

# Year 6 Autumn 1 • Problem solving and reasoning • Commentary chart

Q. no.	Abacus objective	Outgoing National curriculum level	Answers	Marks	Common difficulties	Advice
1	<b>NPV.63</b> Understand place value in 6-digit numbers by creating 6-digit numbers, placing them on a number line and solving place value additions and subtractions	<b>L5</b>	b) seven hundred thousand and thirty c) seven hundred and seventy thousand and three d) seven hundred and two thousand, three hundred and twenty e) three hundred and seven thousand, seven hundred	2	Multiple uses of the same digit in a large number – as in 770 003 and 702 320 – and the positioning of zeros can cause confusion when reading and writing large numbers.	Write large numbers on place-value grids so children can refer to the place value headings when reading large numbers. Insist they are read as proper numbers and not as a digit string (as with a phone number, for example).
2	<b>DPE.70</b> Read, write and order 3-place decimals using a number line	<b>L5</b>	2.86, 2.681, 2.618, 2.6	2	When the 1s digit is the same in a set of decimal numbers as they are here, some children treat the digits after the decimal point as whole numbers (i.e. 86, 681, 618 and 6), and order the decimal numbers according to these 'whole' numbers to give 2.681, 2.618, 2.86, 2.6.	A good strategy is to equalise the number of digits after the decimal point using zeros, e.g. 2.618, 2.860, 2.600, 2.681, then to compare numbers by looking at successive places (1s, tenths, hundredths) in order to determine the correct order.
3	<b>FRP.74</b> Write equivalents of 1-, 2-, and 3-place decimals as fractions over 10, 100 or 1000 as appropriate <b>DPE.77</b> Round decimals to nearest tenth and nearest whole number	<b>L5</b>	a) 0.607, 0.035 b) 72.4, 0.7	2	For part (a) 6.07 and 0.35 are possible errors.  For part (b) 72 and 0.73 are possible errors.	A decimal place-value grid can be used to help children see the decimal equivalents of these fractions.  Use a number line marked in tenths to place the numbers. Ask questions such as: <i>Is 72.36 closer to 72.3 or 72.4? Is 0.728 closer to 0.7 or 0.8?</i>
4	<b>MAS.59</b> Add and subtract larger numbers using place value and number facts	<b>L4</b>	8227	2	Answers such as 8127 or 7127 suggest place-value errors. Less likely are incorrect answers caused by mistakes with simple addition.	Write column headings above the numbers and encourage children to set out with enough space for carrying numbers. If necessary practise using the expanded method.  Where children are making arithmetical errors they need to be reminded to check by repeating their calculations.

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5	<b>MAS.80</b> Add mixed decimal numbers using appropriate mental strategies	<b>L4</b>	a) 6.5 b) 28.5 kg	2	Possible errors for part (a) are 6.7 or 6.6 and for part (b) are 28.6, 28.4 or 27.5. This indicates that a mental strategy has not been applied accurately, e.g. adding 1 then adding 0.1 rather than adding 1 and then subtracting 0.1 when adding 0.9.	If children are still struggling with such mental strategies encourage them to use jottings to reflect their thinking.
6	<b>PRA.78</b> Use mathematical reasoning to investigate and solve problems and puzzles, justify their reasoning	<b>L5</b>	a) 9 cm b) 80°	2	For part (a) 18 cm shows a misunderstanding of finding the unknown length, 5 cm suggests a confusion between area and perimeter.  For part (b) 100° could be the result of thinking that the angles of a triangle add to 200°.	Children need to focus and what information is given and what remains to be found. In each case two steps are required to solve the problem and, although the arithmetic is quite straightforward, children may need support in identifying and articulating the two steps.
7	<b>PRA.82</b> Use order of operations and brackets for calculations involving the four operations	<b>L5</b>	a) $\times$ b) $\checkmark$ c) $\checkmark$ d) $\times$	2	For part (a) some children may add the 3 and 9 first and double to get 24.  For part (c) some may add 18 to 54 before dividing by 9.  For part (d) some may do the subtraction first.	Give children digit cards and cards with each of the operations and brackets. Use these to construct number sentences with a particular target, reminding children of the order of operations.
8	<b>MEA.75</b> Use, read, write and convert between standard units, converting measurements of length, mass and volume from a smaller to a larger unit of measure and vice versa, using up to 3 decimal places	a) <b>L4</b> b) <b>L5</b>	a) 4.5 kg or $4\frac{1}{2}$ kg b) 3000 g	2	Some children may ignore the instructions regarding the units of the answer and give 4500 for part (a) and 3 for part (b). Others may misread the scale and think it is 4.1 kg or 5.5 kg which will then impact on the answer to part (b). Some children may add rather than subtract the weight of the oranges, giving 6000 g as the answer.	Errors such as those described suggest children need to read the questions more carefully, underlining or circling key information.  Where children are unclear about the relationship between kilograms and grams, practise using flashcards with corresponding weights on each side.
9	<b>MEA.75</b> Use, read, write and convert between standard units, converting measurements of length, mass and volume from a smaller to a larger unit of measure and vice versa, using up to 3 decimal places	<b>L5</b>	a) 1000 mm b) 1 km	2	Answers of 10 and 100 for part (a) and 100 and 1000 for part (b) are possible errors.	Give children more experience of the relationships between all length measures, not just the common ones (10 mm = 1 cm, 100 cm = 1 m, 1000 m = 1 km).

