Year 4: Week 2, Day 1
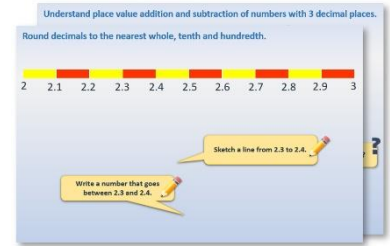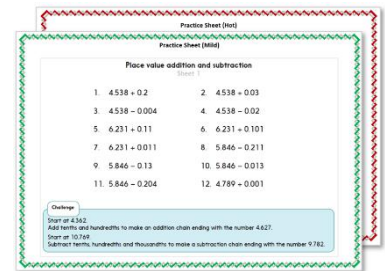## Adding three or four numbers

Each day covers one maths topic. It should take you about 1 hour or just a little more.
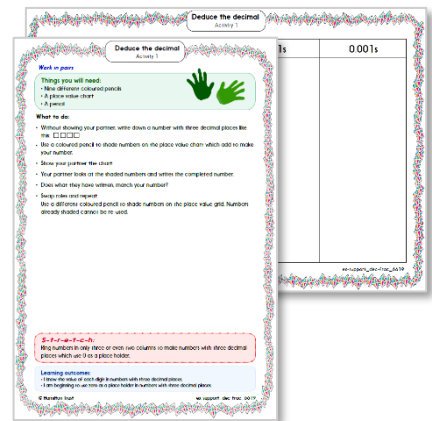
1. Start by reading through the **Learning Reminders**. They come from our *PowerPoint* slides.

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. Have I mastered the topic? A few questions to **Check your understanding**. Fold the page to hide the answers!
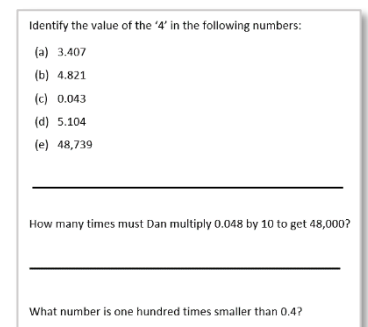
Learning Reminders

Add three 2-digit numbers using column addition.

We can add three 2-digit numbers using **expanded addition.**

Let's try 56 + 37 + 28.

First **partition** the numbers and set out neatly. Leave a space under the last number...

Add the 1s. **6 + 7 + 8 = ?**

Put the 20 on the **waiting line** under the **10s** and 1 in the **answer line under the 1s.**

Add the 10s. **50 + 30 + 20 + 20 = ?**

Finally recombine, **120 + 1 =**

```
   50  6
   30  7
 + 20  8
   20
 _____
  120  1
```

120 + 1 = 121

Learning Reminders

Add three 2-digit numbers using column addition.

Let's compare that with the compact method...

```
  50  6
  30  7
+ 20  8
    20
  ─────
 120  1
```

120 + 1 = 121

```
  5 6
  3 7
+ 2 8
    2
  ────
  1 2 1
```

Learning Reminders

Add four 2-digit numbers using compact addition.

Now we're going to add four 2-digit numbers using the **compact method.**

Let's try **72 + 46 + 25 + 53.** Will the answer be more than 100? More than 200?

Add the 1s. **2 + 6 + 5 + 3 = ?**

Where do we write the 1 and the 6 in 16?

Add the 10s. **70 + 40 + 20 + 50 + 10 = ?**

$$
\begin{array}{r}
72 \\
46 \\
25 \\
+\ 53 \\
1 \\
\hline
196
\end{array}
$$

Practice Sheet Mild
Adding three numbers

Part 1

Use expanded addition to solve these additions:

12 + 13 + 22   20 + 16 + 24

32 + 14 + 27   27 + 21 + 34

36 + 33 + 24   55 + 44 + 32

Part 2

Use compact addition to solve these additions:

21 + 42 + 34   32 + 47 + 46

34 + 25 + 42   46 + 51 + 28

51 + 62 + 45   67 + 72 + 39

48 + 46 + 53   74 + 63 + 86

Part 3

Choose three cards. Add the numbers.
Do this six times. You must do a different addition each time!

| 47 | 66 | 58 | 45 | 74 |

Challenge

I added three consecutive numbers with a total of 222. What were the numbers?

