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# Number: Addition and Subtraction with Reasoning

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| NUMBER BONDS | | | | | | | |
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| Nursery 3 and 4 Year Olds | EYFS | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | Year 6 |
| | Automatically recall number bonds for numbers 0 to 5 and some to 10, including doubles facts.<br><br>Explore the composition of numbers to 10.<br><br>Have a deep understanding of the numbers up to 10, including the composition of each number. | represent and use number bonds and related subtraction facts within 20 | recall and use addition and subtraction facts to 20 fluently, and derive and use related facts up to 100 | | | | |
| | | **Continue the pattern**<br>10 + 8 = 18<br>11 + 7 = 18<br>Can you make up a similar pattern for the number 17? How would this pattern look if it included subtraction?<br><br>**Missing numbers** | **Continue the pattern**<br>90 = 100 – 10<br>80 = 100 – 20<br>Can you make up a similar pattern starting with the numbers 74, 26 and 100?<br><br>**Missing numbers**<br>91 + ☐ = 100<br>100 - ☐ = 89 | | | | |

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| | | 9 + ☐ = 10<br>10 - ☐ = 9<br><br>What number goes in the missing box? | What number goes in the missing box? | | | | |

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| MENTAL CALCULATION | | | | | | | |
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| | Automatically recall number bonds for numbers 0 to 5 and some to 10, including doubles facts. | add and subtract one-digit and two-digit numbers to 20, including zero | add and subtract numbers using concrete objects, pictorial representations, and mentally, including:<br>* a two-digit number and ones<br>* a two-digit number and tens<br>* two two-digit numbers<br>* adding three one-digit numbers | add and subtract numbers mentally, including:<br>* a three-digit number and ones<br>* a three-digit number and tens<br>* a three-digit number and hundreds | | add and subtract numbers mentally with increasingly large numbers | perform mental calculations, including with mixed operations and large numbers |
| | | **Working backwards**<br>Through practical games on number tracks and lines ask questions such as "where have you landed?" and "what numbers would you need to throw to land on other given numbers?"<br><br>**What do you notice?**<br>11 – 1 = 10<br>11 – 10 = 1<br>Can you make up some other number | **True or false?**<br>Are these number sentences true or false?73 + 40 = 113<br>98 – 18 = 70<br>46 + 77 = 123<br>92 – 67 = 35<br>Give your reasons.<br><br>**Hard and easy questions**<br>Which questions are easy / hard?<br>23 + 10 =<br>93 + 10 =<br>54 + 9 =<br>54 + 1 =<br>Explain why you think | **True or false?**<br>Are these number sentences true or false?597 + 7 = 614<br>804 – 70 = 744<br>768 + 140 = 908<br>Give your reasons.<br><br>**Hard and easy questions**<br>Which questions are easy / hard?<br>323 + 10 =<br>393 + 10 =<br>454 - 100 =<br>954 - 120 =<br>Explain why you | **True or false?**<br>Are these number sentences true or false?6.7 + 0.4 = 6.11<br>8.1 – 0.9 = 7.2<br>Give your reasons.<br><br>**Hard and easy questions**<br>Which questions are easy / hard?<br>13323 - 70 =<br>12893 + 300 =<br>19354 - 500 =<br>19954 + 100 =<br>Explain why you | **True or false?**<br>Are these number sentences true or false?6.17 + 0.4 = 6.57<br>8.12 – 0.9 = 8.3<br>Give your reasons.<br><br>**Hard and easy questions**<br>Which questions are easy / hard?<br>213323 - 70 =<br>512893 + 300 =<br>819354 - 500 =<br>319954 + 100 = | **True or false?**<br>Are these number sentences true or false?6.32 + □ = 8<br>□ = 1.68<br><br>Give your reasons.<br><br>**Hard and easy questions**<br>Which questions are easy / hard?<br><br>213323 - 70 =<br>512893 + 37 =<br>8193.54 - 5.9 =<br>Explain why you think the hard |

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| | | sentences like this involving 3 different numbers? | the hard questions are hard?<br><br>**Other possibilities**<br>□ + □ + □ = 14<br><br>What single digit numbers could go in the boxes? How many different ways can you do this? | think the hard questions are hard? | think the hard questions are hard? | Explain why you think the hard questions are hard? | questions are hard? |
| | | read, write and interpret mathematical statements involving addition (+), subtraction (-) and equals (=) signs (appears also in Written Methods) | show that addition of two numbers can be done in any order (commutative) and subtraction of one number from another cannot | | | | use their knowledge of the order of operations to carry out calculations involving the four operations |

