to make a number on the Rekenrek and to tell you its bond to 20

Ask them to write the fact family for this number bond.

Get children to work in pairs to find bonds to 20

Encourage them to work systematically to find all the number bonds and to write the fact family for each.

Ask children if any of the number sentences show the same number bond.

Children should notice that, for example, 14 + 6 and 6 + 14 are the same number bond.

Complete the number sentences.

4 + _____ = 10

14 + _____ = 20

4 + _____ = 20

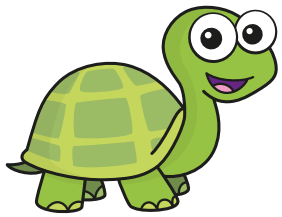
What do you notice?

6

6

16

Tiny has found a pattern in number bonds.



11 + 1 = 12

11 + 2 = 13

11 + 3 = 14

What pattern has Tiny found?

Continue the pattern up to 20

11 + 4 = 15

11 + 5 = 16

11 + 6 = 17

11 + 7 = 18

11 + 8 = 19

11 + 9 = 20

Related facts

Notes and guidance

In this small step, children use their knowledge of number bonds within 10, developed in the previous steps, to identify related facts for both addition and subtraction calculations.

If children know that 2 + 5 = 7, then they should be able to use this knowledge to state that 20 + 50 = 70. Unitising tens and ones within a calculation can support children's understanding and help to avoid common misconceptions. If 2 ones plus 5 ones is equal to 7 ones, then 2 tens plus 5 tens must be equal to 7 tens. This will avoid errors such as 20 + 50 = 700, which stems from thinking that there must be two zeros in the answer.

Concrete resources can be used to support understanding of this. Base 10 is particularly useful and will support children in not only identifying the correct answer, but also using the correct vocabulary of tens and ones when explaining their answers.

Things to look out for

- Children may think that if 8 – 3 = 5, then 80 – 30 = 5 because the zeros cancel each other out.
- Some children may think that, for example, 20 + 30 = 500 because 2 + 3 = 5 and there are two zeros.

Key questions

- If 2 ones plus 3 ones is equal to 5 ones, what is 2 tens plus 3 tens?
- What is the same about the number sentences? What is different?
- If 3 + 5 = 8, what is 30 + 50? How do you know?
- If 6 – 2 = 4, what is 60 – 20? How do you know?
- Show each number sentence using base 10. What is the same? What is different?

Possible sentence stems

- _____ ones + _____ ones = _____ ones,
  so _____ tens + _____ tens = _____ tens
  This means that _____ + _____ = _____
- _____ ones – _____ ones = _____ ones,
  so _____ tens – _____ tens = _____ tens
  This means that _____ – _____ = _____

National Curriculum links

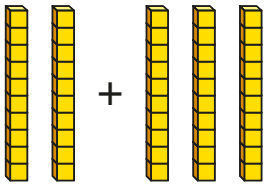
- Recall and use addition and subtraction facts to 20 fluently, and derive and use related facts up to 100

Related facts

Key learning

- Complete the sentences to match the base 10
  - 

    _____ ones + _____ ones = _____ ones

    _____ + _____ = _____
  - 

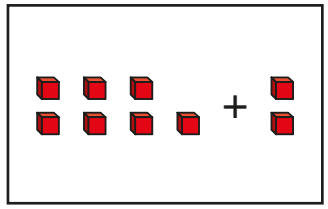
    _____ tens + _____ tens = _____ tens

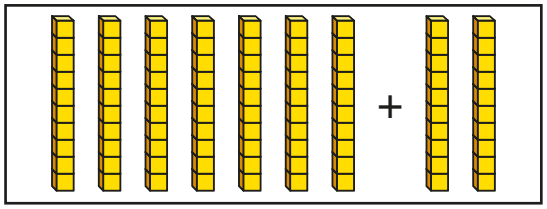
    _____ + _____ = _____

  What is the same about the number sentences?

  What is different?

- Write number sentences to match the base 10

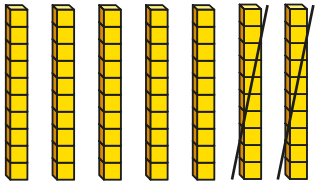
  

  What is the same? What is different?

- Complete the sentences to match the base 10
  - 

    _____ ones – _____ ones = _____ ones

    _____ – _____ = _____
  - 

    _____ tens – _____ tens = _____ tens

    _____ – _____ = _____

  What is the same about the number sentences?

  What is different?

- Complete the related facts.

  ▶ 1 + 4 = _____ ▶ 4 + 5 = _____ ▶ 9 – _____ = 2

  10 + 40 = _____ 40 + 50 = _____ 90 – _____ = 20

Related facts

Reasoning and problem solving

Mo is finding related facts.

I know that 3 ones plus 5 ones is 8 ones, so 3 tens plus 5 tens must be 8 tens.

Explain why Mo is correct.

How else can Mo write 8 tens?

Give your answer in numerals and words.

80, eighty

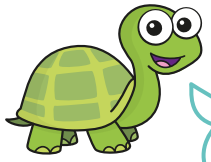
Is the number sentence true or false?

$10 + 70 = 800$

How do you know?

False

Tiny is working out the missing number.



$60 - \square = 10$

The missing number is 5, because $6 - 5 = 1$

Do you agree with Tiny?

Explain your answer.

No

Complete the number sentences.

$100 - 10 =$ _____

$100 - 20 =$ _____

$100 - 30 =$ _____

$100 - 40 =$ _____

What do you notice?

Continue the pattern.

90, 80, 70, 60

Bonds to 100 (tens)

Notes and guidance

In this small step, children build on their previous learning of number bonds to 10 and related facts to find bonds to 100. The focus is on multiples of 10 that have bonds to 100. Children may have seen examples of these in the previous step, and here they focus on them explicitly. By this stage, children should be more confident in automatically recalling their number bonds to 10, and if they know that 4 + 6 = 10, then they also know that 40 + 60 = 100

A Rekenrek and base 10 are useful concrete resources to support this learning. While base 10 supports the link between related facts, the Rekenrek ensures that children keep the 100 visible at all times. A hundred square can also be used.

As with number bonds to 10, the more fluent children are in their bonds to 100 made from multiples of 10, the more efficient they will be in later steps.

Things to look out for

- Children may think that if 3 + 7 = 10, then 30 + 7 = 100, because they need to add a zero.
- If children found any particular bonds to 10 challenging, they are likely to carry this through to this step.

Key questions

- How many tens are there in 100?
- How many tens are there?
- How many more do you need to make 100?
- What is the bond to 100 for _____?
- What number are you starting with?
- What do you need to add to make 100?
- If 4 + 6 = 10, what is the missing number in 40 + _____ = 100? How do you know?

Possible sentence stems

- If _____ ones + _____ ones = 10,

  then _____ tens + _____ tens = 100
- If I have _____ tens, I need to add _____ more tens to make 100
- I need to add _____ to _____ to make 100

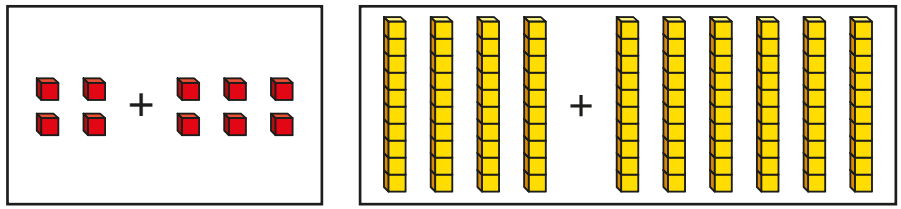
National Curriculum links

- Recall and use addition and subtraction facts to 20 fluently, and derive and use related facts up to 100

Bonds to 100 (tens)

Key learning

- Here are some number bonds.



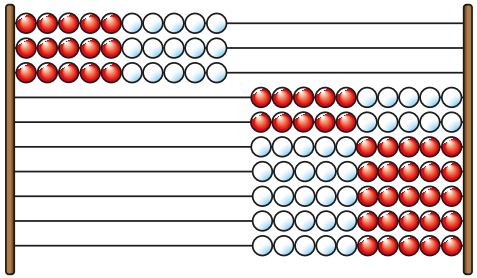
How many ones are there?

How many tens are there?

Write the number sentence for each bond.

What do you notice?

- The Rekenrek shows a bond to 100



Complete the number sentence to show the bond.

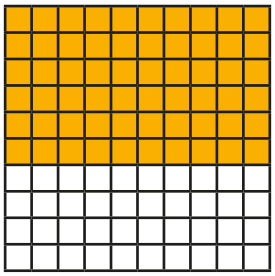
_____ + _____ = 100

- Here is a hundred square.

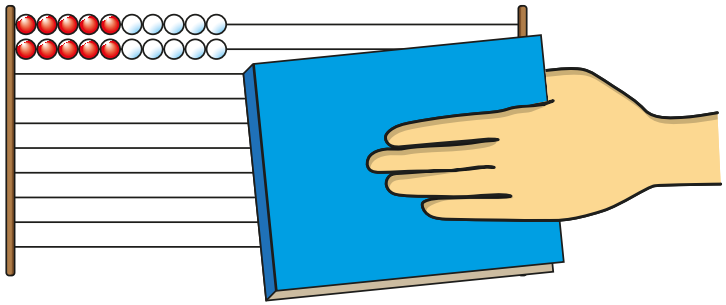
How many squares are shaded?

How many squares are not shaded?

Write the bond to 100



- Here is a Rekenrek.



How many beads are covered? How do you know?

Write the bond to 100

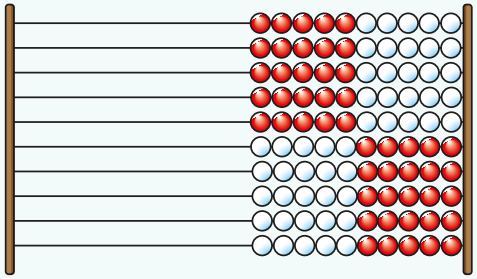
- Use a Rekenrek to find the bond to 100 for each number.

10	50	0	100

Bonds to 100 (tens)

Reasoning and problem solving

Start with a Rekenrek in the ready position.



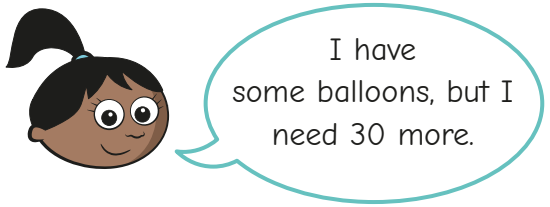
Show children a multiple of 10 and ask them to identify the bond to 100.

Work towards children being able to fluently recall their number bonds to 100. Ask children to work in pairs with a Rekenrek. Encourage them to work systematically to identify all the bonds to 100 using tens.

Consider how these bonds compare to the bonds to 10

Children should notice that, for example, 8 + 2 = 10 and 80 + 20 = 100 are related facts.

Sam needs 100 balloons.

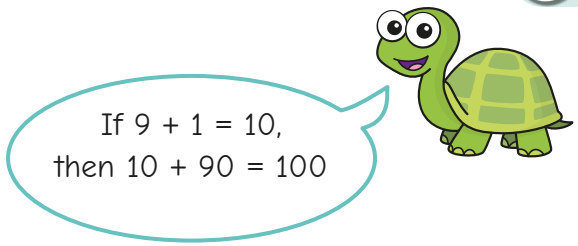


How many balloons does Sam have?

How do you know?

70

Tiny is finding bonds to 100



Is Tiny correct?

How do you know?

