Solving maths problems – Analysis of strategies

Link to the assessment resource, *Solving maths problems* (NM1328).

These tables give detailed breakdowns of the use of different strategies.

Table 1: Frequency of use and success rates of different strategies

Strategy	a) 21 + 13	b) 37 + 28	c) 63 + 59	Total
Numerical				
Partitions across boundaries	1 (1)	4 (4)	5 (5)	10 (10) 100%
Partitions with nice numbers	17 (17)	10 (8)	9 (6)	36 (31) 86%
PV partitions with 10s and 1s	45 (38)	45 (36)	46 (33)	136 (107) 79%
Vertical algorithm	14 (12)	16 (14)	13 (9)	43 (35) 81%
PV partitions with 10s as 1s	21 (17)	24 (11)	21 (4)	66 (32) 48%
Visual PV strategies	7 (6)	7 (3)	5 (2)	19 (11) 58%
Other PV strategies	1 (1)	2 (1)	1 (0)	4 (2) 50%
Counting strategies	13 (8)	6 (2)	4 (2)	23 (12) 52%
Incomplete strategies	5 (1)	9 (4)	5 (1)	19 (6) 32%
ALL STRATEGIES	**124**	**123**	**109**	**356**
States answer	18 (15)	13 (12)	17 (7)	48 (34) 71%
Other statements	3 (1)	3 (1)	2 (0)	8 (2) 25%
Missing	14 (7)	20 (6)	31 (3)	65 (16) 25%
TOTAL	**159**	**159**	**159**	**477**

Based on a representative sample of *159* students

Table 2: Mean abilities of students using different strategies

	Mean	Ability*	(out of 31)	
Numerical				Weighted Average**
Partitions across boundaries	10.0	15.0	18.0	16.0
Partitions with nice numbers	14.5	15.5	13.9	14.6
PV partitions with 10s and 1s	14.5	14.6	14.7	14.6
Vertical algorithm	10.6	10.3	10.7	10.5
PV partitions with 10s as 1s	8.5	8.2	7.7	8.1
Visual PV strategies	7.3	9.1	7.4	8.0
Other PV strategies	10.0	7.0	10.0	8.5
Counting strategies	6.8	3.8	9.0	6.4
Incomplete strategies	2.0	6.4	4.0	4.6
States answer	7.2	7.8	8.1	7.7
Other statements	2.3	2.3	1.0	2.0
Missing	3.4	3.9	4.7	4.2

Based on a representative sample of *159* students

*   Mean ability – average score out of 31 of all students using this strategy on a test set of seven questions.

** [Σ (mean ability × number using strategy in each part of the question)] / total using the strategy in any part of the question

   e.g., for Partitions across boundaries = [10.0×1 + 15.0×4 + 18.0×5] ÷ 10 = 16.0

Table 3: Frequency of wrong answers

Misconception	a) 21 + 13	b) 37 + 28	c) 63 + 59
Miscounts by 1 or 2 a) 32, 33, 35 or 36 b) 63, 64, 66 or 67 c) 120, 121, 123 or 124	8	7	8
Crosses the tens boundary incorrectly a) 24 b) 55 c) 112	1 (2*)	3 (7*)	13 (9*)
Counts the individual digits a) 7 b) 20 c) 23	1	5	10

* Answer close to 24, 55 or 112, indicating this error plus a counting error.