

# Year 6 Spring 1 Problem solving and reasoning

## Marking guidance

↓ NC objective in a year below    ↑ NC objective in a year above    \* Key question

| Qu. | National curriculum objectives                                                                                                                       | Progression map outcome                                                                                      | Answers                                                    | Marks | Possible errors                                                                                                                                                                                                                                                                                                  | Advice                                                                                                                                                                                                                                                                                                                       |
|-----|------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------|------------------------------------------------------------|-------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1*  | <b>Y6.NPV.1</b> Read, write, order and compare numbers up to 10 000 000 and determine the value of each digit                                        | <b>NPV</b><br>Read, write, order and compare numbers up to 10 000 000 and determine the value of each digit. | a) 6 472 621<br>b) 506 239<br>c) 4 300 076<br>d) 7 000 701 | 2     | Watch for children who insert extra 0s, e.g. giving 5 006 239 for (b), or too few 0s, e.g. 4 300 76 for (c).                                                                                                                                                                                                     | Encourage children to group digits in threes with a small gap between millions and thousands and between thousands and hundreds. Practise writing numbers on a grid with place-value headings.                                                                                                                               |
| 2*  | <b>↓ Y5.NAS.1</b> Add and subtract whole numbers with more than 4 digits, including using formal written methods (columnar addition and subtraction) | <b>AS</b><br>Choose and use an appropriate method to subtract whole numbers with up to 7 digits.             | 18 937                                                     | 2     | An answer of 23 747 is the result of adding rather than subtracting.<br><br>An answer of 1143 suggests that the numbers have been lined up correctly but the difference in value between digits in each column has been given.<br><br>Other errors occur when digits have not been aligned correctly in columns. | If children are adding in error, revise identifying the key vocabulary in word problems.<br><br>If decomposition hasn't been understood, it should be revised using 3- and 4-digit numbers with an expanded notation.<br><br>Children who are not aligning digits correctly could be encouraged to use place-value headings. |

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| 3  | <p><b>Y6.NMD.4</b> Perform mental calculations, including with mixed operations and large numbers</p> <p><b>Y6.NF.7</b> Identify the value of each digit in numbers given to three decimal places and multiply and divide numbers by 10, 100 and 1000 giving answers up to three decimal places</p> | <p><b>MD</b></p> <p>Use appropriate strategies to multiply and divide mentally, including by multiples of 10, 100 and 1000.</p> | <p>a) 1500<br/>b) 39 300</p> | 2 | <p>a) Answers such as 15 000 or 150 suggest that children are shifting the wrong number of digits when dividing. Other errors are possible if a child has multiplied or added instead of dividing.</p> <p>b) An answer of 3.93 or 39.3 suggest that a child has misread the question and divided rather than multiplied, i.e. used the inverse operation.</p> | <p>a) Practise using a place-value grid.</p> <p>b) Model how to jot down such problems using <math>n</math> for the unknown number, i.e. <math>n \div 10 \div 10 = 393</math>. The opposite operations must then be carried out to find the original number, i.e. <math>393 \times 10 \times 10</math>.</p> |
| 4* | <p><b>Y6.NF.7</b> Identify the value of each digit in numbers given to three decimal places and multiply and divide numbers by 10, 100 and 1000 giving answers up to three decimal places</p>                                                                                                       | <p><b>FDRP</b></p> <p>Compare and order numbers with 1, 2 or 3 decimal places.</p>                                              | Various                      | 2 | <p>Errors may occur where the missing number given is larger than the final number if children are not confident ordering decimals, particularly when there are differing numbers of decimal places.</p>                                                                                                                                                      | <p>Encourage children to use a number line jotting, with the first and last number at either end. Sometimes it is useful to write the numbers with the same number of decimal places, e.g. 2.54 and 2.60 for part (a), or extra decimal places, e.g. 4.030 and 4.040 for part (d).</p>                      |