Practice Sheet Hot
Adding four numbers

Part 1

Use expanded or compact addition to solve these additions:

11 + 23 + 12 + 31   35 + 21 + 14 + 32
24 + 15 + 23 + 11   41 + 10 + 22 + 53
32 + 61 + 45 + 56   58 + 72 + 63 + 64

Part 2

Use compact addition to solve these additions:

62 + 75 + 84 + 53   76 + 71 + 27 + 82
83 + 81 + 94 + 37   95 + 12 + 60 + 76
84 + 72 + 85 + 96   98 + 89 + 78 + 97

Part 3

A palindrome reads the same backwards as forwards, e.g. the words: mum, level or madam. Palindromic numbers do the same, e.g. 4114 or 55 or 727.

Add four 2-digit numbers to give each of these palindromic answers:

202   191   333   252

Challenge

What is the largest possible palindromic total you can find by adding four 2-digit numbers?

Practice Sheet Answers

Adding three numbers (mild)

Part 1

Use expanded addition to solve these additions:

12 + 13 + 22 = 47   20 + 16 + 24 = 60

32 + 14 + 27 = 73   27 + 21 + 34 = 82

36 + 33 + 24 = 93   55 + 44 + 32 = 131

Part 2

Use compact addition to solve these additions:

21 + 42 + 34 = 97   32 + 47 + 46 = 125

34 + 25 + 42 = 101   46 + 51 + 28 = 125

51 + 62 + 45 = 158   67 + 72 + 39 = 178

48 + 46 + 53 = 147   74 + 63 + 86 = 223

Part 3

Choose three cards. Add the numbers.
Do this six times. You must do different addition each time!

47 + 66 + 58 = 171   66 + 58 + 45 = 169

47 + 66 + 45 = 158   66 + 58 + 74 = 198

47 + 66 + 74 = 187   66 + 45 + 74 = 185

47 + 58 + 45 = 150   58 + 45 + 74 = 177

47 + 58 + 74 = 179

47 + 45 + 74 = 166

> **Challenge**
>
> The numbers were:
> 73 + 74 + 75 = 222

Adding four numbers (hot)

Part 1

Use expanded or compact addition to solve these additions:

11 + 23 + 12 + 31 = 77   35 + 21 + 14 + 32 = 102

24 + 15 + 23 + 11 = 73   41 + 10 + 22 + 53 = 126

32 + 61 + 45 + 56 = 194   58 + 72 + 63 + 64 = 257

Part 2

Use compact addition to solve these additions:

62 + 75 + 84 + 53 = 274   76 + 71 + 27 + 82 = 256

83 + 81 + 94 + 37 = 295   95 + 12 + 60 + 76 = 243

84 + 72 + 85 + 96 = 337   98 + 89 + 78 + 97 = 362

Part 3

Examples include:

202 = 48 + 17 + 83 + 54

191 = 23 + 38 + 69 + 61

333 = 81 + 82 + 83 + 87

252 = 49 + 74 + 83 + 46

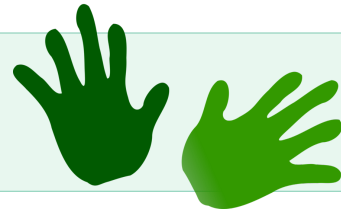> **Challenge**
>
> 393 is the largest possible answer, e.g. 99 + 99 + 98 + 97

Work in pairs

Things you will need:
• A set of 100s, 10s and 1s place value cards
• A pencil

What to do:

• Shuffle the 100 to 500 cards and place face down in a pile.
  Shuffle the 10 to 50 cards and place face down.
  Shuffle the 1 to 9 cards and place face down.

• Take the top two cards from each pile and put them together to make a pair of 3-digit numbers.

• Collect the 100s, 10s and 1s. Find the combined total. Record the addition.

• Repeat at least two more times.

• Repeat, but this time use the 100 to 500 cards, 10 to 90 cards and 1 to 5 cards.

