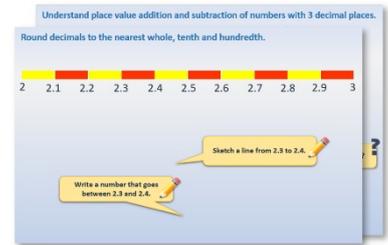


## Week 10, Day 2

### Use column subtraction to subtract 3-digit 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.

Practice sheet (Mild)

Place value addition and subtraction

1. $4.538 - 0.2$	2. $4.538 - 0.03$
3. $4.538 - 0.004$	4. $4.538 - 0.02$
5. $0.231 + 0.11$	6. $0.231 + 0.101$
7. $0.231 + 0.011$	8. $5.846 - 0.211$
9. $5.846 - 0.13$	10. $5.846 - 0.013$
11. $5.846 - 0.204$	12. $4.789 - 0.001$

Challenge

Start at 4.53. Add tenths and hundredths to make an addition chain ending with the number 4.627. Start at 10.348. Subtract tenths, hundredths and thousandths to make a subtraction chain ending with the number 9.782.

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

Deduce the decimal  
Activity 3

Work in pairs

Things you will need:

- 100 different coloured pencils
- A place value chart
- A game

What to do:

- Without showing your partner write down a number with three decimal places like 0.1234567.
- Use 3 coloured pencils to shade numbers on the place value chart which add to make your number!
- Show your partner the chart
- Your partner looks at the shaded numbers and writes the completed number
- Does what they have written match your number?
- Swap roles and repeat
- Use 3 different coloured pencils to shade numbers on the place value grid. Number groups should choose how to use.

Learning outcomes:

- I can use a place value chart to add a number with three decimal places
- I can explain to an adult or older sibling how to subtract with three decimal places

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

Identify the value of the '4' in the following numbers:

(a) 3.407  
(b) 4.821  
(c) 0.043  
(d) 5.104  
(e) 48,739

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How many times must Dan multiply 0.048 by 10 to get 48,000?

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What number is one hundred times smaller than 0.4?

## Learning Reminders

Introduce compact column subtraction to subtract 3-digit numbers.

Here is **652 - 327** using **expanded** column subtraction.

$$\begin{array}{r} 40 \ 12 \\ 600 \ ~~50~~ \ ~~2~~ \\ - 300 \ 20 \ 7 \\ \hline 300 \ 20 \ 5 \end{array}$$

$$652 - 327 = 325$$

When you are confident with subtraction you can try the **'compact'** method.

$$\begin{array}{r} 4 \ 12 \\ 6 \ ~~5~~ \ ~~2~~ \\ - 3 \ 2 \ 7 \\ \hline 3 \ 2 \ 5 \end{array}$$

This is quicker to write than the expanded way but is still the same method.

The important thing is to remember to exchange between columns when a digit in the second number is larger than the corresponding digit in the first number.

## Learning Reminders

Introduce compact column subtraction to subtract 3-digit numbers.

Here is  $725 - 484$  set out with each method. This time the exchange is between 100s and 10s.

$$\begin{array}{r} 600 \ 120 \\ \cancel{700} \ \cancel{20} \ 5 \\ - 400 \ 80 \ 4 \\ \hline 200 \ 40 \ 1 \end{array}$$

$$725 - 484 = 241$$

Whichever method you use it is very important to set the numbers out neatly in columns!

$$\begin{array}{r} 6 \ 12 \\ \cancel{7} \ \cancel{2} \ 5 \\ - 4 \ 8 \ 4 \\ \hline 2 \ 4 \ 1 \end{array}$$

## Practice Sheet Mild

### Expanded column subtraction

1.  $764 - 328 =$

$$\begin{array}{r} 700 & 50 & 14 \\ - 300 & 20 & 8 \\ \hline & & 6 \end{array}$$

2.  $835 - 451 =$

$$\begin{array}{r} 700 & 130 \\ 800 & 30 & 5 \\ - 400 & 50 & 1 \\ \hline & & 4 \end{array}$$

Set out these questions in the same way:

3.  $645 - 228$

4.  $961 - 627$

5.  $736 - 552$

6.  $528 - 253$

7.  $940 - 316$

8.  $527 - 342$

Now have a go at questions 1, 3, 5 and 7 using the compact method. Check you find the same answers!

#### Challenge

1. Harry has £248 in his bank account. He buys a bike for £157. How much does he have left?
2. Write your own number story for a partner to solve where they have to do a column subtraction.

## Practice Sheet Hot

### Column subtraction

1.  $973 - 328$

2.  $745 - 367$

3.  $925 - 481$

4.  $713 - 572$

5.  $640 - 328$

6.  $827 - 542$

7.  $823 - 567$

8.  $745 - 347$

9.  $635 - 328$

10.  $562 - 386$

#### Challenge

Find two pairs of 3-digit numbers whose difference is 238.

