Subtracting simple sets of numbers

The last area that many students had difficulties with was subtracting simple sets of numbers. This was particularly evident with large numbers (up to three-digits), where students needed to use regrouping.

These types of questions require students to understand the place of each digit in a number and how to subtract in groups, such as groups of 10.

Example question

An example of one of these questions and how students responded to it is provided. This example is a question only asked to year four students; however, year six students also had difficulty with these types of questions.

Figure DEF#2 / Sample question:
Subtract simple sets of numbers

? Question:

Mechanical problem:

- 324 - 45

Learning outcome:

Subtract up to 3 digit numbers with regrouping (horizontal subtraction).

Responses:

✓ Correct response:

279

Possible misconceptions:

✗ xx9 or x7x or 2xx

Only one column subtraction is correct after allignment.

✗ 321

Subtracting the smaller digit from the bigger digit and not understanding regrouping in subtraction.

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Level of difficulty:

Expected performance:

We would expect only higher performing Year 4 students to successfully answer this question.

The question item is asked of Year 4.

The question item is on level 4 of the numeracy proficiency descriptors, which is above the minimum level of proficiency expected from Year 4 (level 3).

Performance analysis:

Code	Descriptor	Score	Year 4	
0	Incorrect response	0		53.7%
1	Expected response	1		22.3%
2	Some evidence of correct subtraction	0		8.8%
3	Subtracts smaller from bigger number	0		7.7%
4	Incorrect operation	0		0.7%
5	Incorrect alignment	0		0.2%
7	Not applicable	0		0%
9	No response/blank	0		6.6%

The question is relatively difficult – only higher performing year four students would be expected to answer this correctly.

In this example, only 22% of students correctly answered the question with another small proportion coming close to a correct answer (9%). A further 7% left the question unanswered and the rest gave incorrect responses such as using an incorrect operation (for example, addition).

Students may need more support to understand larger subtraction calculations. This could include the various techniques to perform these calculations or a deeper understanding of techniques they are familiar with.

How can teachers support learning in this area?

Addressing how these types of questions are taught in schools may increase student performance in future. Below, SPC present some ways that teachers might support learning in this area.

1. Emphasise the importance of understanding the fundamentals of subtraction. This includes its symbol, place value, and that the order in subtraction is important. Point out that, whilst the commutative law applies to addition it does NOT apply to subtraction.

2. Teach correct methods of subtraction with regrouping, especially decomposition, but also other methods, such as equal addition or Austrian subtraction.

3. Give students a variety of methods to solve these types of questions. Students can then use the method they know best from their repertoire.