453 + 238 =

600 + 80 + 11 = 691

S-t-r-e-t-c-h:
Try using the 100 to 500 cards, 10 to 90 cards and 1 to 9 cards.

Learning outcomes:
• I can use partitioning to add pairs of 3-digit numbers (answers < 1000, 10s < 100, 1s < 10).
• I am beginning to use partitioning to add pairs of 3-digit numbers (answers < 1000, 10s > 100 or 1s > 10).

Place Value Cards (sheet 1)

1 0 0

6 0 0

2 0 0

7 0 0

3 0 0

8 0 0

4 0 0

9 0 0

5 0 0

Place Value Cards (sheet 2)

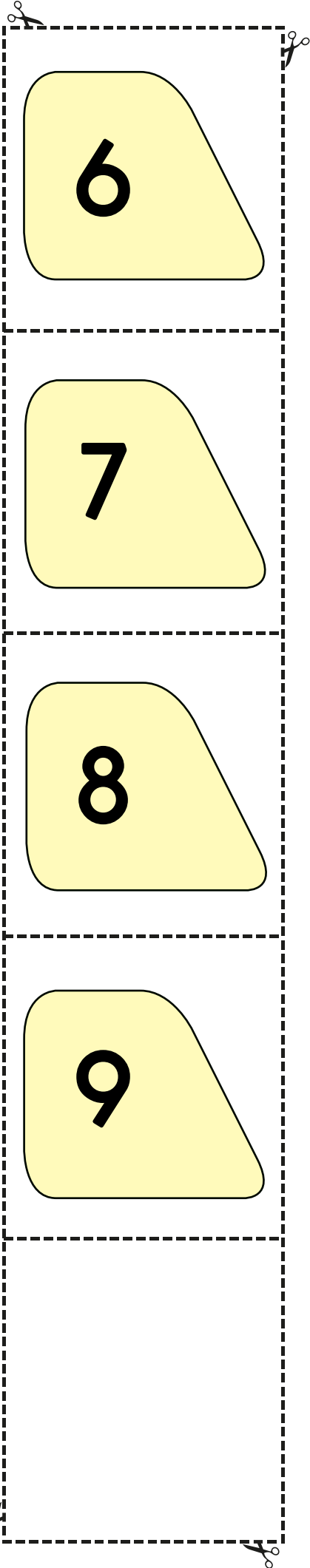|		
1 0	6 0	1
2 0	7 0	2
3 0	8 0	3
4 0	9 0	4
5 0		5

6

7

8

9

Check your understanding
Questions

True or false?

- Adding three 2-digit numbers always produces a number over 50.

- Adding three 2-digit numbers cannot produce 299.

- There are three identical numbers which add to 252.

Choose three consecutive numbers, e.g. 39, 40 and 41.

Add them.

Repeat twice with different sets of consecutive numbers.

Can you see any relationship between the total in each case and the numbers added?

Simplify the numbers if it's hard to spot a pattern.

Use a calculator to play with the numbers if necessary…

Does this work with all sets of three consecutive numbers, regardless of their size? Can you explain why?

Fold here to hide your answers

Check your understanding
Answers

True or false?

- Adding three 2-digit numbers always produces a number over 50. False – e.g. 12, 14 and 23 which total 49. Children should be able to give their own similar counter-examples.
- Adding three 2-digit numbers cannot produce 299. True, since the largest 2-digit number is 99 and 99 + 99 + 99 = 297.
- There are three identical numbers which add to 252. True – since the digit sum of 252 is 9, it must be divisible by 3. Children may solve this by trial and improvement and find 84 + 84 + 84 = 252.

Choose three consecutive numbers, e.g. 39, 40 and 41.

Add them. 120.

Repeat twice with different sets of consecutive numbers.

Can you see any relationship between the total in each case and the numbers added?

Simplify the numbers if it's hard to spot a pattern.

Use a calculator to play with the numbers if necessary…

Does this work with all sets of three consecutive numbers, regardless of their size? Can you explain why?
The total is always 3 times the middle number of the three; this is because one of the numbers is *one less* and one is *one more* than the middle one.

Hamilton Trust