Addition and Subtraction: Perform mental calculations, including with mixed operations and large numbers.

Learning focus	Make effective choices about calculation methods, based on the numbers involved. ▯ Use mental jottings and record them accurately and tidily. ▯ Use number bonds, extended number bonds, related subtraction facts and strategies learned over time to find the most efficient solutions to addition and subtraction problems.

Greater Depth Challenge:

Yasmine says she doesn't need to do any written jottings to calculate 4972 + 328 - 1300.

What is the correct answer?

Explain what strategies she may have used to calculate this mentally.

Greater Depth Challenge:

Jad and Blerim have been asked to calculate:

57,456 + 1,553 and 7,219 - 503.

Jad says *'57,456 is 6 more than 57,450 and 1,553 is 3 more than 1,550. I can subtract 6 from 57,456 and 3 from 1,553. I know 450 and 550 bond to 1000 and 7000 and 1000 bond to 8000. All I need to do is add 9 back on at the end.'*

What answer will Jad get and is he correct?

Blerim says *'7,189 is 11 less than 7,200 and 503 is 3 more than 500. I can add on 11 to 7,189 and subtract 500 then add 14 back on.'*

What answer will Blerim get and is he correct?

Greater Depth Challenge:

Mr Kiely goes to the shop.

He buys two items which total £15.50.

One of the items cost £7.28.

Calculate the price of the other item using mental strategies.

Draw and explain the most efficient way to solve this problem.

Greater Depth Challenge:

Solve the below equations mentally. Jot down the mental strategies you used.

4550 - _____ = 1300

_____ + 567 = 1100

_____ - 682 = 818

How many decimal amounts can you find to solve the below?

_____ + _____ = £16.60

Addition and Subtraction: Use their knowledge of the order of operations to carry out calculations involving the four operations.

Learning focus	☐ Appreciate that, in an equation, a calculation inside brackets must be calculated first.
	☐ Apply the correct order of operations when solving problems

Greater Depth Challenge:

What would the answer be to this calculation?

360 x 20 + 5

If brackets were put around the addition part would the answer be the same or different? Explain your answer.

Rob says if you write (360x20) + 5 the answer would be different. Is he correct?

If you moved the brackets, what is the largest answer that you could make?

Greater Depth Challenge:

By putting brackets in different positions, how many different answers can you come up with for this calculation:

8 + 5 x 1 + 3 – 6 =

Greater Depth Challenge:

Can you use the symbols + - X ÷ () to make this equation true?

318   392   5   560 = 125

Can you find other sets of 4 numbers that would have the same answer?

Greater Depth Challenge:

Write a word problem that matches this calculation:

1670 + 72 x 4

What would the answer be?
What were your steps for working it out?

Addition and Subtraction: Use estimation to check answers to calculations and determine, in the context of a problem, an appropriate degree of accuracy.

Learning focus	▢ Estimate results and check them for reasonableness against the outcome.
	▢ Make estimations in practical contexts, e.g., The volume of a cuboid, the area of a playground, the weight of objects.

Greater Depth Challenge:

A = 3.2 x 4.7 x 5.1   B= 4.4 x 4.4 x4.4   C=2.6 x 5.8 x 12.1

Estimate the volume of these 3D shapes and check your answers to see if they make sense. Can you order from the smallest volume to the largest volume?

Greater Depth Challenge:

Can you estimate the answers to these calculations to check to see if the answers are correct or not?

5,989 + 734,568 =740,557

65.4 + 73.2 = 138.6

85,762 – 4,702 = 81060

Greater Depth Challenge:

In the 2016\17 Premier League the top 4 attendances for away matches were:

Leeds United - 722,852

Arsenal FC - 1,872,569

Chelsea – 2,572,329

Huddersfield – 431,290

The estimated total attendance is 6 million. Convince me why this is not an accurate rounding.

Greater Depth Challenge:

Elliot is training for a Triathlon. He cycled 58 miles, swam 35 miles and ran 23 miles.

This week he doubled his training time and he cycled an extra 16 miles, swam an extra 12.5 miles and ran an extra 9 miles.

What is the difference in miles between this week's training compared to the previous week? Explain your answer using estimation and calculations using only the addition and subtraction operations.

Learning focus	☐ Round answers to the nearest or the specified power of 10 in context of + or - problem ☐ Refine the rounding of answers to a specified degree of accuracy that is not necessarily a power of 10, e.g., Round to the nearest, 20, 50, etc.

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Greater Depth Challenge:

My score (rounded to the nearest 20) was 80.

Mine was 100 (rounded to the nearest 50).

I got 90(rounded to the nearest 10).