Yes

Add and subtract 1s

Notes and guidance

In this small step, children add and subtract ones from a given number. Children should start to spot patterns when adding and subtracting 1s and link these to their knowledge of number bonds from earlier in the block. If children know, for example, that 3 + 1 = 4, then they can use this to understand that 23 + 1 = 24 and 53 + 1 = 54. The focus of this small step is the way in which the ones digit changes, and calculations that cross a 10 boundary are not included at this point.

It is important that children make connections between adding 1 and, for example, adding 2, which is the same as adding 1 and then adding another 1. Once children are confident in adding and subtracting 1, they then go on to add and subtract different numbers of ones.

Things to look out for

- Children may add to the wrong digit, for example 23 + 1 = 33
- When a calculation is written with the smallest number first, for example 2 + 35, children may try to count on 35 rather than use the commutative property of addition to support them.

Key questions

- How many ones are there in _____?
- How many ones do you need to add/subtract?
- What is _____ ones + _____ ones?
- What is _____ + _____?
- What happens to the tens?
- What happens to the ones?

Possible sentence stems

- _____ has _____ tens and _____ ones.

  _____ ones + _____ ones = _____ ones,

  so _____ + _____ = _____
- To subtract _____ ones, I need to subtract 1 _____ times.

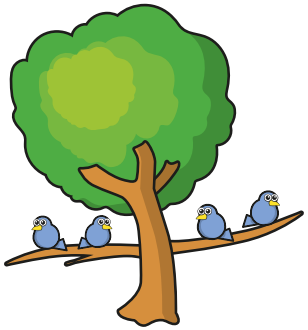
National Curriculum links

- Add and subtract numbers using concrete objects, pictorial representations, and mentally, including: a 2-digit number and 1s, a 2-digit number and 10s, two 2-digit numbers and adding three 1-digit numbers

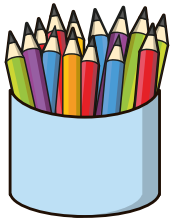
Add and subtract 1s

Key learning

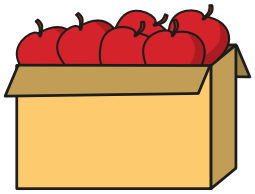
- There are 4 birds on a tree.
  - 1 more bird lands on the tree.
    How many birds are there now?
  - Another bird lands on the tree.
    How many birds are there now?



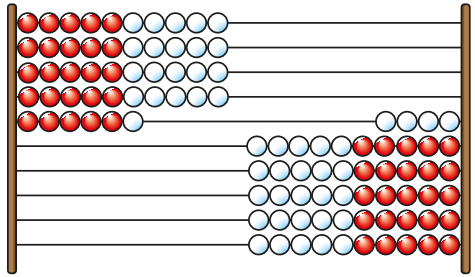
- There are 14 pencils in a pot.
  2 pencils are added to the pot.
  How many pencils are there now?



- There are 57 apples in a box.
  - Mo takes 1 apple out of the box.
    How many apples are there now?
  - Mo takes another apple.
    How many apples are there now?



- The Rekenrek shows 46



Use the Rekenrek to complete the number sentences.

46 + 1 = _____	46 – 1 = _____
46 + 2 = _____	46 – 2 = _____
46 + 3 = _____	46 – 3 = _____

What do you notice?

- Kay has these stickers.

Her teacher gives her five more stickers.

How many stickers does she have now?

Add and subtract 1s

Reasoning and problem solving

Max is subtracting 1s.

22 = 29 – 7

22 = 28 – 6

22 = 27 – 5

I can see a pattern!

22 = 26 – 4

22 = 25 – 3

22 = 24 – 2

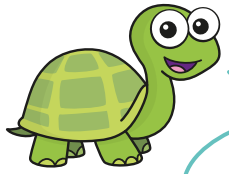
22 = 23 – 1

22 = 22 – 0

What pattern can Max see?

Continue the pattern.

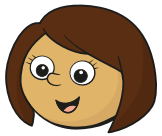
Tiny and Kim use different methods to work out 6 + 72



Tiny

I am going to start at 6 and count on 72

I am going to use the fact that 6 + 2 = 8 to help me.



Kim

78

96

Choose a method to work out the additions.

6 + 72	5 + 91

Did you choose the same method as your partner?

Add by making 10

Notes and guidance

In this small step, children use their knowledge of number bonds to 10 to add numbers within 20. Children are familiar with using the counting on method for calculations that cross a 10, but the purpose of this step is to improve both efficiency and accuracy using number bonds.

Children need to be able to partition a number into two parts in order to use number bonds to 10 to simplify a calculation.

Different concrete resources and representations can support children's understanding. Counters and ten frames, Rekenreks and number lines can help children to represent a calculation and work out the answer, and part-whole models can provide support when partitioning a number. Children can then use the knowledge gained from this to move towards a mental strategy.

Things to look out for

- If children are not confident in recalling their number bonds to 10, this will cause difficulty in this small step.
- Children may not partition the number they are adding in a way that simplifies the calculation.
- Some children may identify the jump to 10, but then still rely on their fingers to count beyond 10

Key questions

- What numbers do you need to add together?
- What is the bond to 10 for _____?
- What do you need to add to _____ to make _____?
- What can you partition _____ into?
- How many more do you need to add to 10?
- What is _____ plus _____?
- Why does partitioning _____ into _____ and _____ help with this question?

Possible sentence stems

- _____ can be partitioned into _____ and _____

  _____ + _____ = 10

  10 + _____ = _____

  So _____ + _____ = _____

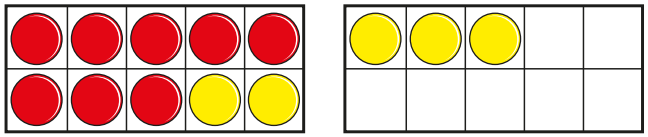
National Curriculum links

- Add and subtract numbers using concrete objects, pictorial representations, and mentally, including: a 2-digit number and 1s, a 2-digit number and 10s, two 2-digit numbers and adding three 1-digit numbers

Add by making 10

Key learning

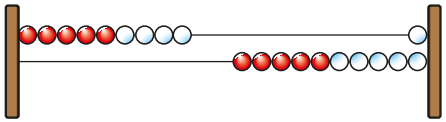
- The counters show that 8 + 5 = 10 + 3

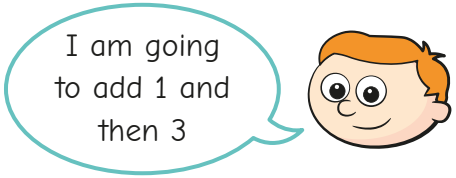


Use counters and ten frames to fill in the missing numbers.

- 9 + 5 = 10 + _____
- 8 + 4 = 10 + _____
- 4 + 7 = 10 + _____
- 7 + 9 = 10 + _____

- Ron is using a Rekenrek to work out 9 + 4





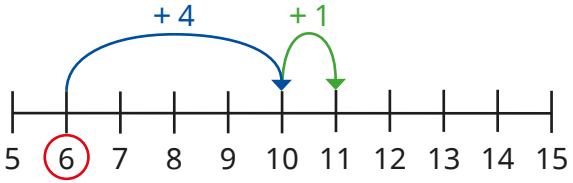
Why does Ron do this?

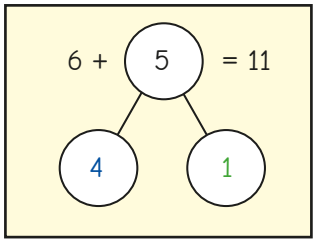
What is 9 + 4?

Use a Rekenrek to work out the additions.

8 + 6	7 + 5	5 + 6	3 + 9

- Here is Jo's method for working out 6 + 5





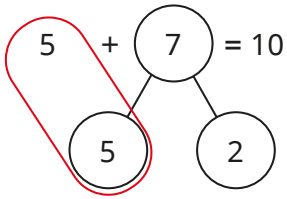
Use Jo's method to work out the additions.

4 + 8	2 + 9	7 + 6	9 + 9

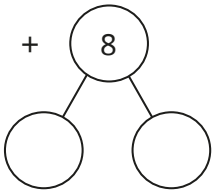
- Use bonds to 10 to complete the additions.

The first one has been started for you.

- 5 + 7 = 10 + _____ = _____



- 3 + 8



- 8 + 9
- 7 + 8

Add by making 10

Reasoning and problem solving

Mo and Kim are working out 4 + 9

I am going to start with 4 and add 6

Mo

What will Mo do next?

I am going to start with 9 and add 1

Kim

What will Kim do next?

What is 4 + 9?

Why do both methods work?

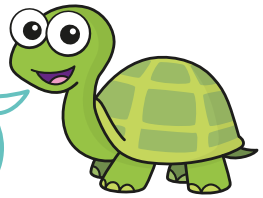
add 3

add 3

13

Tiny is working out 3 + 8

I am going to add 5 and then add 3



Will Tiny get the correct answer?

Is there a better way to work out the addition?

Yes

Tiny could use bonds to 10

Work out the missing number.

$9 + 8 = \square + 10$

How did you do it?

7

Add three 1-digit numbers

Notes and guidance

Children should now be confident in adding two 1-digit numbers. In this small step, they explore adding three 1-digit numbers. The use of concrete resources can support with this, and counters with ten frames or a Rekenrek are particularly helpful.

Children recognise that to add three numbers, they just need to add two of them and then add the third to the answer.

Initially, the focus is just on completing the calculations, but children then use their knowledge of the commutative property of addition to complete calculations in the most efficient way. For example, when working out 4 + 3 + 6, while children would get the correct answer by working out 4 + 3 and then adding on 6, using the number bond to 10 within the calculation simplifies their workings.

Things to look out for

- Children may add two pairs of numbers and then add the answers. For example, when working out 4 + 3 + 6, they might add 4 and 3 to give 7, add 3 and 6 to give 9 and then add the 9 to the 7
- Children may make numerical errors when crossing 10

Key questions

- What is _____ ones + _____ ones?
  If you add _____ more ones, what do you get?
- What is _____ + _____ + _____?
- Does it matter what order you add the numbers in?
- Can you see any number bonds in the calculation?
- What is the most efficient way to complete the calculation?

Possible sentence stems

- _____ ones + _____ ones = _____ ones

  So _____ ones + _____ ones + _____ ones = _____ones
- _____ and _____ are a bond to _____

  10 + _____ = _____

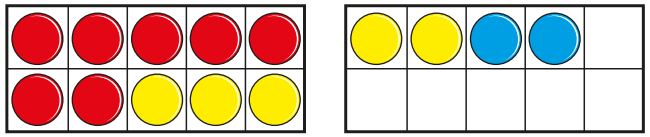
  So _____ + _____ + _____ = _____

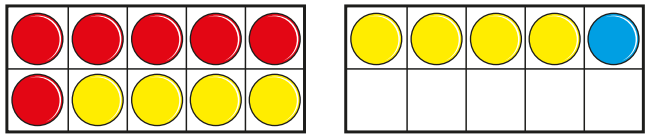
National Curriculum links

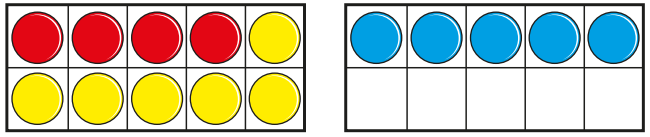
- Add and subtract numbers using concrete objects, pictorial representations, and mentally, including: a 2-digit number and 1s, a 2-digit number and 10s, two 2-digit numbers and adding three 1-digit numbers

Add three 1-digit numbers

Key learning

- Use the ten frames to complete the additions.
  - 

    7 + 5 + 2 = _____
  - 

    6 + 8 + 1 = _____
  - 

    4 + 6 + 5 _____

- Work out the additions.

