Addition and Subtraction: Add and subtract mentally with increasingly large numbers

Learning focus	Know when it might be appropriate to use a mental method of addition and subtraction Choose the most efficient known mental strategy and explain why Explain / discuss how a mental calculation has been done.

Greater Depth Challenge:

- **8999 + 4308**
- **4725 + 3275**

Can you explain how you would work out these calculations in your head?
Is there more than one way?
Which way is the most efficient?

Greater Depth Challenge:

2003 – 1385

Can you explain how you would work out these calculations in your head?
Is there more than one way?
Which way is the most efficient?

Greater Depth Challenge:

True or false?

12999 – 6999 = 13000 – 7000

Explain your reasoning without using the column method!

Greater Depth Challenge:

16732 – 13421 = 16733 – 13422

Using this number sentence, write three more pairs of equivalent calculations.

Addition and Subtraction: Add and subtract whole numbers with more than 4 digits, including using formal written methods (columnar addition and subtraction).

Learning focus	Add two or more multi-digit whole numbers using short columnar addition.

Greater Depth Challenge:

$$\begin{array}{r} 38\square75 \\ +\ 61\,8\square9 \\ \hline 10\square834 \end{array}$$

How would you fill in the missing boxes?

What is the most efficient way?

Greater Depth Challenge:

I'm thinking of two four- digit numbers.

When they are added together they make a five-digit number. In this five- digit number the ones digit is 3, the hundreds digit is 6.

Write three different column addition methods that would give this answer.

Greater Depth Challenge:

How would you fill in the missing boxes? Explain your methods!

$$\begin{array}{r} 324\square \\ 8\square\square9 \\ +\ \square287 \\ \hline 152\square3 \end{array}$$

Greater Depth Challenge:

I am thinking of a four-digit number. I take my number and, using the column method, I add 600 and 2140 to it.

The ones column remains the same: 5. The hundreds column changes to 8.

What could me answer be? What could my original number be?

Could there be more than one answer?

Learning focus	Add two or more multi-digit decimal numbers using short columnar addition.

Greater Depth Challenge:

James worked out the problem **3.2 + 17 + 3.08** using column method and got the answer **5.45**

Can you find out where James made a mistake?

What should he do to avoid making the same mistake again?

Greater Depth Challenge:

10 = ▭ + ▭ + ▭

Fill in the boxes so that each number is different and has at least 3 digits.

How many different ways can you do this?

Greater Depth Challenge:

Mary says *"When you add two decimal numbers together, your answer will also be a decimal number"*

Is Mary correct? Can you think of a situation where she could be wrong?

Greater Depth Challenge:

1.21 + 1.8 = 2.29

True or false?

Explain how you know!

Learning focus	▯ Add two multi-digit whole numbers using short columnar subtraction. ▯ Demonstrate an understanding of how to subtract with numbers including a zero

Greater Depth Challenge:

3857 + ▭ = 8613

Is the same as

8613 - ▭ = 3857

True or false? Explain why!

Greater Depth Challenge:

Amy and Barry have £7520 between them. Barry has £300 less than Amy.

What is the most Barry could have?

What is the least Barry could have?

Prove your answer using column addition.

Greater Depth Challenge:

Tom is struggling with the calculation 5000 – 3321.

Can you give a step by step explanation about how to do this calculation?

Make sure to clearly explain how to exchange- you can use diagrams to help explain it!

Greater Depth Challenge:

8000 – 4321 = 4321

Why is this calculation incorrect? Where did the student go wrong?

Learning focus	? Add two multi-digit decimal numbers using short columnar subtraction. ? Demonstrate an understanding of how to subtract with numbers including a zero

Greater Depth Challenge:

Sam has £26 more than Tom and Amy has £17.10 which is £11.05 less than Tom.

How much do they have altogether?

Greater Depth Challenge:

Jack and Anne have £87.80 between them. Anne has £12.20 less than Jack.

How much money do both Anne and Jack have?

Greater Depth Challenge:

Make up a subtraction problem with **missing boxes** for me to work out!

Both numbers should contain at least 2 decimal places

Challenge me!!

Greater Depth Challenge:

$$\begin{array}{r} 8\square.\square14 \\ -\ 25.83\square \\ \hline \square1.4\square5 \end{array}$$

Fill in the missing boxes- can you explain your strategy?

Addition and Subtraction: **Use rounding to check answers to calculations and determine, in the context of a problem, levels of accuracy**.