Who could have got the highest/lowest score?

What are all of the possibilities?

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Greater Depth Challenge:

The local government conducts a survey of how people travel to work. They rounded the results to the nearest 50.

Mode of transport	Number of people
Car	4750
Train	6700
Cycle	2300
Walk	2100

What is the largest possible sum of people who walk and cycle to work?

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Greater Depth Challenge:

A class are raising money for charity by holding a cake sale.

Adam has raised £567, but he spent £13.25 on supplies.

He rounds his profit to the nearest £10.

Mustafa has raised £600 to the nearest 100.

What is the most that Mustafa could have raised?

Could Mustafa has raised less than Adam?

Explain your answer.

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Greater Depth Challenge:

Use < > = symbols to make these statements correct:

56,789 rounded to the nearest 50 ☐ 56,799 to the nearest 10

309.50+ 99 rounded to the nearest 10 ☐ 462 to the nearest 100

5682 is rounded to the nearest 20 ☐ 8000- 999 rounded to the nearest thousand and added to 1032. The answer is the rounded to the nearest one hundred.

Addition and Subtraction: Solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why.

Learning focus	☐ Understand, and interpret correctly, mathematical vocabulary in word problems, e.g., 'Find the difference' is subtraction, the word 'more' can appear in a subtraction problem.

Greater Depth Challenge:

The sum of three siblings' pocket money is £75. How much money do they each have if:

- *They all have an odd amount of money.*
- *Their amounts are all whole numbers.*
- *They all have different amounts of money.*

How many ways can you solve this?

Greater Depth Challenge:

How many children are at each school?

- *The sum of children at school A and B is 872 children. School A has 214 children fewer than school B.*
- *School A has 179 more than school C.*
- *School D has 17 children less than school C.*

What calculations would you have to use to work out the answer to this problem?
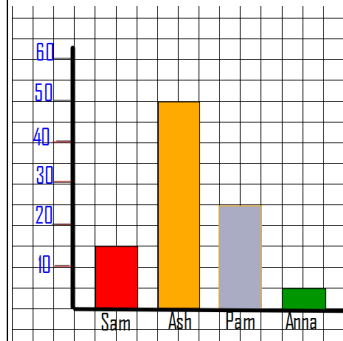Could there be more than one solution?

Greater Depth Challenge:

These are the answers to some questions about this bar chart.
a) 70
b) 25
c) 10
Write the questions using the correct mathematical vocabulary from this list: more than, together difference, 'product' to make this word problem match the answers.

Greater Depth Challenge:

Jitesh is 148.2cm tall. Sophia is 154.6cm tall. What is the difference in height between these children?
Robert is 16.2m tall and Ella is 153.9cm tall. How many more centimetres does Jitesh need to grow to be the same height as Ella?

Mr Maths Conjecture says that both questions require the same operation. Do you agree? What operation would you use?
Would the answer for both be the same? Explain your answer using words and pictures.

Addition and Subtraction: Solve problems involving addition, subtraction, multiplication and division.

| Learning focus | ▢ Explain to somebody else how a problem might be solved to clarify thinking. |
| | ▢ Create a sequence of steps with jottings and / or diagrams to showing the processes necessary to solve the problem and the order of operations. |

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Greater Depth Challenge:

Kelly buys 5 bags of sweets.

She pays with a £5 note.

Her changes is a 50p coin, 20p coin, 10p coin, 10p coin and a 5p coin.

Can you calculate the cost of one bag of sweets and use a visual representation to explain your thinking?

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Greater Depth Challenge:

Amanda starts a SPAG test at 3pm, she completes her paper at 3:40.

Tyreece gets 10 % extra time.

Can you calculate the number of degrees the minute hand has moved when Amanda completes her test?

Can you draw the clock face showing the time Tyreece completed his test?

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Greater Depth Challenge:

Jack's watch showed that he had travelled a total of 40,126m in three weeks.

In week 1 he travelled 17.018km.

He walked up and down his local mountain in the second week. The distance to the top was 9.469km.

During his final week, he walked to a nearby city.

How far away was this city?

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Greater Depth Challenge:

Can you find the missing values in this sequence?

-450, _____, _____, -225 _____

Convince me that you can definitely find the solution to this problem.

True or False
If you carried the sequence on, the number 1075 will be in the sequence.

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Greater Depth Challenge:

17, 33, 65, _____, _____

What is the rule for this sequence?

What would the 10th number be in the sequence?

What would the 14th number be in the sequence?

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Greater Depth Challenge:

15, 32, 66, 132, _____, _____

Tom says, 'To find the next number in the sequence you double and add two.'

Can you write an expression to show this rule?