2 + 5 + 8	2 + 8 + 5	5 + 8 + 2

What do you notice?

Which addition was easiest?

- Ron is working out 6 + 9 + 4

$$\underline{6} + 9 + \underline{4} = \underline{6 + 4} + 9$$
$$= 10 + 9$$
$$= 19$$

Why has Ron worked it out this way?

Use Ron's method to work out the additions.

3 + 5 + 7	2 + 9 + 1	8 + 1 + 2	5 + 3 + 5

- Find the total of each row and column.

5	4	2	
3	7	8	
5	7	3	

Add three 1-digit numbers

Reasoning and problem solving

Tom has 8 sweets.

Ben gives him 7 more sweets.

Kim gives him 2 more sweets.

How many sweets does Tom have now?

How did you work this out? Talk about it with a partner.

17

Tiny is working out 9 + 8 + 1

How can Tiny simplify the addition?

What is the answer?

18

Work out the missing numbers.

3 + _____ + 7 = 19

_____ + 4 + 6 = 11

2 + 6 + _____ = 16

1 + _____ + 3 = 13

9

1

8

9

7 + 9 + 3 | 7 + 3 + 9

Why do both additions have the same answer?

The numbers are the same, and addition can be done in any order.

Add to the next 10

Notes and guidance

In this small step, children add to the next ten using their knowledge of number bonds, adding by making 10 and related facts. They also identify missing numbers in a given calculation using the learning from earlier in the block. For example, to find the missing number in 28 + _____ = 30, they can use the fact that 8 + 2 = 10

Encourage children to make connections between the ones in calculations. For example, if they know that 25 + 5 = 30, they can use this to identify the missing number in 26 + _____ = 30: 26 is 1 more than 25 so the missing number must be 1 less than 5

Useful concrete resources to support this learning are base 10 and Rekenreks, as children can physically see the 10 they are making. It is important they do not rely on counting the individual ones and so move towards a mental strategy.

Things to look out for

- Calculations presented in a different way can feel more difficult, for example children may find it easier to identify the missing number in 26 + _____ = 30 than in _____ + 26 = 30 or 30 = _____ + 26

Key questions

- What numbers do you need to add together?
- How many tens are there in _____?
- What is the multiple of 10 after _____?
- How many ones are there in _____?
- What is the bond to 10 for _____?
- How many more do you need to add to get to _____?
- What is _____ plus _____?

Possible sentence stems

- _____ has _____ tens and _____ ones.
- The next 10 is _____
  The bond to 10 for _____ is _____
  I need to add _____ to _____ to get to the next 10

National Curriculum links

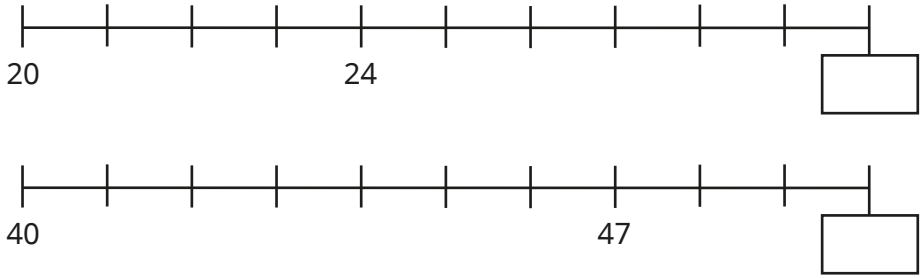
- Add and subtract numbers using concrete objects, pictorial representations, and mentally, including: a 2-digit number and 1s, a 2-digit number and 10s, two 2-digit numbers and adding three 1-digit numbers

Add to the next 10

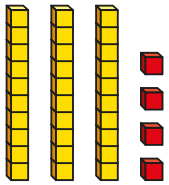
Key learning

- Work out the missing numbers.
  - 4 + _____ = 10
  - 7 + _____ = 10
  - _____ + 2 = 10
  - 10 = 1 + _____
  - 10 = _____ + 5
  - _____ + 3 = 10

- What are the missing numbers?



- The base 10 shows 34



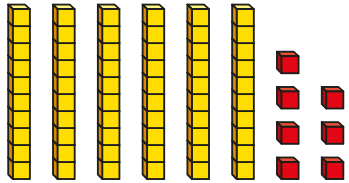
How many tens are there in 34?

What is the multiple of 10 after 34?

How many ones are there in 34?

How many ones do you need to add to get to the next 10?

- The base 10 shows 67



Work out the missing number.

67 + _____ = 70

- Work out the missing numbers.
  - 24 + _____ = 30
  - _____ + 12 = 20
  - 47 + _____ = 50
  - 70 = _____ + 65
  - 40 = 31 + _____
  - _____ + 83 = 90

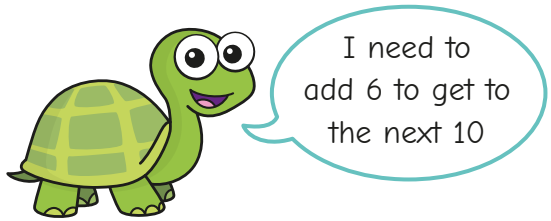
- Work out the missing numbers.
  - 3 + _____ = 10
  - 20 = 13 + _____
  - 73 + _____ = 80
  - _____ + 53 = 60
  - 23 + _____ = 30
  - 100 = _____ + 93

What do you notice?

Add to the next 10

Reasoning and problem solving

Tiny uses base 10 to make 46



Is Tiny correct?

How do you know?

No

Fill in the missing numbers.

24 + _____ = 30

25 + _____ = 30

26 + _____ = 30

27 + _____ = 30

What do you notice?

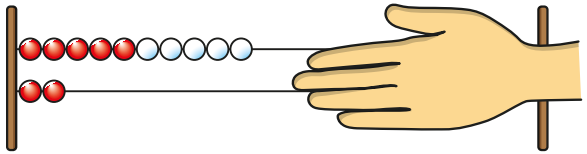
6

5

4

3

How many beads are covered?



How do you know?

8

Work out the missing number.

73 + 7 = ☐ + 71

How did you do it?

9

Add across a 10

Notes and guidance

Now that children can add to the next 10, in this small step they perform additions that cross a 10

The calculations within this step all require children to add a 1-digit number to a 2-digit number, and knowledge of place value, in particular the fact that 10 ones make up 1 ten, is essential prerequisite knowledge and should be reinforced throughout. Links can be made to the learning from an earlier step where children partitioned a 1-digit number to make 10, and this idea can be applied to support working with greater numbers.

Base 10, Rekenreks and number lines can continue to be used and a part-whole model can support children in partitioning the 1-digit number in the calculation. Children are not required to set their calculations up using the formal written method, but they should be encouraged to set concrete resources out in a methodical way.

Things to look out for

- If children are not confident in their number bonds to 10, it can make this step more challenging.
- Children may think calculations such as 3 + 19 are harder than 19 + 3, but should be encouraged to recognise that these are the same.

Key questions

- What numbers do you need to add together?
- How many tens are there in _____?
- What do you need to add to get to the next 10?
- What can you partition _____ into?
- How many more do you need to add?
- What is _____ plus _____?

Possible sentence stems

- The multiple of 10 after _____ is _____

  I need to add _____ to get to the next 10

  _____ + _____ = _____

  I need to add _____ more.

  So _____ + _____ = _____

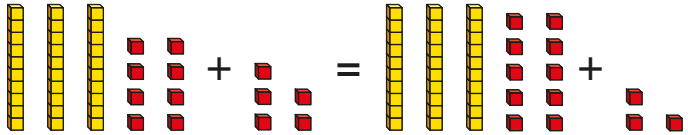
National Curriculum links

- Add and subtract numbers using concrete objects, pictorial representations, and mentally, including: a 2-digit number and 1s, a 2-digit number and 10s, two 2-digit numbers and adding three 1-digit numbers

Add across a 10

Key learning

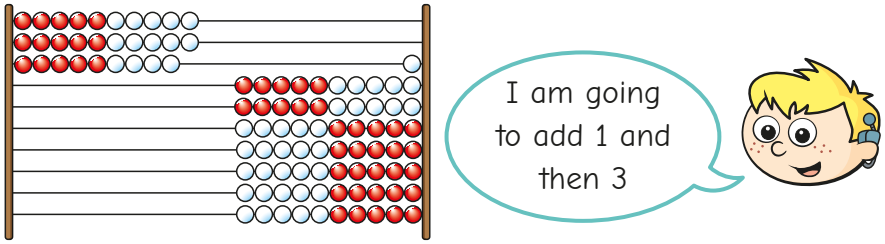
- The base 10 shows that 38 + 5 = 40 + 3



Use base 10 to work out the missing numbers.

- 29 + 5 = 30 + _____
- 18 + 4 = 20 + _____
- 45 + 7 = 50 + _____
- 67 + 9 = 70 + _____

- Max is using a Rekenrek to work out 29 + 4



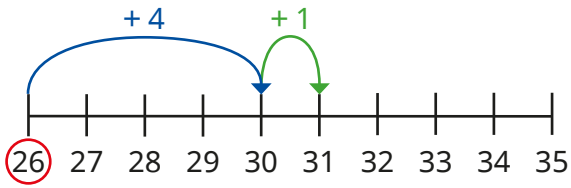
Why does Max do this?

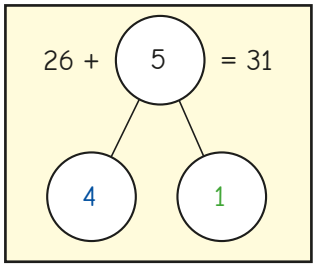
What is 29 + 4?

Use a Rekenrek to work out the additions.

18 + 6	67 + 5	75 + 6	33 + 9

- Here is Ben's method for working out 26 + 5





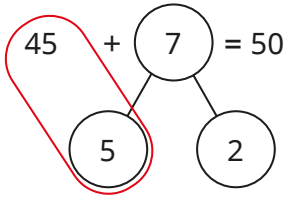
Use Ben's method to work out the additions.

44 + 8	2 + 19	37 + 6	9 + 59

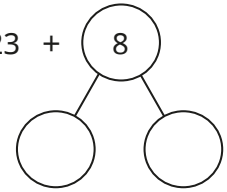
- Use bonds to 10 to complete the additions.

The first one has been started for you.

- 45 + 7 = 50 + _____ = _____



- 23 + 8

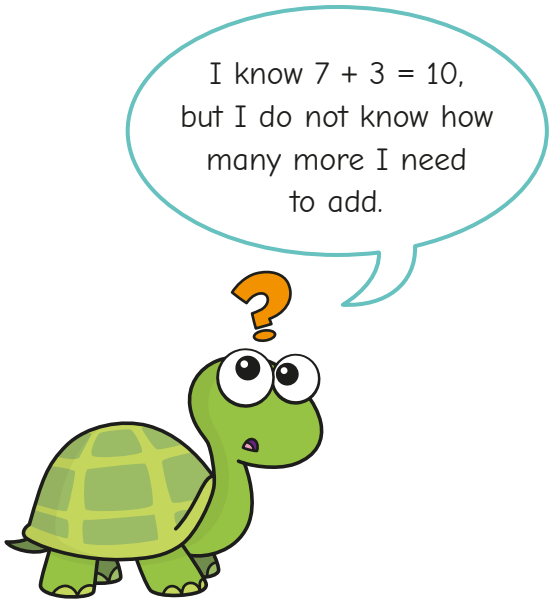


- 17 + 9
- 57 + 6

Add across a 10

Reasoning and problem solving

Tiny is working out 7 + 48



What can Tiny do to simplify the addition?

What is 7 + 48?

