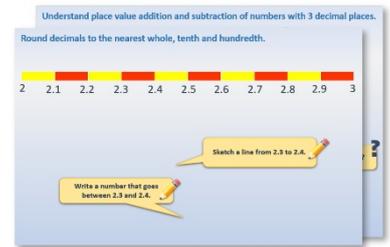


# Week 15, Day 5

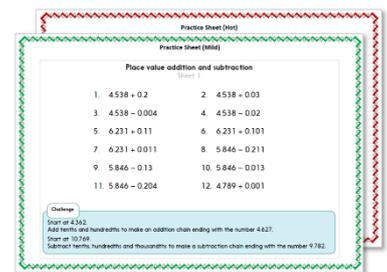
## Number magic

Each day covers one maths topic. It should take you about 1 hour or just a little more.

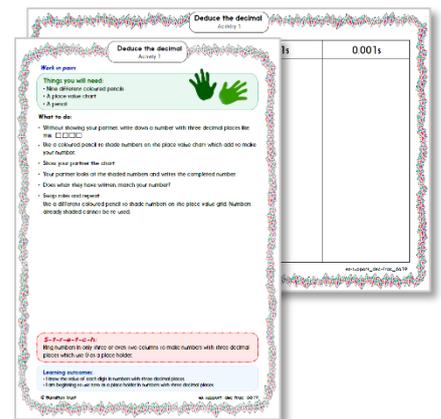
1. Start by reading through the **Learning Reminders**. They come from our *PowerPoint* slides.



2. Tackle the questions on the **Practice Sheet**. There might be a choice of either **Mild** (easier) or **Hot** (harder)! Check the answers.



3. Finding it tricky? That's OK... have a go with a grown-up at **A Bit Stuck?**



4. Think you've cracked it? Whizzed through the Practice Sheets? Have a go at the **Investigation...**

## Learning Reminders

### Magic chains

- Follow these instructions:

1. Think of a 2-digit number less than 70. Write it down.
2. Add 30.
3. Subtract 20.
4. Add 10.
5. Subtract 20.
6. Add 3.
7. Write down this final answer.

- Look at the number you first thought of. Add 3.  
Now look at your final answer – magic!
- Ask someone in your home to follow the instructions as above.  
Ask them to tell you the number they first thought of.  
Quickly add 3 to this number and say: *Your answer is... ta-da!*
- Why does this 'trick' work?

**We added 30 and 10, so 40 altogether.**

**We subtracted 20 and 20, so 40 altogether, so we subtracted what we added!**

**Then we added 3, which means that we just need to add 3 to calculate the final answer!**

- You can write your own 'Magic chains' like this in the investigation ...

## Practice Sheet Mild

### Working backwards

Work backwards to find the start number in these chains.

1.  - 5 = 10

2.  + 4 = 9

3.  + 3 - 3 = 5

4.  + 2 - 4 = 8

5.  - 10 + 3 = 13

6.  - 5 + 3 = 18

## Practice Sheet Mild

### Working backwards

Work backwards to find the start number in these chains.

1.  - 10 + 3 = 13

2.  - 5 + 3 = 18

3.  + 2 - 5 - 2 = 5

4.  + 5 - 4 + 10 = 23

5.  + 3 - 10 + 5 - 20 = 6

6.  + 10 - 4 + 3 - 8 = 11

## Practice Sheet Hot

### Working backwards

Work backwards to find the start number in these chains.

1.  - 10 + 3 = 13

2.  - 5 + 3 = 18

3.  + 2 - 5 - 2 = 5

4.  + 5 - 4 + 10 = 23

5.  + 3 - 10 + 5 - 20 = 6

6.  + 10 - 4 + 3 - 8 = 11

## Practice Sheet Hot

### What's my age?

1. Ahmed doubles his age, and then adds 9.  
This gives his mother's age which is 33.  
What is Ahmed's age?
2. Becky doubles her age and then subtracts 10.  
This gives her sister's age which is 32.  
What is Becky's age?
3. Sam adds 5 to his age, and then doubles this answer.  
This gives his father's age which is 40.  
What is Sam's age?
4. Maya halves her age, then subtracts 8.  
This gives her daughter's age which is 12.  
What is Maya's age?

#### Challenge

Now write your own age puzzle!

## Practice Sheets Answers

### Working backwards (mild)

1.  $15 - 5 = 10$
2.  $5 + 4 = 9$
3.  $5 + 3 - 3 = 5$
4.  $10 + 2 - 4 = 8$
5.  $20 - 10 + 3 = 13$
6.  $20 - 5 + 3 = 18$

### Working backwards (mild)

1.  $20 - 10 + 3 = 13$
2.  $20 - 5 + 3 = 18$
3.  $10 + 2 - 5 - 2 = 5$
4.  $12 + 5 - 4 + 10 = 23$
5.  $28 + 3 - 10 + 5 - 20 = 6$
6.  $10 + 10 - 4 + 3 - 8 = 11$

### Working backwards (hot)

1.  $20 - 10 + 3 = 13$
2.  $20 - 5 + 3 = 18$
3.  $10 + 2 - 5 - 2 = 5$
4.  $12 + 5 - 4 + 10 = 23$
5.  $28 + 3 - 10 + 5 - 20 = 6$
6.  $10 + 10 - 4 + 3 - 8 = 11$