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| | | **Fact families**<br>Which four number sentences link these numbers? 12, 15, 3<br><br>**What else do you know?**<br>If you know this:<br>12 – 9 = 3<br>what other facts do you know?<br><br>**Missing symbols**<br>Write the missing symbols ( + - =) in these number sentences:<br>17 ☐ 3 ☐ 20<br><br>18 ☐ 20 ☐ 2 | **Fact families**<br>Which four number sentences link these numbers?<br>100, 67, 33<br><br>**What else do you know?**<br>If you know this:<br>87 = 100 – 13<br>what other facts do you know?<br><br>**Missing symbols**<br>Write the missing symbols (+ - =) in these number sentences:<br>80 ☐ 20 ☐ 100<br><br>100 ☐ 70 ☐ 30<br><br>87 ☐ 13 ☐ 100 | | | | **Missing symbols**<br>Write the missing signs<br>( + - x ÷) in this number sentence:<br><br>6 ◯ 12.3 = 61 ◯ 11.9<br><br>**What else do you know?**<br>If you know this:<br>86.7 + 13.3 = 100<br>what other facts do you know? |

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| WRITTEN METHODS | | | | | | | |
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| | | read, write and interpret mathematical statements involving addition (+), subtraction (-) and equals (=) signs (appears also in Mental Calculation) | | add and subtract numbers with up to three digits, using formal written methods of columnar addition and subtraction | add and subtract numbers with up to 4 digits using the formal written methods of columnar addition and subtraction where appropriate | add and subtract whole numbers with more than 4 digits, including using formal written methods (columnar addition and subtraction) | |
| | | **Convince me**<br>In my head I have two odd numbers with a difference of 2. What could they be?<br>Convince me<br><br>**Missing numbers**<br>Fill in the missing numbers (using a range of practical resources to support)<br>12 + ☐ = 19<br>20 - ☐ = 3 | **Convince me**<br>What digits could go in the boxes?<br>7 ☐ - 2 ☐ = 46<br>Try to find all of the possible answers.<br>How do you know you have got them all?<br>Convince me | **Convince me**<br>☐☐+☐☐+☐☐<br>The total is 201<br>Each missing digit is either a 9 or a 1.<br>Write in the missing digits.<br>Is there only one way of doing this or lots of ways?<br>Convince me | **Convince me**<br>☐ - 666 =<br>What is the largest possible number that will go in the rectangular box?<br>What is the smallest?<br>Convince me | **Convince me**<br>☐ + 1475 = 6☐24<br><br>What numbers go in the boxes?<br>What different answers are there?<br>Convince me | **Convince me**<br>Three four digit numbers total 12435.<br>What could they be?<br>Convince me |

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| INVERSE OPERATIONS, ESTIMATING AND CHECKING ANSWERS | | | | | | | |
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| | | | recognise and use the inverse relationship between addition and subtraction and use this to check calculations and solve missing number problems. | estimate the answer to a calculation and use inverse operations to check answers | estimate and use inverse operations to check answers to a calculation | use rounding to check answers to calculations and determine, in the context of a problem, levels of accuracy | use estimation to check answers to calculations and determine, in the context of a problem, levels of accuracy. |
| | | **Making an estimate**<br><br>Pick (from a selection of number sentences) the ones where the answer is 8 or 9.<br><br>**Is it true that?**<br><br>Is it true that 3+4 = 4 + 3? | **Making an estimate**<br>Which of these number sentences have the answer that is between 50 and 60<br>74 - 13 55 + 17 87 – 34<br><br>**Always, sometimes, never**<br><br>Is it always, sometimes or never true that if you add three numbers less than 10 the answer will be an odd number | **Making an estimate**<br>Which of these number sentences have the answer that is between 50 and 60<br>174 - 119<br>333 – 276<br>932 - 871<br><br>**Always, sometimes, never**<br><br>Is it always, sometimes or never true that if you subtract a multiple of 10 from any number the units digit of that number stays the same.<br>Is it always, sometimes or never true that when you | **Making an estimate**<br>Which of these number sentences have the answer that is between 550 and 600<br>1174 - 611<br>3330 – 2779<br>9326 - 8777<br>**Always, sometimes, never**<br><br>Is it always sometimes or never true that the difference between two odd numbers is odd. | **Making an estimate**<br>Which of these number sentences have the answer that is between 0.5 and 0.6<br>11.74 - 11.18<br>33.3 – 32.71<br><br>**Always, sometimes, never**<br><br>Is it always, sometimes or never true that the sum of four even numbers is divisible by 4. | **Making an estimate**<br>Circle the number that is the best estimate to<br>932.6 - 931.05<br><br>1.3 1.5 1.7 1.9<br><br>**Always, sometimes, never**<br><br>Is it always, sometimes or never true that the sum of two consecutive triangular numbers is a square number |

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| | | | | add two numbers together you will get an even number | | | |

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| PROBLEM SOLVING | | | | | |
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| solve one-step problems that involve addition and subtraction, using concrete objects and pictorial representations, and missing number problems such as 7 = □ - 9 | solve problems with addition and subtraction:<br>* using concrete objects and pictorial representations, including those involving numbers, quantities and measures<br>* applying their increasing knowledge of mental and written methods | solve problems, including missing number problems, using number facts, place value, and more complex addition and subtraction | solve addition and subtraction two-step problems in contexts, deciding which operations and methods to use and why | solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why | solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why |
| | *solve simple problems in a practical context involving addition and subtraction of money of the same unit, including giving change* (copied from Measurement) | | | | Solve problems involving addition, subtraction, multiplication and division |