55

Work out the additions.

43 + 8	48 + 3
18 + 3	13 + 8
8 + 23	3 + 28
53 + 8	3 + 58

What do you notice?

Write a similar addition that has an answer of 71

51, 51

21, 21

31, 31

61, 61

63 + 8 or 68 + 3

Subtract across 10

Notes and guidance

So far in this block, children have added and subtracted 1s without crossing a 10 and have added across 10 or a multiple of 10. In this small step, children subtract from 2-digit numbers less than 20 where they are required to cross 10. They use strategies similar to those that they used for addition, partitioning the 1-digit number in order to get to 10 and then subtracting whatever is remaining.

The use of concrete resources such as ten frames and counters, base 10 and Rekenreks can support children in choosing the most efficient way to partition the 1-digit number they are subtracting and can also aid their understanding. Other representations, such as number lines for representing calculations and part-whole models for partitioning, are also useful throughout. All of these will support children as they start to move towards a mental strategy for subtracting across a 10

Things to look out for

- Children may find the difference between the ones rather than correctly performing the subtraction, for example 15 – 7 = 12 because 7 – 5 = 2
- If children incorrectly partition a number, this will lead to an incorrect answer.

Key questions

- How many do you start with?
- How many do you need to take away?
- What can you partition _____ into?
- How many do you need to subtract to get 10?
- How many more do you need to subtract?
- What is _____ less than _____?

Possible sentence stems

- I need to subtract _____ to get to 10

  I can partition _____ into _____ and _____

  I need to subtract _____ more.

  _____ less than _____ is _____

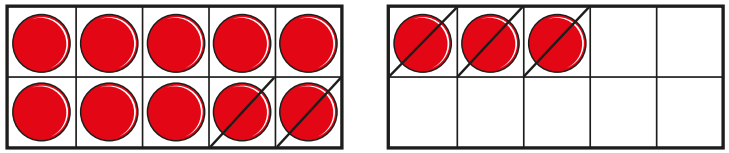
National Curriculum links

- Add and subtract numbers using concrete objects, pictorial representations, and mentally, including: a 2-digit number and 1s, a 2-digit number and 10s, two 2-digit numbers and adding three 1-digit numbers

Subtract across 10

Key learning

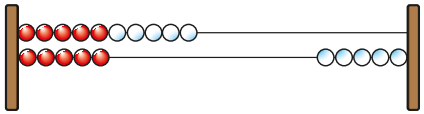
- The counters show that 13 – 5 = 10 – 2

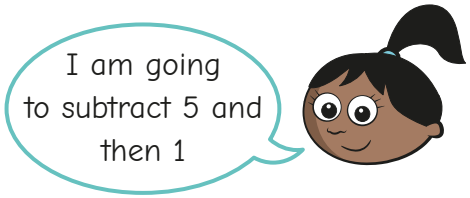


Use counters and ten frames to work out the missing numbers.

- 14 – 5 = 10 – _____
- 18 – 9 = 10 – _____
- 13 – 7 = 10 – _____
- 12 – 8 = 10 – _____

- Sam is using a Rekenrek to work out 15 – 6





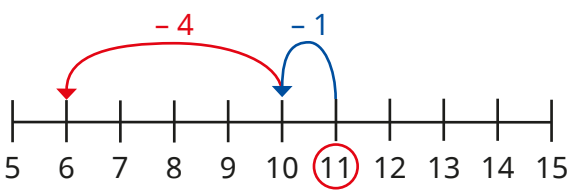
Why does Sam do this?

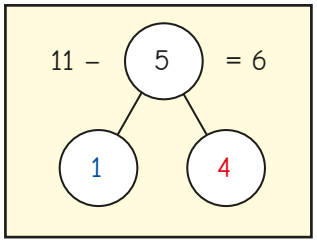
What is 15 – 6?

Use a Rekenrek to work out the subtractions.

16 – 8	15 – 9	14 – 7	13 – 9

- Here is Tom's method for working out 11 – 5



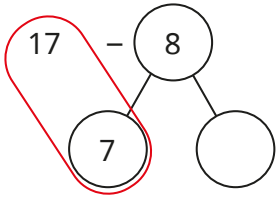


Use Tom's method to work out the subtractions.

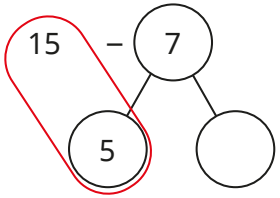
14 – 8	12 – 9	11 – 4	12 – 5

- Use bonds to 10 to complete the subtractions.

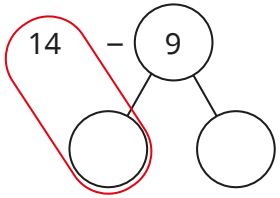
The first one has been started for you.



10 – ___ = ___



___ – ___ = ___

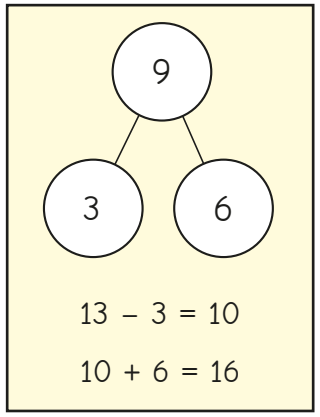


___ – ___ = ___

Subtract across 10

Reasoning and problem solving

Here are Jo's workings for 13 – 9



How do you know Jo has made a mistake?

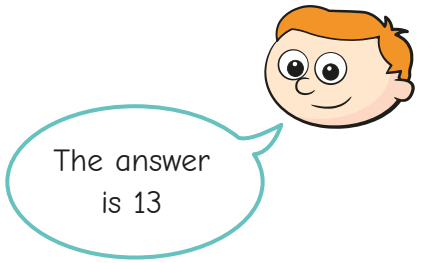
Explain the mistake.

What is 13 – 9?

Jo's answer is greater than the number she started with.

4

Ron is working out 15 – 8



Is Ron correct?

How do you know?

No

Ann has 14 stickers.

She gives some stickers to Ben.

Now she has 6 stickers.

How many stickers does she give to Ben?

How do you know?

8

Subtract from a 10

Notes and guidance

In this small step, children subtract a 1-digit number from any multiple of 10 within 100. Their knowledge of fact families for number bonds is particularly helpful here. For example, if they are calculating 50 – 6, they can use the fact that 6 + 4 = 10, so 10 – 6 = 4, and so 50 – 6 = 44

Rekenreks and number lines can be used to support children. Base 10 could be used, but might be less helpful for some children since they cannot physically break up the 10 rod. Counters and ten frames are less useful, because of the size of the numbers children are working with.

While children might initially count back using the chosen representations as support, it is essential that they do not rely too heavily on counting the individual ones, as they need to move towards a mental strategy.

Children are often more confident working out the missing number in 24 + _____ = 30 than they are calculating 30 – 6, so links to fact families and number bonds can provide support.

Things to look out for

- Children may not reduce the number of tens by 1, instead just using bonds to 10, for example 50 – 4 = 56

Key questions

- How many do you start with?
- How many do you need to take away?
- What is the bond to 10 for _____?
- What is _____ less than 10? So what is _____ less than _____?
- If you know that 4 + 6 = 10, what is 50 – 6?
- What do you notice about the tens? What do you notice about the ones?

Possible sentence stems

- When subtracting, the answer will be _____ than the number I start with.
- _____ + _____ = 10, so 10 – _____ = _____
- If 10 – _____ = _____, then _____ – _____ = _____

National Curriculum links

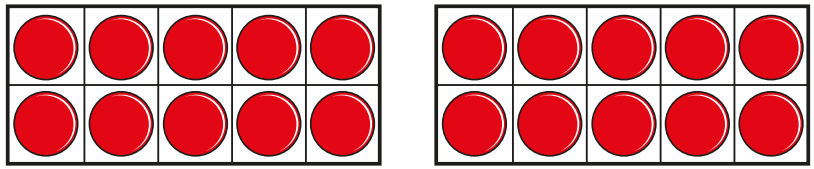
- Add and subtract numbers using concrete objects, pictorial representations, and mentally, including: a 2-digit number and 1s, a 2-digit number and 10s, two 2-digit numbers and adding three 1-digit numbers

Subtract from a 10

Key learning

- Fill in the missing numbers.
  - 10 – 4 = _____
  - 10 – 7 = _____
  - 10 – 2 = _____
  - 10 – 1 = _____
  - 10 – _____ = 5
  - _____ = 10 – 3

- The ten frames show 20



Use the ten frames to work out the subtractions.

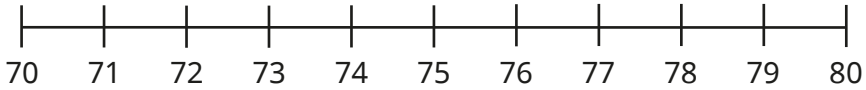
20 – 4	20 – 7	20 – 2
20 – 1	20 – 5	20 – 3

What do you notice?

- Complete the subtractions.

20 – 8	30 – 8	30 – 5	30 – 9

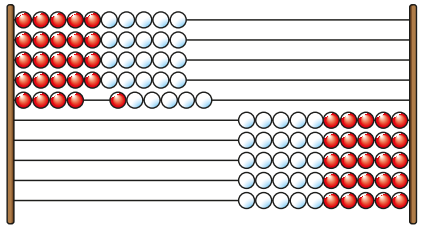
- Here is a number line.



Use the number line to work out the subtractions.

80 – 4	80 – 7	80 – 2
80 – 1	80 – 5	80 – 3

- Dan is using a Rekenrek to work out 50 – 6



What is 50 – 6?

Use a Rekenrek to work out the subtractions.

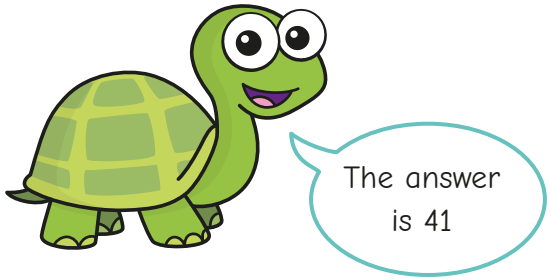
50 – 7	90 – 9	70 – 8	60 – 3

Subtract from a 10

Reasoning and problem solving

Tiny is working out 40 – 9

9 + 1 = 10



31

How do you know Tiny has made a mistake?

Explain the mistake.

What is 40 – 9?

Work out the subtractions.

10 – 4	6
20 – 4	16
30 – 4	26
40 – 4	36
50 – 4	46
60 – 4	56
70 – 4	66
80 – 4	76
90 – 4	86
100 – 4	96

What do you notice?

Subtract a 1-digit number from a 2-digit number (across a 10)

Notes and guidance

Now that children can subtract from a multiple of 10, in this small step they perform subtractions that cross a 10

All the calculations within this step require children to subtract a 1-digit number from a 2-digit number and, as with addition, knowledge of place value, in particular the fact that 10 ones make up 1 ten, is essential prerequisite knowledge and should be reinforced throughout. Links can be made to the learning from Step 10, where children partitioned a 1-digit number to make 10, and this idea can be applied here to support working with greater numbers. Base 10, Rekenreks and number lines can continue to be used and a part-whole model can support children in partitioning the 1-digit number.

Children are not required to set out their calculations using the formal written method.

Things to look out for

- Children may find the difference between the ones digits, for example 34 – 7 = 33 because 7 – 4 = 3
- When counting back, children may get to, for example, 50 and then go to 59, rather than recognising that they have crossed a 10 and should be at 49

Key questions

- How many do you start with?
- How many do you need to take away?
- What is the multiple of 10 before _____?
- What can you partition _____ into?
- How many do you need to subtract to get to the previous 10?
- How many more do you need to subtract?
- So what is _____ less than _____?