### What's my age? (hot)

1. Ahmed is **12** years-old.
2. Becky is **21** years-old.
3. Sam is **15** years-old.
4. Maya is **40** years-old.

## A Bit Stuck? Spider shortcuts

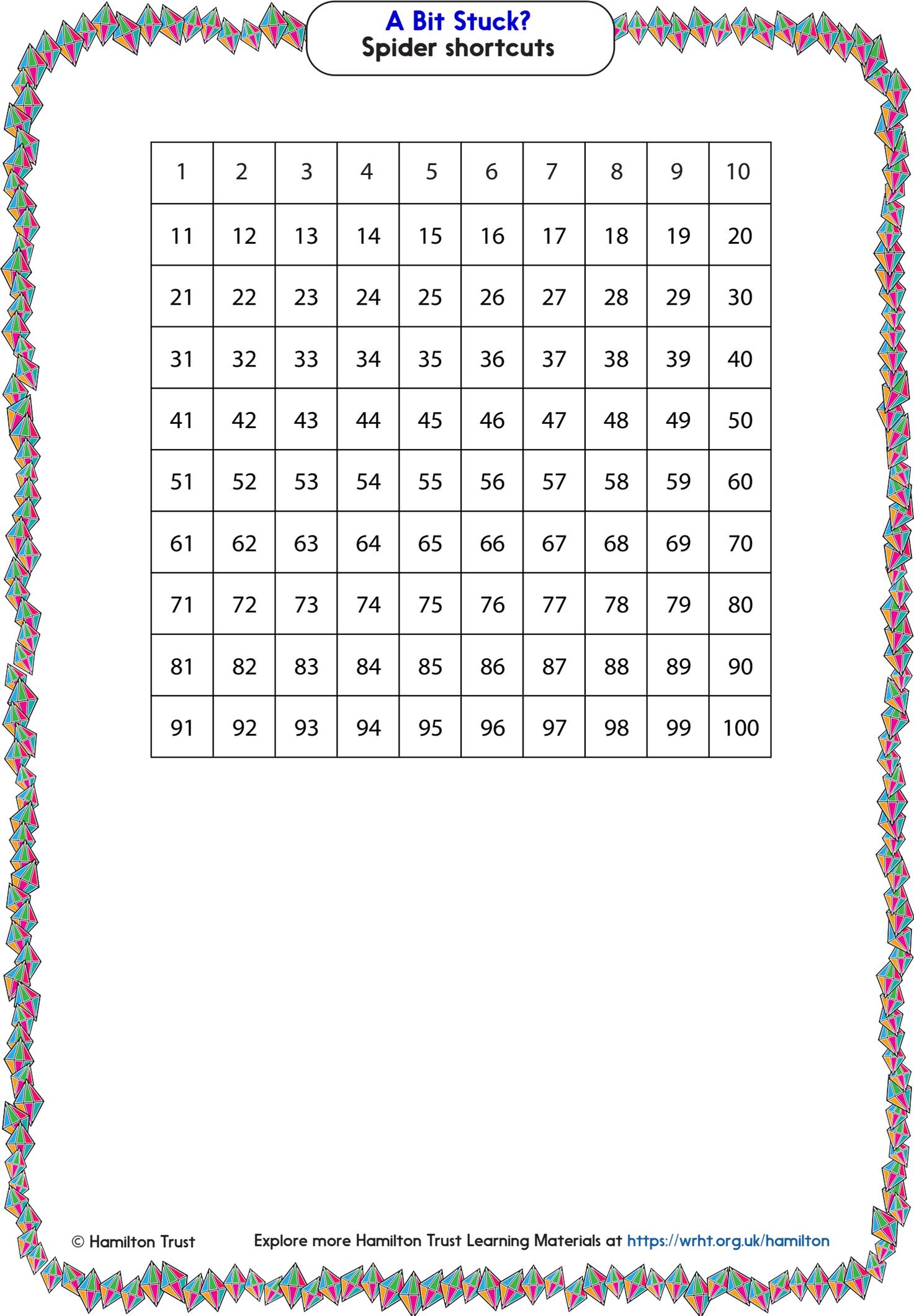
- Spider has been told to add and subtract lots of 10s. She's getting tired!!
- Help her to find the answer to the first number chain.  
Where does she end up compared to where she started?
- Now look at it again. Can you see any short-cuts?  
Do any additions and subtractions 'cancel' each other out?
- Look at the next number chain.  
See if you can find a shortcut to help Spider.  
Test out your idea by working out the short-cut as well as the full chain to check that you get the same answer.
- For the next number chains, write the short-cut for Spider at the side.

### Number chains

1.  $35 + 20 - 10 - 10 + 10 =$
2.  $47 + 10 + 10 - 20 - 10 =$
3.  $52 + 10 + 10 + 10 - 30 + 10 =$
4.  $64 - 30 + 20 + 10 + 10 =$
5.  $95 - 20 - 20 + 40 - 10 =$
6.  $83 + 10 - 10 - 20 + 20 + 10 =$

|    |    |    |    |    |    |    |    |    |     |
|----|----|----|----|----|----|----|----|----|-----|
| 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 |





## A Bit Stuck? Spider shortcuts

|    |    |    |    |    |    |    |    |    |     |
|----|----|----|----|----|----|----|----|----|-----|
| 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 |

## Investigation Magic chains

- Now it's your chance to write your own magic chains!
- To begin with, use these steps.

Think of a 2-digit number less than 50. Write it down.

Add

Subtract

Add

Subtract

Add 5.

Write down your final answer.

- Make sure that your steps mean that **the same amount** is added as is subtracted, apart from the 5 at the end.
- Test it out on someone in your home! Ask them for the number they thought of, add 5 and amaze them by telling them their final answer.
- Now write your own instructions for a 'magic chain'. You need to ask someone to think of a 2-digit number, add and subtract the same total of numbers in different ways before performing a final addition/subtraction. Test it out!

### Challenge

Can you make a really long 'Magic chain'?!