## Practice Sheets Answers

### Expanded column subtraction (mild)

$$\begin{array}{r}
 1. \quad 764 - 328 = 436 \\
 \begin{array}{r}
 700 \quad 50 \quad 14 \\
 - 300 \quad \cancel{60} \quad \cancel{4} \\
 \hline
 400 \quad 30 \quad 6
 \end{array}
 \end{array}$$

$$\begin{array}{r}
 5. \quad 736 - 552 = 184 \\
 \begin{array}{r}
 600 \quad 130 \\
 - 500 \quad \cancel{30} \quad 6 \\
 \hline
 100 \quad 80 \quad 4
 \end{array}
 \end{array}$$

$$\begin{array}{r}
 2. \quad 835 - 451 = 384 \\
 \begin{array}{r}
 700 \quad 130 \\
 - 400 \quad \cancel{30} \quad 5 \\
 \hline
 300 \quad 80 \quad 4
 \end{array}
 \end{array}$$

$$\begin{array}{r}
 2. \quad 528 - 253 = 275 \\
 \begin{array}{r}
 400 \quad 120 \\
 - 200 \quad \cancel{20} \quad 8 \\
 \hline
 200 \quad 70 \quad 5
 \end{array}
 \end{array}$$

$$\begin{array}{r}
 3. \quad 645 - 228 = 417 \\
 \begin{array}{r}
 600 \quad 30 \quad 15 \\
 - 200 \quad \cancel{40} \quad \cancel{5} \\
 \hline
 400 \quad 10 \quad 7
 \end{array}
 \end{array}$$

$$\begin{array}{r}
 3. \quad 940 - 316 = 624 \\
 \begin{array}{r}
 900 \quad 30 \quad 10 \\
 - 300 \quad \cancel{40} \quad \cancel{0} \\
 \hline
 600 \quad 20 \quad 4
 \end{array}
 \end{array}$$

$$\begin{array}{r}
 4. \quad 961 - 627 = 334 \\
 \begin{array}{r}
 900 \quad 50 \quad 11 \\
 - 600 \quad \cancel{60} \quad \cancel{1} \\
 \hline
 300 \quad 30 \quad 4
 \end{array}
 \end{array}$$

$$\begin{array}{r}
 4. \quad 527 - 342 = 185 \\
 \begin{array}{r}
 400 \quad 120 \\
 - 300 \quad \cancel{20} \quad 7 \\
 \hline
 100 \quad 80 \quad 5
 \end{array}
 \end{array}$$

### Challenge

1. £248 - £157 = £91 Harry has £91 left.
2. Check that the calculation can not be quickly solved mentally.

### Column subtraction (hot)

1. 973 - 328 = 645
2. 745 - 367 = 378
3. 925 - 481 = 444
4. 713 - 572 = 141
5. 640 - 328 = 312
6. 827 - 542 = 285
7. 823 - 567 = 256
8. 745 - 347 = 398
9. 635 - 328 = 307
10. 562 - 386 = 176

### Challenge

Find two pairs of 3-digit numbers whose difference is 238.

e.g. 824 - 586  
763 - 525

## A Bit Stuck?

### Subtraction in columns

#### You will need:

- 1p and 10p coins

#### What to do:

- We want to calculate  $64 - 28$ . Find the coins to make 64p. Write the calculation as an expanded column subtraction:

$$\begin{array}{r} 60 \quad 4 \\ - 20 \quad 8 \\ \hline \end{array}$$



8 is larger than 4 so we exchange a 10 for ten 1s:

$$\begin{array}{r} 50 \quad 14 \\ \cancel{60} \quad \cancel{4} \\ - 20 \quad 8 \\ \hline \end{array}$$



Now subtract eight 1ps and two 10ps...  $14 - 8 = 6$  and  $50 - 20 = 30$ :

$$\begin{array}{r} 50 \quad 14 \\ \cancel{60} \quad \cancel{4} \\ - 20 \quad 8 \\ \hline 30 \quad 6 \end{array}$$



$$64 - 28 = 36$$

- Now try these questions, setting out in columns and using the coins to help with exchanges:

1.  $42 - 18$

2.  $61 - 37$

3.  $73 - 48$

4.  $82 - 38$

5.  $54 - 26$

## Investigation

### Target subtractions



- Use expanded or compact column subtraction to find answers to these:

$$584 - 256$$

$$529 - 175$$

$$656 - 273$$

- For each one, how many exchanges did you make between columns?  
Did you have to exchange a 10 to get ten 1s?  
Did you have to exchange a 100 to get ten 10s?
- Use the number cards to create three 3-digit - 3-digit subtractions, where you **do not** need to make any exchanges between columns.
- How did you choose which digits to put in which place in your numbers?
- Now try to create three 3-digit - 3-digit subtractions where you will have to make **two** exchanges, one between 100s and 10s and one between 10s and 1s.  
Which digits will you put in which place in your numbers this time?
- Look at these 5 questions. Without solving them, identify which will need:  
(a) two column exchanges  
(b) one column exchange  
(c) no exchanges

$$487 - 134$$

$$563 - 422$$

$$324 - 177$$

$$649 - 358$$

$$454 - 227$$