Possible sentence stems

- The previous multiple of 10 is _____
- _____ = _____ + _____, so
  _____ – _____ = _____ – _____ – _____
- I need to subtract _____ and then subtract another _____

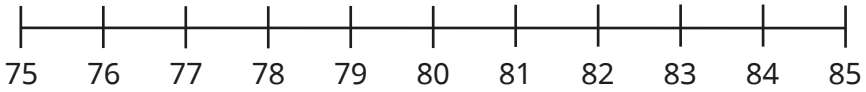
National Curriculum links

- Add and subtract numbers using concrete objects, pictorial representations, and mentally, including: a 2-digit number and 1s, a 2-digit number and 10s, two 2-digit numbers and three 1-digit numbers

Subtract a 1-digit number from a 2-digit number (across a 10)

Key learning

- Here is a number line.

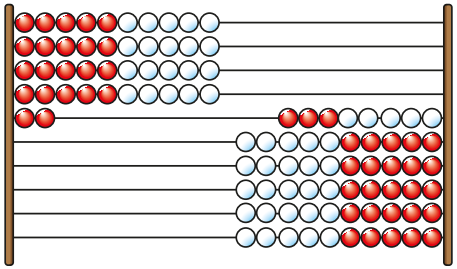


Use the number line to work out the subtractions.

83 – 1	83 – 3	83 – 5
83 – 2	83 – 4	83 – 6

What do you notice?

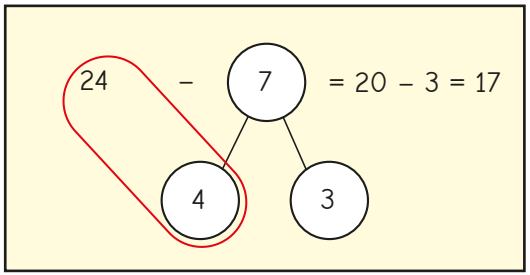
- The Rekenrek shows 42



Use the Rekenrek to work out 42 – 6

Use a Rekenrek to work out 75 – 9

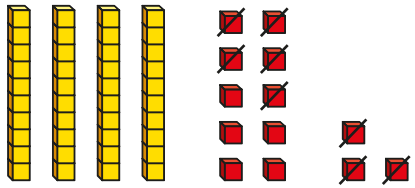
- Kay works out 24 – 7



Use Kay's method to work out the subtractions.

34 – 7	42 – 6	23 – 5	61 – 9

- Max is using base 10 to work out 53 – 8



Why did Max make 53 like this?

Use base 10 to work out the subtractions.

42 – 7	25 – 9	31 – 8	42 – 5

Subtract a 1-digit number from a 2-digit number (across a 10)

Reasoning and problem solving

Mo and Kim use different methods to work out 53 – 9

Mo

I am going to start at 53 and count back 9

I am going to subtract 3 and then subtract another 6

Kim

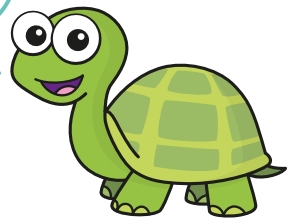
Choose a method to work out 53 – 9

Did you choose the same method as your partner?

44

Tiny is working out 61 – 8

8 – 1 = 7
so 61 – 8 = 67



Is Tiny correct?

How do you know?

No

Work out the missing number.

$32 - \square = 30 - 7$

9

10 more, 10 less

Notes and guidance

Earlier in this block, children added and subtracted 1-digit numbers, both with and without crossing a 10. In this small step, they focus on finding 10 more and 10 less than a given number within 100, in preparation for calculating with two 2-digit numbers that are not multiples of 10

Children should already be able to count in 10s from earlier learning, and this will help when finding 10 more or 10 less than a multiple of 10. The use of concrete manipulatives such as base 10 and Rekenreks can support children's understanding. Other representations such as hundred squares and number tracks can also be helpful.

Children need to pay close attention to the digits in the number before and after finding 10 more/less to recognise that the tens digit increases/decreases by 1, while the ones digit remains unchanged.

Things to look out for

- Children may add or subtract 1 from the ones digit rather than from the tens digit.
- Children may jump straight to the next/previous multiple of 10 rather than finding 10 more/less than the given number.

Key questions

- What number are you starting with?
- When you count on 10, what do you get?
- When you count back 10, what do you get?
- What is 10 more/less than _____?
- What do you notice about the number of tens?
- What do you notice about the number of ones?
- What do you notice about the positions of the numbers on the hundred square?

Possible sentence stems

- _____ has _____ tens and _____ ones.
- 10 more than _____ is _____
- 10 less than _____ is _____

National Curriculum links

- Add and subtract numbers using concrete objects, pictorial representations, and mentally, including: a 2-digit number and 1s, a 2-digit number and 10s, two 2-digit numbers and adding three 1-digit numbers

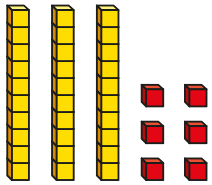
10 more, 10 less

Key learning

- Complete the number tracks.

10	20	30						
			35	45	55			

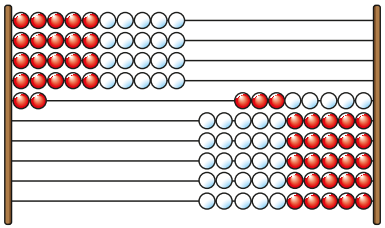
- The base 10 shows 36



What is 10 more than 36?

What is 10 less than 36?

- The Rekenrek shows 42



What is 10 more than 42?

What is 10 less than 42?

- 73 is circled on the hundred square.

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

Circle the number that is 10 more than 73

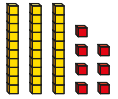
Circle the number that is 10 less than 73

Choose two more numbers to circle.

Circle 10 more and 10 less than each number.

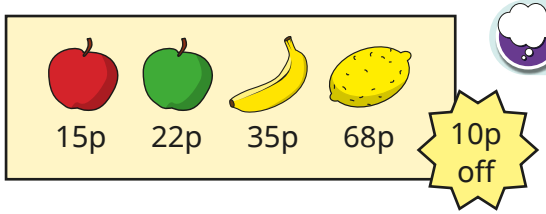
What do you notice?

- Draw base 10 and write numerals to complete the table.

10 less	Number	10 more
		
2	12	
		
	37	

10 more, 10 less

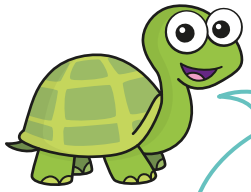
Reasoning and problem solving



Each piece of fruit is now 10p cheaper.

What are the new prices?

5p, 12p, 25p, 58p



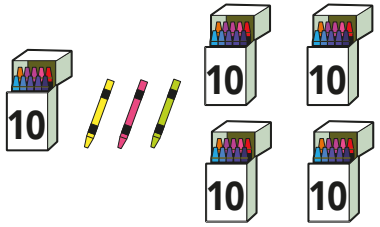
I know that 10 more than 72 is 82, because I only need to look at the tens digit.

Is Tiny correct?

How do you know?

Yes

Class 2 have these crayons.



They give 10 crayons away.

How many crayons do they have left?

How do you know?

43

Jo is counting backwards in 10s.

Forty-nine, thirty-nine, twenty-nine ...

What number comes next? Give your answer in words.

How did you work this out?

nineteen

Add and subtract 10s

Notes and guidance

In this small step, children add and subtract multiples of 10 from a given number, working within 100

Children can use their learning from the previous step where they recognised the effect that finding 10 more/less has on the tens digit. By unitising the tens in the number, they can also make connections to their earlier learning on adding ones and apply that here. For example, when calculating 43 + 20, they should recognise that they are adding 2 tens, so they can find 10 more and then 10 more again.

Base 10, Rekenreks and hundred squares can continue to be used to support children's understanding.

In the next step, children will add two 2-digit numbers, so secure understanding of this step is essential before moving on.

Things to look out for

- Children may add or subtract from the ones digit rather than from the tens digit.
- Children may jump straight to the next/previous multiple of 10 and then keep counting in 10s.

Key questions

- What number are you starting with?
- Count on/back 10. What do you get?
  Count on/back another 10. What do you get?
- 30 has _____ tens, so I need to add/subtract 10 _____ times.
- What is _____ more/less than _____?
- What do you notice about the number of tens?
- What do you notice about the number of ones?
- What do you notice about the positions of the numbers on the hundred square?

Possible sentence stems

- _____ has _____ tens.
- To add/subtract _____, I need to add/subtract 10 _____ times.

National Curriculum links

- Add and subtract numbers using concrete objects, pictorial representations, and mentally, including: a 2-digit number and 1s, a 2-digit number and 10s, two 2-digit numbers and adding three 1-digit numbers

Add and subtract 10s

Key learning

- Ben has these sweets.

He buys 2 more packets of sweets.

How many sweets does he have now?

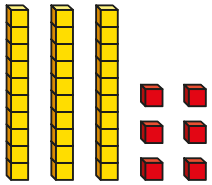
- Count in 20s to fill in the number track.

0	20			

- The base 10 shows 36

What is 20 more than 36?

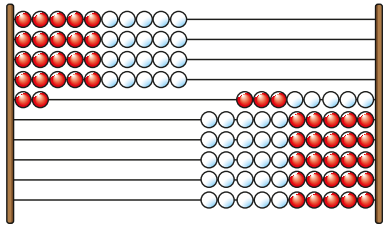
What is 20 less than 36?



- The Rekenrek shows 42

What is 42 + 30?

What is 42 – 30?



- 53 is circled on the hundred square.

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

Circle the answer to 53 + 40

Circle the answer to 53 – 40

Choose two more numbers between 40 and 60

Circle 40 more and 40 less than each number.

What do you notice?

- Work out the calculations.

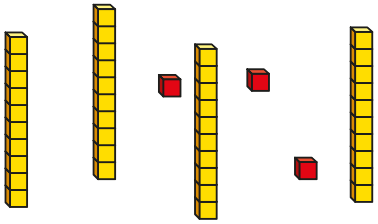
▶ 80 – 10	▶ 23 + 10	▶ 76 – 10
80 – 20	23 + 20	76 – 20
80 – 30	23 + 30	76 – 30
80 – 40	23 + 40	76 – 40

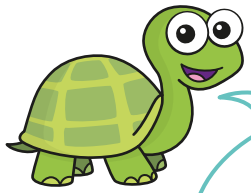
What do you notice?

Add and subtract 10s

Reasoning and problem solving

Tiny is making numbers with these pieces of base 10





I'm going to use all the ones and some of the tens to make a number.

What numbers can Tiny make?

Talk about your answer with a partner.

13, 23, 33

43 would require Tiny to use all of the tens.

Class 2 has 26 crayons.

They are given 10 more crayons every day for 5 days.

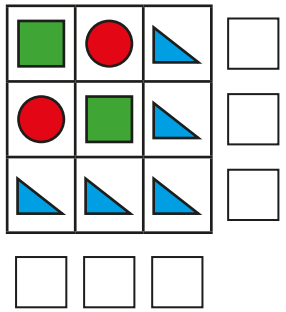
How many crayons do they have after 5 days?

How did you work this out?

76

● = 20 ◣ = 10 ■ = 57

What is the total of each row and column?



rows (top to bottom): 87, 87, 30

columns (left to right): 87, 87, 30

Add two 2-digit numbers (not across a 10)

Notes and guidance

This small step brings together all the learning on addition from earlier in the block, with children adding two 2-digit numbers composed of both tens and ones. The calculations in this step do not require children to make an exchange, as this will be covered explicitly at a later point.

