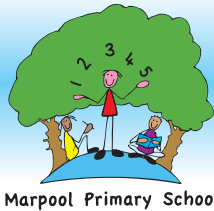


Notes 4 Parents Subtraction



Marpool Primary School

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'Every child will have confidence in their own self-worth and an aspiration to achieve.'

Subtraction vocabulary = Difference between, subtract, fewer than, decrease, take away, minus, reduce, -

To subtract successfully, children need to be able to:

- recall all addition and subtraction facts to 20
- subtract multiples of 10 (such as $160 - 70$) using the related subtraction fact, $16 - 7$, and their knowledge of place value
- partition two-digit and three-digit numbers into multiples of one hundred, ten and one in different ways (e.g. partition 74 into $70 + 4$ or $60 + 14$).

Stage 1: Using the empty number line

Method

The empty number line helps to record or explain the steps in mental subtraction. A calculation like $74 - 27$ can be recorded by counting back 27 from 74 to reach 47. The empty number line is also a useful way of modelling processes such as bridging through a multiple of ten.

The steps can also be recorded by counting up from the smaller to the larger number to find the difference, for example by counting up from 27 to 74 in steps totalling 47.

With practice, children will need to record less information and decide whether to count back or forward. It is useful to ask children whether counting up or back is the more efficient for calculations such as $57 - 12$, $86 - 77$ or $43 - 28$.

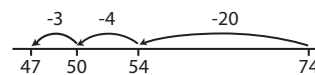
Example

Steps in subtraction can be recorded on a number line. The steps often bridge through a multiple of 10.

$$15 - 7 = 8$$



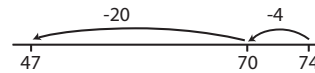
$74 - 27 = 47$ worked by counting back:



The steps may be recorded in a different order:



or combined:



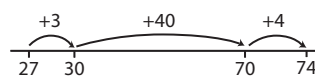
The counting-up method, extension of stage 1

Method

The mental method of counting up from the smaller to the larger number can be recorded using either number lines or vertically in columns. The number of rows (or steps) can be reduced by combining steps. With two-digit numbers, this requires children to be able to work out the answer to a calculation such as $30 + ? = 74$ mentally.

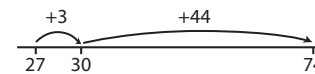
The method can be used with decimals where no more than three columns are required. However, it becomes less efficient when more than three columns are needed.

Example

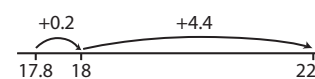


$$\begin{array}{r} 74 \\ - 27 \\ \hline 3 \rightarrow 30 \\ 40 \rightarrow 70 \\ 4 \rightarrow 74 \\ \hline 47 \end{array}$$

Or:



$$\begin{array}{r} 74 \\ - 27 \\ \hline 3 \rightarrow 30 \\ 44 \rightarrow 74 \\ \hline 47 \end{array}$$



$$\begin{array}{r} 22.4 \\ - 17.8 \\ \hline 0.2 \rightarrow 18 \\ 4.4 \rightarrow 22.4 \\ \hline 4.6 \end{array}$$

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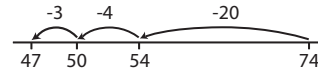
Stage 2: Partitioning

Method

Subtraction can be recorded using partitioning to write equivalent calculations that can be carried out mentally. For $74 - 27$ this involves partitioning the 27 into 20 and 7, and then subtracting from 74 the 20 and the 7 in turn. Some children may need to partition the 74 into $70 + 4$ or $60 + 14$ to help them carry out the subtraction. This requires children to subtract a single-digit number or a multiple of 10 from a two-digit number mentally. The method of recording links to counting back on the number line.

Example

Subtraction can be recorded using partitioning:
 $74 - 27 = 74 - 20 - 7 = 54 - 7 = 47$
 $74 - 27 = 70 + 4 - 20 - 7 = 60 + 14 - 20 - 7 = 40 + 7$



Stage 3: Expanded layout, leading to column method

Method

Partitioning the numbers into tens and units and writing one under the other mirrors the column method, where units are placed under units and tens under tens.

This method moves children to the shorter method so that they understand its layout.

Example

Partitioned numbers are then written under one another:

Example: $74 - 27$

$70 + 4$	$\overset{60}{\cancel{70}} + \overset{1+}{\cancel{4}}$	$\overset{6}{\cancel{7}} \overset{1+}{\cancel{4}}$
$- 20 + 7$	$- 20 + 7$	$- 2 \ 7$
<hr style="width: 100%;"/>	$40 + 7$	$4 \ 7$

Example: $741 - 367$

$700 + 40 + 1$	$\overset{600}{\cancel{700}} + \overset{130}{\cancel{40}} + \overset{11}{\cancel{1}}$	$\overset{6}{\cancel{7}} \overset{13}{\cancel{4}} \overset{11}{\cancel{1}}$
$- 300 + 60 + 7$	$- 300 + 60 + 7$	$- 3 \ 6 \ 7$
<hr style="width: 100%;"/>	$300 + 70 + 4$	$3 \ 7 \ 4$

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The expanded method for three-digit numbers

Example: $563 \square 241$, no adjustment or decomposition needed

Expanded method

$$\begin{array}{r} 500 + 60 + 3 \\ - 200 + 40 + 1 \\ \hline 300 + 20 + 2 \end{array}$$

leading to

$$\begin{array}{r} 563 \\ - 241 \\ \hline 322 \end{array}$$

Start by subtracting the ones, then the tens, then the hundreds. Refer to subtracting the tens, for example, by saying 'sixty take away forty', not 'six take away four'.

