**St Augustine of Canterbury RC Primary School**

# Maths - Mental Calculations Policy

In the name of God the Father, the Son and the Holy Spirit, we remember that each person is gifted, unique and loved by God and so in the family of St Augustine's we:

Welcome everyone in Jesus' name;

Work together in Jesus' community;

Follow Jesus' example in all we do;

Learn with Jesus as our inspiration;

Grow in faith with Jesus as our leading light.

## Y4

> **End of Year Objective:**
> *Add and subtract numbers mentally, including: a three-digit number to or from a three-digit multiple of tens; two three-digit numbers (where there is no carrying or exchange involved)*

## Rapid Recall:

Children should be able to:

- recall and use addition and subtraction facts for 100
- recall and use addition and subtraction facts for multiples of 100 that total 1000
- derive and use addition and subtraction facts for 1 and 10 (with decimal numbers to one decimal place)

## Mental Strategies

### *Partition and combine multiples of hundreds, tens and ones*

Partitioning numbers is a core strategy for adding and subtracting pairs of numbers. Children can either partition both of the numbers in the calculation, or keep the first number the same and just partition the second. *(See Y2 and Y3 for more information).*

*Examples of calculations:*

| | |
|---|---|
| 320+150 | 320 add 100 and 50 = 320 add 100 add 50 |
| 243+230 | 243 add 200 and 30 = 243 add 200 add 30 |
| 460-140 | 460 take away 100 and 40 = 460 take away 100 take away 40 |
| 562 -320 | 562 take away 300 and 20 = 562 take away 300 take away 20 |
| 234+125 | 234 add 100 and 20 and 5 = 234 add 100 add 20 add 5 (crossing no boundaries) |

| 765-241 | 765 take away 200 and 40 and 1 = 765 take away 200 take away 40 take away 1 (crossing no boundaries) |
| 85 + 47 | 85 add 40 and 7 = 84 add 40 add 7 (crossing hundreds and tens boundaries) |
| 122 – 35 | 122 take away 30 and 5 = 122 take away 30 take away 5 (crossing hundreds and tens boundaries) |

*Prerequisite skills:*

- Count forwards and backwards in ones, tens and hundreds from any one-, two- or three-digit number
- Understand place value and understand which digit changes if one, ten or hundred is added or subtracted
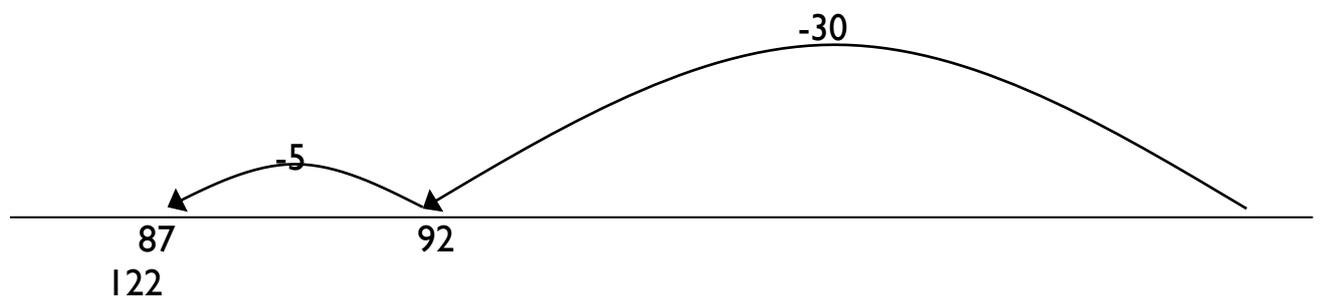- Partition numbers into hundreds, tens and ones

85 + 47 = 132 (shown using a numberline)
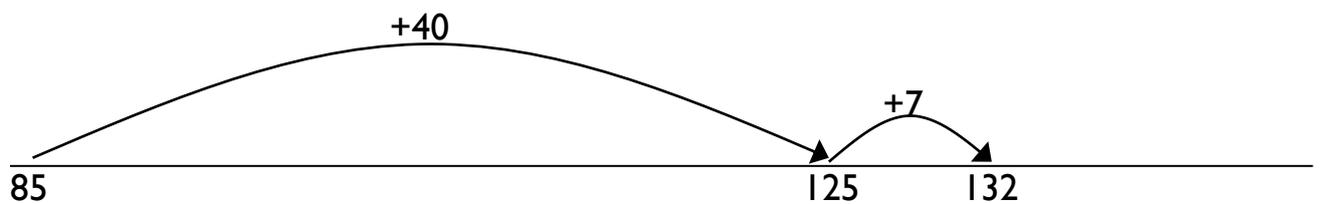