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10	<b>MEA.79</b> Convert between miles and kilometres	<b>L5</b>	64 kilometres	2	An answer of 25 suggests a child has divided by 8 and multiplied by 5 rather than the other way around. Answers such as 53 or 27 suggest children have misunderstood this topic completely and simply added or subtracted 5 and 8 to 40	Practise in a real life context, e.g. convert distances between towns in the UK from miles to kilometres. Since 5 miles is approximately 8 kilometres, children should realise that the number of kilometres equivalent to a number of miles will always be larger.
11	<b>MEA.77</b> Read and tell the time using analogue, digital and 24-hour clocks, converting times between the three	<b>L4</b>	a) 17:15, 18:25 b) 1 hour 10 minutes (or 70 minutes)	2	For part (a) answers of 15:15 and 16:25 suggest children have added 10 rather than 12 to the pm times. Some may give the correct numerical answers but still include the pm, which is not needed.  For part (b), some children may give the answer as 110mins or 1 hour 50 minutes.	A good way to avoid all of these errors is to use a timeline from midnight to midnight, i.e. 24 hours. Write both 12 hour and 24 hour times on this so the equivalents can be seen and calculations across a whole hour can be drawn out.
12	<b>PRA.75</b> Solve problems involving addition, subtraction, multiplication and division	<b>L4</b>	1656	2	Some children may add rather than subtract and give an answer of 11438. A variety of place-value errors can occur when using column subtraction and answers such as 2356, 1678, 1658 or 1766 would indicate this.	Practise column subtraction using the expanded method if necessary. Also encourage children to check a subtraction by adding their answer back on.
13	<b>PRA.75</b> Solve problems involving addition, subtraction, multiplication and division	<b>L5</b>	£14.50	2	Some children may do only one step of the problem, subtracting only the adult ticket from £50 to give an answer of £26.50 or adding the two amounts but not subtracting to give an answer of £35.50. An answer of £15.50 would suggest a place-value error in the final subtraction.	Aside from correcting any subtraction errors, encourage children to identify word problems as '1-step' or '2-step' by carefully reading them before carrying out any calculations.
14	<b>MMD.71</b> Use mental strategies to multiply by 4, 8, 5, 25, 19, 29 and 99	<b>L5</b>	£2574	2	Answers of £2600 or £2626 suggest that 26 has been correctly multiplied by 100, but not adjusted or not adjusted correctly. An answer of £2501 is the result of subtracting 99 rather than 26 from £2600. An answer of £234 suggests that the 26 has been multiplied by 10, not 100. A range of arithmetical or place-value errors may occur if children try to solve this using long multiplication.	Encourage children to find the easier method, in this case multiplying by 100, and how that can be used to help find the answer, in this case adjusting by subtracting 26 to find the cost. Discuss how much easier that is than performing a long multiplication.
15	<b>WMD.64</b> Use short multiplication to multiply 4-digit numbers by 1-digit numbers	<b>L4</b>	9102	2	Errors may be the result of mistakes in layout, particularly carrying between columns. There could also be arithmetical mistakes in the recall of 6 times-table facts.	Encourage children to estimate – in this case $1500 \times 6$ gives 9000. Children who are confused with the layout could practise using the grid method and, when confident, look again at short multiplication.