Base 10 is a useful manipulative to support children with the learning in this step. Encourage them to set their numbers out in an organised way, for example one above the other with the tens together and the ones together. Setting them out in this way will support children later when they look at the column method for addition. While it will be tempting for children to consider the tens first, as they are used to working from left to right, encourage them to first consider how many ones they have altogether before looking at the tens. This will help to prevent misconceptions later in the block, when performing exchanges.

Things to look out for

- If children do not set out their concrete resources in an organised way, they may make numerical errors.
- Children may add the tens first, then the ones. While this will work for these questions, it will hold them back in later steps.

Key questions

- What numbers are you adding together?
- How many ones are there in each number?
- How many ones are there altogether?
- How many tens are there in each number?
- How many tens are there altogether?

Possible sentence stems

- _____ ones + _____ ones = _____ ones
  _____ tens + _____ tens = _____ tens
- There are _____ ones altogether.
  There are _____ tens altogether.
  _____ tens and _____ ones is _____

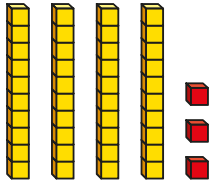
National Curriculum links

- Add and subtract numbers using concrete objects, pictorial representations, and mentally, including: a 2-digit number and 1s, a 2-digit number and 10s, two 2-digit numbers and adding three 1-digit numbers

Add two 2-digit numbers (not across a 10)

Key learning

- Ann uses base 10 to make a number.

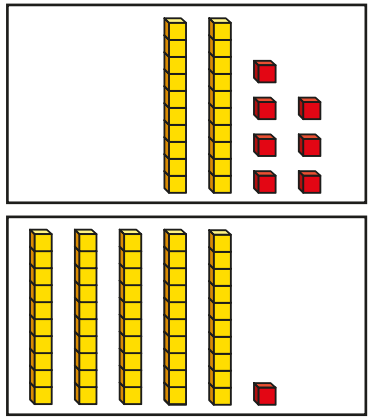


  - What is Ann's number?
  - Ann adds 4 more ones.

    What number does she have now?
  - Ann then adds 1 more ten.

    What number does she have now?
  - What has Ann added altogether?

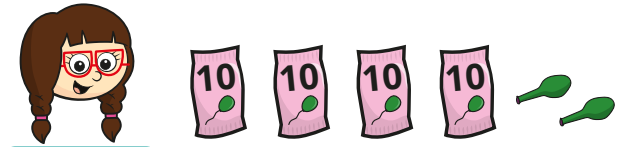
- Here are two numbers in base 10
  - How many ones are there altogether?
  - How many tens are there altogether?
  - What is the total of the two numbers?



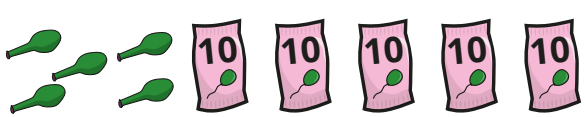
- Use base 10 to work out the additions.

52 + 14	23 + 31	37 + 22
78 + 11	42 + 27	63 + 35

- Jo and Ron each have some balloons.



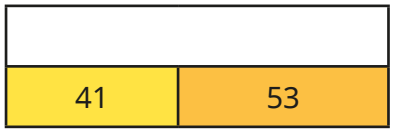
Jo

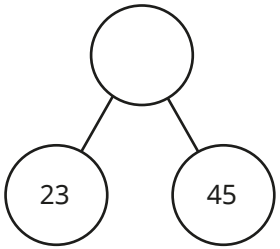


Ron

How many balloons do they have in total?

- Work out the wholes.

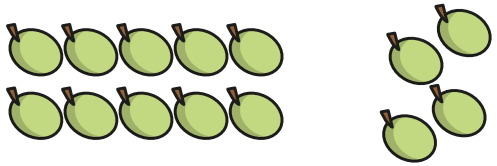




Add two 2-digit numbers (not across a 10)

Reasoning and problem solving

Ron has these grapes.

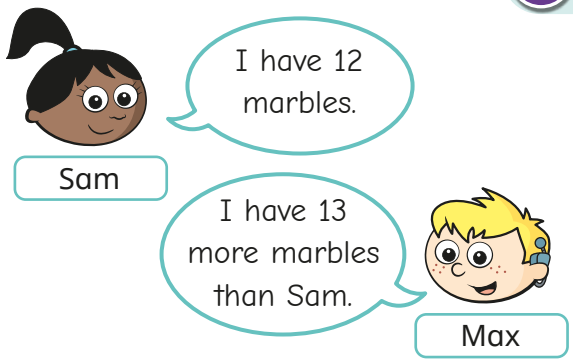


Teddy has 25 more grapes than Ron.

How many grapes does Teddy have?

39

Sam and Max have some marbles.

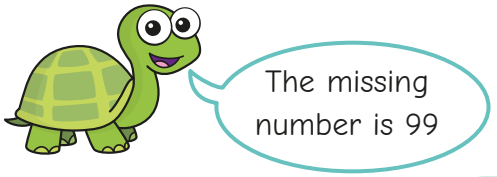


How many marbles do they have altogether?

37

Tiny is working out the missing number.

$57 = 42 + \square$



Explain the mistake Tiny has made.

What is the missing number?

15

What could the missing digits be?

$\_\_2 + \_\_5 = 87$

How many different answers can you find?

multiple possible answers, e.g.

1 and 7

5 and 3

Add two 2-digit numbers (across a 10)

Notes and guidance

In the previous step, children added two 2-digit numbers where there was no exchange. In this small step, they look at additions where they must exchange 10 ones for 1 ten. Their knowledge of place value will be used throughout to support their understanding of exchanges.

Base 10 can continue to be used to support learning. Encourage children to explain why they need to make an exchange when they have more than 10 ones.

As in the previous step, children should first consider how many ones they have before looking at the tens. They could also be encouraged to think about why they need to do it in this order.

Children do not need to set out their calculations using the column method, but should be encouraged to organise their manipulatives in a structured way.

Things to look out for

- Children may say, for example, 25 + 38 = 513 because 5 ones + 8 ones = 13 ones and 2 tens + 3 tens = 5 tens.
- Children may forget to add the extra ten that resulted from an exchange.

Key questions

- How many ones are there in each number?
- How many ones are there altogether?
- Can you make an exchange? Why?
- How many tens are there in each number?
- How many tens are there altogether?
- Did you include the ten from your exchange?

Possible sentence stems

- _____ has _____ tens and _____ ones.
- _____ ones + _____ ones = _____ ones
  _____ ones = _____ ten + _____ ones
- There are _____ ones, so I do/do not need to make an exchange.

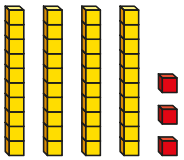
National Curriculum links

- Add and subtract numbers using concrete objects, pictorial representations, and mentally, including: a 2-digit number and 1s, a 2-digit number and 10s, two 2-digit numbers and adding three 1-digit numbers

Add two 2-digit numbers (across a 10)

Key learning

- Mo uses base 10 to make the number 43



  - Mo adds 8 more ones.

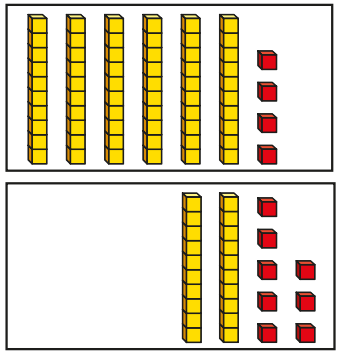
    What number does he have now?

  - Mo then adds 1 more ten.

    What number does he have now?

  - How many has Mo added altogether?

- Complete the sentences to work out 64 + 28



4 ones + 8 ones = _____ ones

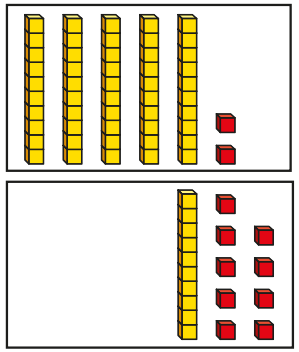
_____ ones = _____ ten + _____ ones

6 tens + 2 tens + _____ ten = _____ tens

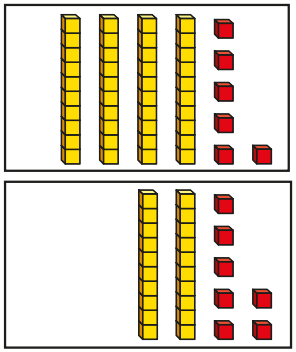
_____ tens + _____ ones = _____

- Use base 10 to work out the additions.

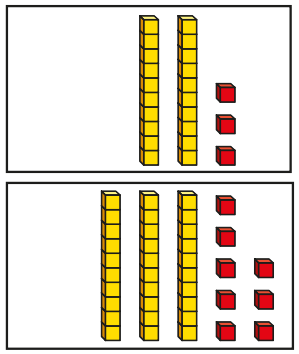
  - 52 + 19



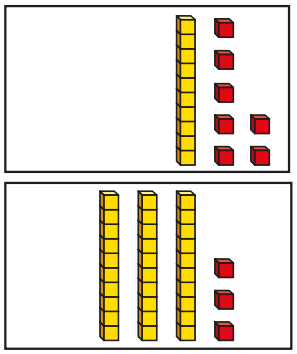
  - 46 + 27



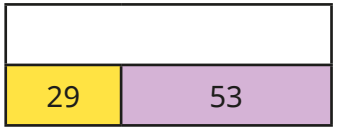
  - 23 + 38

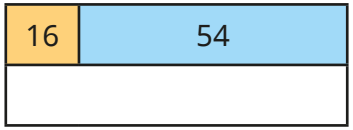


  - 17 + 33



- Work out the wholes.





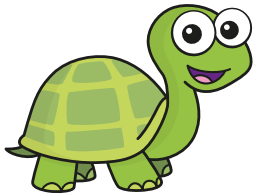
Add two 2-digit numbers (across a 10)

Reasoning and problem solving

Tiny is working out 57 + 26

7 ones + 6 ones = 13 ones

5 tens + 2 tens = 7 tens



The answer is 713

Do you agree with Tiny?

Talk about it with a partner.

No

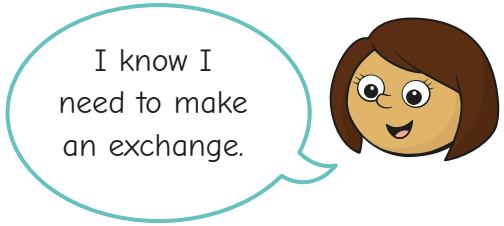
Jo has 47 stickers.

Ben has 16 more stickers than Jo.

How many stickers does Ben have?

63

Kim is working out 28 + 19



How does Kim know this?

What is 28 + 19?

8 + 9 is greater than 10

47

What could the missing digits be?

$$46 + 2\_\_ = 7\_\_$$

How many answers can you find?

multiple possible answers, e.g.

5 and 1

9 and 5

Subtract two 2-digit numbers (not across a 10)

Notes and guidance

This small step brings together all the learning on subtraction from earlier in the block, with children subtracting two 2-digit numbers composed of both tens and ones. The calculations in this step do not require children to make an exchange, as this will be covered explicitly once they are confident in completing calculations with no exchange.

Base 10 is a useful manipulative to support children with the learning in this step. Unlike addition, children will only need to make one of the numbers in the calculation: the number they are subtracting from. While it will be tempting for children to consider the tens first, as they are used to working from left to right, encourage them to first consider how many ones they have left before looking at the tens. This will help to prevent misconceptions later in the block when performing exchanges.