Example: $563 \square 271$, adjustment from the hundreds to the tens, or partitioning the hundreds

$\begin{array}{r} 500 + 60 + 3 \\ - 200 + 40 + 1 \\ \hline \end{array}$	$\begin{array}{r} 400 + 160 + 3 \\ - 200 + 70 + 1 \\ \hline 200 + 90 + 2 \end{array}$	$\begin{array}{r} 400 \quad 160 \\ \cancel{500} + \cancel{60} + 3 \\ - 200 + 70 + 1 \\ \hline 200 + 90 + 2 \end{array}$	$\begin{array}{r} 4 \quad 16 \\ \cancel{5} \cancel{6} 3 \\ - 2 \quad 7 \quad 1 \\ \hline 2 \quad 9 \quad 2 \end{array}$
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Begin by reading aloud the number from which we are subtracting: 'five hundred and sixty-three'. Then discuss the hundreds, tens and ones components of the number, and how $500 + 60$ can be partitioned into $400 + 160$. The subtraction of the tens becomes '160 minus 70', an application of subtraction of multiples of ten.

Example: $563 \square 278$, adjustment from the hundreds to the tens and the tens to the ones

$\begin{array}{r} 500 + 60 + 3 \\ - 200 + 70 + 8 \\ \hline \end{array}$	$\begin{array}{r} 400 + 150 + 13 \\ - 200 + 70 + 8 \\ \hline 200 + 80 + 5 \end{array}$	$\begin{array}{r} 400 \quad 150 \quad 13 \\ \cancel{500} + \cancel{60} + \cancel{3} \\ - 200 + 70 + 8 \\ \hline 200 + 80 + 5 \end{array}$	$\begin{array}{r} 4 \quad 15 \quad 13 \\ \cancel{5} \cancel{6} \cancel{3} \\ - 2 \quad 7 \quad 8 \\ \hline 2 \quad 8 \quad 5 \end{array}$
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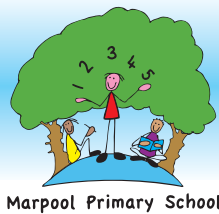
Here both the tens and the ones digits to be subtracted are bigger than both the tens and the ones digits you are subtracting from. Discuss how $60 + 3$ is partitioned into $50 + 13$, and then how $500 + 50$ can be partitioned into $400 + 150$, and how this helps when subtracting.

Example: $503 \square 278$, dealing with zeros when adjusting

$\begin{array}{r} 500 + 0 + 3 \\ - 200 + 70 + 8 \\ \hline \end{array}$	$\begin{array}{r} 400 + 90 + 13 \\ - 200 + 70 + 8 \\ \hline 200 + 20 + 5 \end{array}$	$\begin{array}{r} 400 \quad 90 \quad 13 \\ \cancel{400} + \cancel{100} + \cancel{3} \\ - 200 + 70 + 8 \\ \hline 200 + 20 + 5 \end{array}$	$\begin{array}{r} 4 \quad 9 \quad 13 \\ \cancel{5} \cancel{0} \cancel{3} \\ - 2 \quad 7 \quad 8 \\ \hline 2 \quad 2 \quad 5 \end{array}$
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Here 0 acts as a place holder for the tens. The adjustment has to be done in two stages. First the $500 + 0$ is partitioned into $400 + 100$ and then the $100 + 3$ is partitioned into $90 + 13$.

Notes 4 Parents Subtraction



Key objectives for subtraction

Year group	Objective
Foundation	<ul style="list-style-type: none"> • Use language such as 'more' or 'less' to compare two numbers. • Begin to relate subtraction to 'taking away' • In practical activities and discussion begin to use the vocabulary involved in subtracting
Year 1	<ul style="list-style-type: none"> • Say the number that is 1 more or less than any given number, and 10 more or less for multiples of 10 • Understand subtraction as 'take away' and find a 'difference' by counting up; use practical and informal written methods to support the subtraction of a one-digit number from a one digit or two-digit number and a multiple of 10 from a two-digit number • Use the vocabulary related to subtraction and symbols to describe and record subtraction number sentences
Year 2	<ul style="list-style-type: none"> • Subtract mentally a one-digit number or a multiple of 10 to or from any two-digit number; use practical and informal written methods to subtract two-digit numbers • Understand that subtraction is the inverse of addition and vice versa; use this to derive and record related subtraction number sentences
Year 3	<ul style="list-style-type: none"> • Subtract mentally combinations of one-digit and two-digit numbers • Develop and use written methods to record, support or explain subtraction of two-digit and three-digit numbers
Year 4	<ul style="list-style-type: none"> • Subtract mentally pairs of two-digit whole numbers (e.g. $47 + 58$, $91 - 35$) • Refine and use efficient written methods to subtract two-digit and three-digit whole numbers and £.p • Use a calculator to carry out one-step and two-step calculations
Year 5	<ul style="list-style-type: none"> • Use efficient written methods to subtract whole numbers and decimals with up to two places • Extend mental-methods for whole-number calculations, for example to subtract one near-multiple of 1000 from another (e.g. $6070 - 4097$) • Use a calculator to solve problems, including those involving decimals
Year 6	<ul style="list-style-type: none"> • Calculate mentally with integers and decimals • Use efficient written methods to subtract integers and decimals • Use a calculator to solve problems involving multi-step calculations