Learning focus	Demonstrate a secure understanding of appropriate rounding, e.g., Round to the nearest 10, 100, 1,000 or 10,000. Use rounding of numbers in a calculation to estimate answers. Understand when numbers need to be rounded up or down in context of a problem, i.e., how the left overs need to be accounted for.

Greater Depth Challenge:

I'm thinking of a number

Rounded to the nearest hundred it is 4500.

Rounded to the nearest thousand it is 5000

List all the numbers my number could be.

Greater Depth Challenge:

What is the largest and the smallest number that rounds to **8500** when rounded to the nearest hundred?

Greater Depth Challenge:

Jane is solving: 75213 + 82047.

Before she calculates her final answer, she wants to round each number to do a quick estimation.

Do you think she should round to the nearest 10, 100, 1000 or 10000?

Explain your choice.

Greater Depth Challenge:

Joe uses rounding to estimate the answer to a problem.

His estimate was **300,000.**

Write down three equations that he could have started with.

Explain how you created each number sentence.

Addition and Subtraction: Solve addition and subtraction multi step problems in contexts, deciding which operation and method to use and why.

Learning focus	Use inverse operations to check answers, e.g., 3·42 + = 10.

Greater Depth Challenge:

$$\begin{array}{r} \square\square\square\square\square \\ +\ 3\ 7\ 3\ 4\ 5 \\ \hline 8\ 1\ 7\ 3\ 4 \end{array}$$

What are the missing digits?

What strategy did you use?

Greater Depth Challenge:

Use inverse operations to decide whether these statements are true or false. For any which are false, explain what the mistake was.

- 3.42 + 7.58 = 10
- 2.11 + 7.99 = 10
- 5.9 + 4.01 = 10

Greater Depth Challenge:

 + 3845 = 8  34

What numbers do you think go in the boxes? Convince me of your answer!

Could there be more than one solution?

Learning focus	Compare alternative methods for the same calculation and discuss any merits and disadvantages.

Greater Depth Challenge:

3999 + 4002

What are the different ways you could do this calculation? Which is the most efficient and why?

Greater Depth Challenge:

True or false?

"When adding decimal numbers, you should always use a column method to be accurate."

Do you agree with this statement? Give reasons for your opinion.

Greater Depth Challenge:

A pupil worked out this problem:

1.42 + 1.08 + 1.11 = 3.61

What method do you think they used to work this out?

Was there more than one way?
Which way would you choose and why?

Greater Depth Challenge:

5003 – 1998

What are the different ways you could do this calculation?

Which is the most efficient and why?

Learning focus	? Understand the mathematical vocabulary used in a problem. ? Identify the order of the steps needed to solve a problem.

Greater Depth Challenge:

A car park has 2112 cars in it on Monday morning. By lunchtime, 34 cars had left and 52 new ones had arrived. By 4pm another 138 left and 129 arrived. By 6 o'clock there was only 6 cars left. How many cars came and left between 4pm and 6pm?

Show your workings.

Greater Depth Challenge:

A shop had £75.50 in the till when it opened.
During the morning, the shop made another £89.90 and gave away £12.20 in refunds. During the afternoon, the shopkeeper spent £5.25 from his till on lunch. He then made another £105.40.

A pupil worked out £75.50 + (89.90-12.20) + 105.40 – 5.25 = 253.35

Is the pupil correct? Explain!

Greater Depth Challenge:

Are these calculations the same?

200 – (170 + 24)

200 – 170 + 24

Explain your reasoning.

Greater Depth Challenge:

Which words in word problems tell you that you will need to **add or subtract**?
Can you create a word bank of these **"adding and subtracting"** words?
Are there any words which are particularly confusing? Why?

Learning focus	Compose a similar problem using different numbers or different contexts.

Greater Depth Challenge:

Can you make up a word problem starting with these numbers: 20786 and 4572?

Your problem must contain both addition and subtraction steps.

Greater Depth Challenge:

If 90,000 is my answer, what could my problem have been?

Choose your own units of measurement and steps.

Greater Depth Challenge:

The price for an adult on the train London to Brighton is £9.90 one way and £16.70 return. A child is £5.15 one way and £8.35 return.

Family A has 3 adults and 1 child.

Family B has 2 adults and 6 children.

Amy says "Obviously, Family A will pay more because adults cost more than children."

Do you agree with her? Why/ why not?