Things to look out for

- When adding, children used base 10 to make both numbers. Doing that here may cause confusion. Instead, they need to make the greater of the two numbers and "take away" the smaller one.
- Children may start by considering the tens first, which can cause problems with later learning.

Key questions

- What number are you subtracting from?
- What number are you subtracting?
- How many ones do you need to subtract?
- How many ones are left?
- How many tens do you need to subtract?
- How many tens are left?
- What is the difference between _____ and _____?

Possible sentence stems

- _____ ones – _____ ones = _____ ones

  _____ tens – _____ tens = _____ tens
- The difference between _____ and _____ is _____
- _____ minus _____ is equal to _____

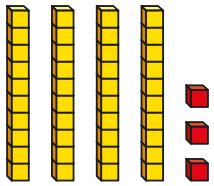
National Curriculum links

- Add and subtract numbers using concrete objects, pictorial representations, and mentally, including: a 2-digit number and 1s, a 2-digit number and 10s, two 2-digit numbers and adding three 1-digit numbers

Subtract two 2-digit numbers (not across a 10)

Key learning

- Ron uses base 10 to make a number.

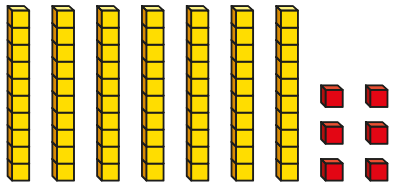


  - What is Ron's number?
  - Ron takes away 2 ones.

    What number does he have now?
  - Ron then takes away 3 tens.

    What number does he have now?
  - What number has Ron taken away altogether?

- The base 10 shows 76

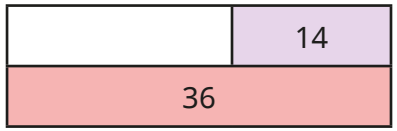


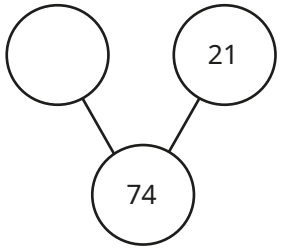
  - Subtract 4 ones.
  - Now subtract 2 tens.
  - What is 76 – 24?

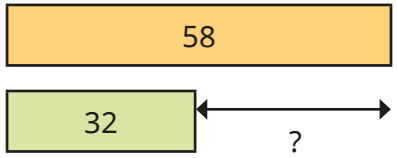
- Use base 10 to work out the subtractions.

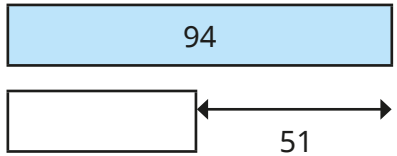
54 – 12	73 – 31	37 – 22
78 – 11	49 – 17	68 – 35

- Work out the missing parts.









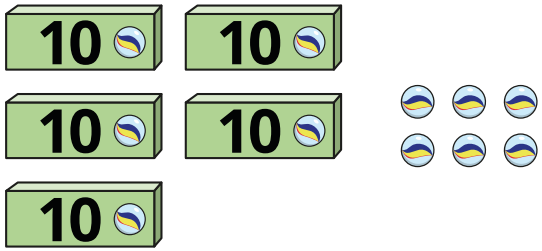
- Work out the difference between the numbers.

56 and 21	39 and 34	97 and 47

Subtract two 2-digit numbers (not across a 10)

Reasoning and problem solving

Kim has these marbles.



Sam has 22 fewer marbles than Kim.

How many marbles does Sam have?

How many marbles do they have altogether?

34

90

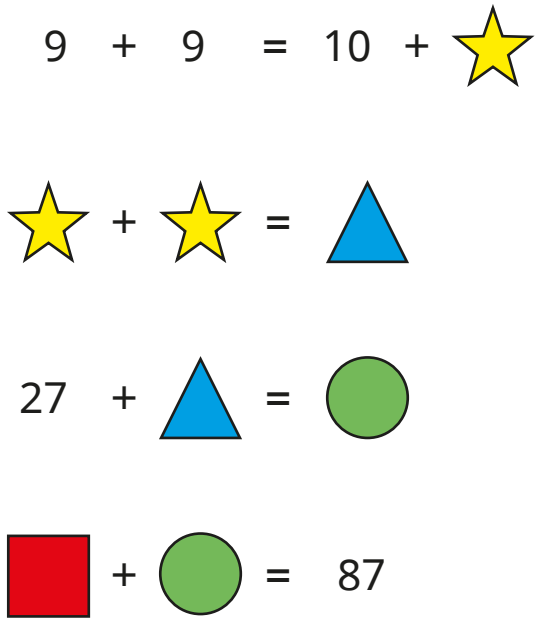
Tom has 47 stickers.

He gives Kay 16 stickers.

How many stickers does Tom have now?

31

Work out the value of 



How did you work this out?

44

Subtract two 2-digit numbers (across a 10)

Notes and guidance

In the previous step, children subtracted two 2-digit numbers where there was no exchange. In this small step, they look at calculations where they must exchange 1 ten for 10 ones in order to complete the subtraction. Their knowledge of place value will be used throughout to support their understanding of exchanges.

Base 10 can continue to be used to support learning, and children should be encouraged to explain why they need to make an exchange when the number that they are subtracting has more ones than the number they are subtracting from.

As in the previous step, children first consider how many ones they have left before looking at the tens. Encourage them to think about why they need to do it in this order.

Children do not need to set out their calculations using the column method, but should be encouraged to organise their manipulatives in a structured way.

Things to look out for

- Children may simply find the difference between the tens digits and the ones digits in order to avoid making an exchange, for example 81 – 25 = 64 because 8 – 2 = 6 and 5 – 1 = 4

Key questions

- What number are you subtracting from?
- How many ones do you need to subtract?
- What do you do if there are not enough ones?
- What can you exchange 1 ten for?
- How many tens do you need to subtract?
- How many tens are left?
- What is the difference between _____ and _____?

Possible sentence stems

- 1 ten is equal to _____ ones.
  I need to exchange _____ for _____
- I know I need to make an exchange because ...
- The difference between _____ and _____ is _____

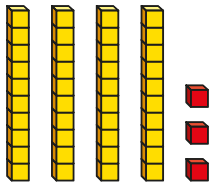
National Curriculum links

- Add and subtract numbers using concrete objects, pictorial representations, and mentally, including: a 2-digit number and 1s, a 2-digit number and 10s, two 2-digit numbers and adding three 1-digit numbers

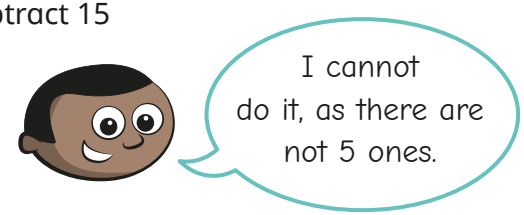
Subtract two 2-digit numbers (across a 10)

Key learning

- Mo uses base 10 to make the number 43

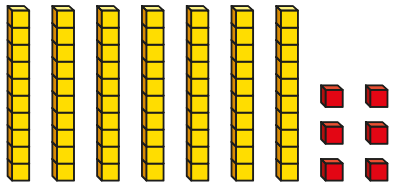


Mo wants to subtract 15



  - What does Mo need to do?
  - What is 43 – 15?

- Ann uses base 10 to make the number 76



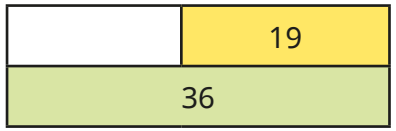
She exchanges 1 ten for 10 ones.

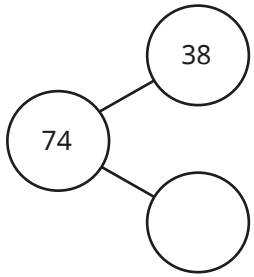
  - Draw the base 10 that Ann has now.
  - Use the base 10 to work out 76 – 19

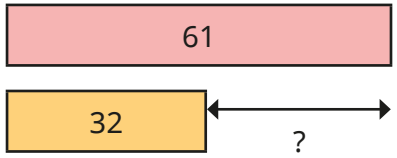
- Use base 10 to work out the subtractions.

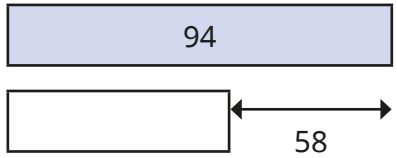
54 – 17	73 – 38	31 – 22
78 – 19	42 – 17	63 – 37

- Work out the missing parts.









- Work out the difference between the numbers.

75 and 28	54 and 46	80 and 32

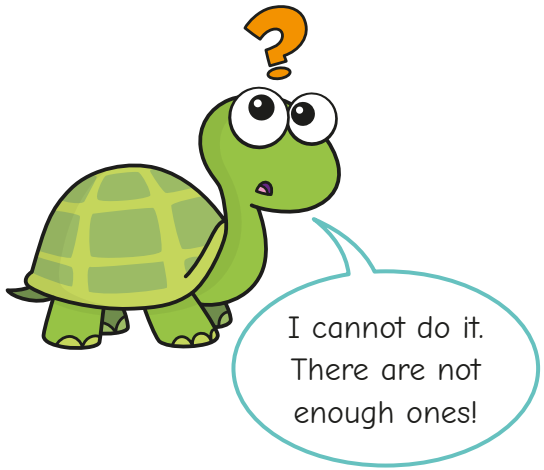
Subtract two 2-digit numbers (across a 10)

Reasoning and problem solving

Tiny is working out 45 – 29

4 tens – 2 tens = 2 tens

5 ones – 9 ones = ?



What mistake has Tiny made?

Work out 45 – 29

16

Ann is trying to work out the difference between 83 and 59

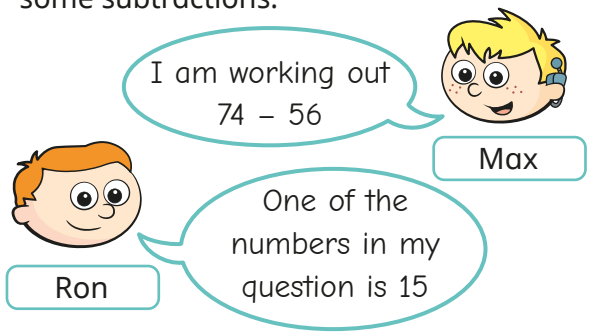
83 – 59 = 36

What mistake has Ann made?

What is the correct answer?

24

Max and Ron are working out some subtractions.



Max's answer is double Ron's answer.

What could Ron's subtraction be?

24 – 15

or

15 – 6

Mixed addition and subtraction

Notes and guidance

So far, children have looked in depth at addition and subtraction separately, and at calculations with and without exchanges separately. Now that they have this knowledge, this small step provides the opportunity for children to consolidate this learning while also requiring them to think about how to tackle each question.

Base 10 can continue to be used to support children, and they will need to think carefully about how they set this out for each question and whether they need to make both numbers or not. Word problems give rise to different structures of subtraction, so encourage children to explain what the numbers in the calculations represent in each case.

Before they begin a question, encourage children to consider whether it will require an exchange, and ask them to explain their decision.

Things to look out for

- If children make both numbers using base 10 to perform a subtraction, this can lead to confusion.
- When performing a subtraction, children may just find the difference between digits in each column, rather than make an exchange.

Key questions

- Is the question an addition or a subtraction? How do you know?
- Do you need to make both numbers using base 10? Why/why not?
- What does the number _____ represent in the calculation?
- Do you need to make an exchange? How do you know?

Possible sentence stems

- I know this is an addition/subtraction because ...
- I know I need to make an exchange because ...
- _____ plus _____ is equal to _____
- _____ subtract _____ is equal to _____

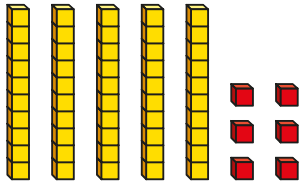
National Curriculum links

- Add and subtract numbers using concrete objects, pictorial representations, and mentally, including: a 2-digit number and 1s, a 2-digit number and 10s, two 2-digit numbers and adding three 1-digit numbers

Mixed addition and subtraction

Key learning

- The base 10 shows 56



Use base 10 to work out the calculations.

56 + 23	56 + 19
56 – 23	56 – 19

- Fay and Mo are playing a game.

  Fay has 63 points.

  Mo has 18 points more than Fay.

  How many points does Mo have?

- Find the total of 24 and 16

- Find the difference between 95 and 68

- A jumper costs £25

  - A T-shirt costs £17 less than the jumper.

    How much does the T-shirt cost?

  - Mr Trent buys a jumper and a T-shirt.

    How much does he spend?

- Max has 45 stickers.

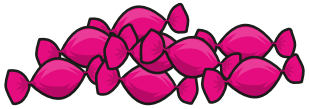
  Sam has 28 stickers.

  - How many more stickers does Max have than Sam?
  - How many stickers do they have altogether?

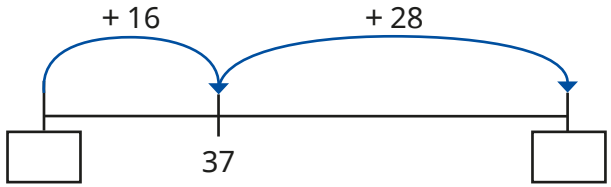
- Dan has 21 sweets.

  He gives 7 sweets to Ben.

  How many sweets does Dan have left?



- Work out the missing numbers on the number line.



Mixed addition and subtraction

Reasoning and problem solving

Kim, Jo and Mo are each thinking of a number.

My number is 7 less than 63

Kim

Kim's number is 29 more than my number.

Jo

My number is the sum of Kim's and Jo's numbers.

Mo

What number is Mo thinking of?

How did you work this out?
Talk about it with a partner.

83

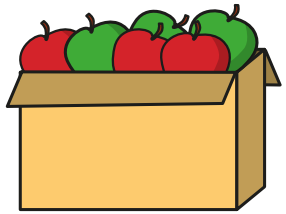
There are 52 apples in a box.

35 of the apples are red.

The rest of the apples are green.

23 green apples are added to the box.

How many green apples are there in the box?



40

The difference between two 2-digit numbers is 42

What could the numbers be?

Compare answers with a partner.

multiple possible answers, e.g.

53 and 11

49 and 91

Compare number sentences

Notes and guidance

Children should already be familiar with the inequality symbols and in this small step they use them to compare number sentences. Encourage children to use correct mathematical language to say their answer in words, for example 4 + 7 > 4 + 5 should be said as "4 plus 7 is greater than 4 plus 5".

The focus of this small step is not just on working out the values of the calculations, but rather comparing the numbers within them. For example, when comparing 32 + 24 and 32 + 27, children do not need to work out both totals; instead, they should recognise that 32 is the same in each, and since 27 is greater than 24, this means that 32 + 27 is greater than 32 + 24

Children need to consider carefully when comparing subtractions, as even though 27 is greater than 24, 32 – 27 is not greater than 32 – 24, because they are subtracting more.

Things to look out for

- Children may need reminding of the meaning of the inequality symbols.
- When comparing calculations, children may automatically find the value of each number sentence rather than considering the numbers that they are made up of.

Key questions

- What do the symbols >, < and = mean?
- Do you need to work out the answer to each calculation? Why/why not?
- When you add a greater number, is the answer greater or smaller?
- When you subtract a greater number, is the answer greater or smaller?

Possible sentence stems

- _____ is greater/less than _____
- _____ is greater than _____, so _____ + _____ is greater than _____ + _____
- _____ is less than _____, so _____ – _____ is greater than _____ – _____

National Curriculum links

- Add and subtract numbers using concrete objects, pictorial representations, and mentally, including: a 2-digit number and 1s, a 2-digit number and 10s, two 2-digit numbers and adding three 1-digit numbers
- Compare and order numbers from 0 up to 100; use <, > and = signs

Compare number sentences

Key learning

- Complete the calculations.

35 + 12	27 + 25	41 – 18

Choose the correct phrase to compare the calculations.

greater than	less than	equal to

- 35 + 12 is _____ 27 + 25
- 35 + 12 is _____ 41 – 18
- 27 + 25 is _____ 35 + 12
- 27 + 25 is _____ 41 – 18
- 41 – 18 is _____ 35 + 12
- 41 – 18 is _____ 27 + 25

Write <, > or = to compare the calculations.

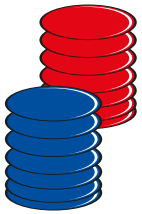
- 35 + 12 ◯ 27 + 25
- 35 + 12 ◯ 41 – 18
- 27 + 25 ◯ 35 + 12
- 27 + 25 ◯ 41 – 18
- 41 – 18 ◯ 35 + 12
- 41 – 18 ◯ 27 + 25

- Ben has 15 blue counters and 12 red counters.

  Kay has 15 blue counters and 17 red counters.

  Who has more counters?

  How do you know?



- Sam and Ron each have 50 stickers.

  Sam gives 32 stickers away.

  Ron gives 17 stickers away.

  Who has more stickers left?

  How do you know?

- Write <, > or = to compare the calculations.
  - 53 + 19 ◯ 53 + 25
  - 53 – 19 ◯ 53 – 25
  - 27 + 31 ◯ 42 + 27
  - 71 – 43 ◯ 71 – 39
  - 56 – 43 ◯ 56 – 43
  - 60 – 15 ◯ 58 – 15

Compare number sentences

Reasoning and problem solving

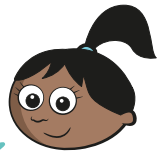
Jo and Sam are comparing the additions.

42 + 19 ◯ 23 + 42

I am going to start by working out the answers.

Jo

I do not need to do that. I already know the answer.



Sam

How does Sam already know the answer?

What is the missing symbol?

<

Work out the missing digit.

27 + 39 = 17 + __ 9

4

Max is working out the missing symbol.

14 – 5 ◯ 14 + 5

The missing symbol must be =, because the numbers are the same in both calculations.

Do you agree with Max?

Explain your answer.

No

Missing number problems

Notes and guidance

In this small step, children use their knowledge of place value and addition and subtraction in order to find missing numbers in calculations.

The types of questions that they will see in this small step are, for example, 10 + 6 = 13 + _____. They could partition the 6 into 3 and 3 to find the missing number, or they could consider that 13 is 3 more than 10, so the missing number must be 3 less than 6 in order for the two calculations to be equal. Correct mathematical language can support children's understanding. For example, if the example above is read as "10 plus 6 is equal to 13 plus something", this can support children in understanding what they need to do, whereas if the = symbol was read as something else, such as "makes", this understanding is likely to be hindered.

Things to look out for

- When finding the missing number in 10 + 6 = 13 + _____, children may think that because 13 is 3 more than 10, then the missing number must be 3 more than 6
- Children may try to complete a series of calculations to find the missing number, rather than think about the connections between the numbers in the question.

Key questions

- What can you partition _____ into?
- How does that help you to work out the missing number?
- If one number increases by _____ ones, what must happen to the other number if the answer is the same?
- Do you need to work out the answer to each calculation?
- How can you check your answer?
- What do you notice about the numbers?

Possible sentence stems

- _____ can be partitioned into _____ and _____

  _____ + _____ = _____ + _____ + _____

  _____ is _____ more than _____, so the missing number must be _____

National Curriculum links

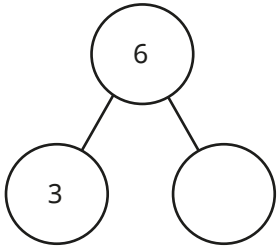
- Add and subtract numbers using concrete objects, pictorial representations, and mentally, including: a 2-digit number and 1s, a 2-digit number and 10s, two 2-digit numbers and adding three 1-digit numbers

Missing number problems

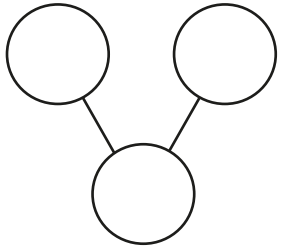
Key learning

- Complete the part-whole models and number sentences.

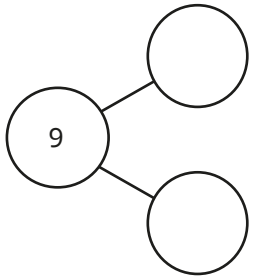
10 + 6 = 13 + _____



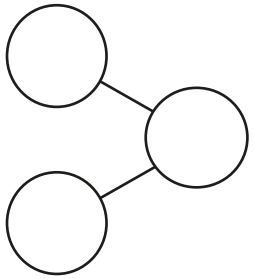
50 + 8 = _____ + 52



20 + 9 = 25 + _____



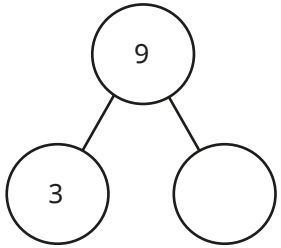
_____ + 31 = 40 + 2



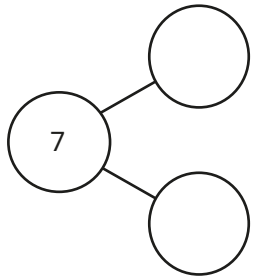
- Work out the missing numbers.
  - 45 + 8 = 50 + _____
  - 45 + 8 = 51 + _____
  - 45 + 8 = 49 + _____
  - 45 + 8 = _____ + 47

- Complete the part-whole models and number sentences.

53 – 9 = 50 – _____



64 – 7 = 60 – _____



- Work out the missing numbers.
  - 22 – 7 = 20 – _____
  - 22 – 7 = 23 – _____
  - 22 – 7 = 19 – _____
  - 22 – 7 = _____ – 6

- Work out the missing numbers.
  - 23 + 35 = 24 + _____
  - 50 – 16 = 49 – _____
  - 42 + _____ = 32 + 18
  - 75 – 21 = _____ – 31

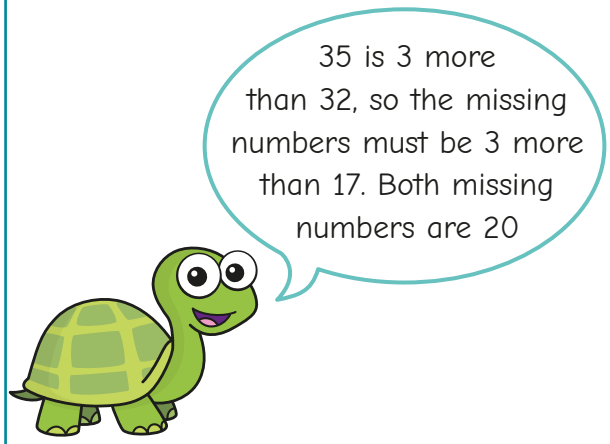
Missing number problems

Reasoning and problem solving

Tiny is working out the missing numbers.

$32 + 17 = 35 + \square$

$32 - 17 = 35 - \square$



Do you agree with Tiny?

Explain your answer.

No

Kim and Jo each have some money.

Kim has £40

She buys a coat.

Jo buys a dress.

They both have the same amount of money left.

How much money did Jo have at the start?

How did you work this out? Talk about it with a partner.

£38