85 + 47 = 132

85 + 40 = 125
125 + 7 =132

122 – 35 = 87 (shown using a numberline)



122 – 35 = 87 (shown using number sentences)

122 – 30 = 92
92 – 5 = 87

*Reorder numbers in a calculation*

In Y4, children need to build on their knowledge gained in Y3 and continue to reorder calculations to make them more efficient.  They should now be solving calculations involving subtraction such as 16 – 3 – 6, when reordering would be appropriate.

*Examples of calculations:*

7 + 12 + 3 + 5        7 + 3 + 12 + 5
18 + 6 – 8             18 – 8 + 6
27 + 75               75 + 27 (thinking of 27 as 25 + 2)

*Prerequisite skills:*

- Understand the place value of numbers to identify which number is the greater
- Understand that reordering works for addition but not subtraction

### *Identify and use knowledge of number bonds within a calculation and identify related facts, e.g. 150 + 270 from 15 + 27*

Children should use their knowledge of the number system to help them use related facts to calculate, e.g. 15 is ten times bigger than 150, 270 is ten times bigger than 27, so the answer to 150 + 270 will be ten times bigger than 15 + 27.

*Examples of calculations:*

120 + 80          using knowledge of 12 + 8 = 20
250 + 130         using knowledge of 25 + 13 = 38
200 – 70          using knowledge of 20 – 7 = 13
460 – 150         using knowledge of 46 – 15 = 31

*Prerequisite skills:*
- Know, or quickly derive, number bonds to 10, 100 or 1000
- Identify number bonds within other numbers, e.g. identifying 7 + 3 within the calculation 257 + 343
- Identify that when adding two two-digit numbers, that 57 + 43 = 100 but 57 + 53 does not and why

### *Find differences by counting up through the next multiple of 10 or 100*

In Y4, children need to build on their knowledge and understanding gained in Y3 to find larger differences that cross 10 and 100 boundaries. When deciding whether to use a mental or a written method for a calculation, **children should be encouraged to select**

**the method which is most efficient**. e.g. 203 – 96 =. It is more efficient to count up from 96 to 203 in three steps (+4, +100, +3) than to use the formal written method of:

$$\begin{array}{r} {}^{1}\cancel{2}\,{}^{9}\cancel{0}\,{}^{1}3 \\ -\ \ \ 9\ 6 \\ \hline 1\ 0\ 7 \end{array}$$

which requires a lot of exchanging.
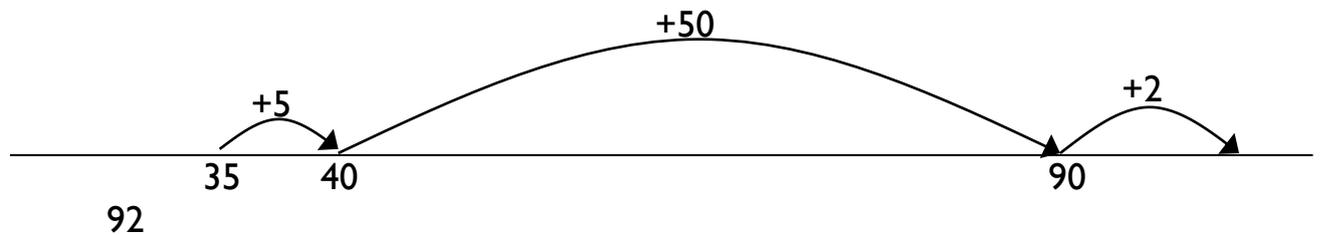
*Examples of calculations:*

80 – 43
92 – 35
203 – 96
504 – 180

*Prerequisite skills:*
- Understand the place value of numbers to identify which number is the greater or lesser
- Establish whether numbers are close together or near to multiples of 10 or 100
- Place numbers appropriately on an unmarked numberline
- Count forwards and backwards in ones and tens

Children could use empty numberlines to record the calculation.

92 – 35 = 57

+5   +50   +2
35   40   ...   90
92

504 – 180 = 324

+20   +300   +4
180   200   ...   500
504
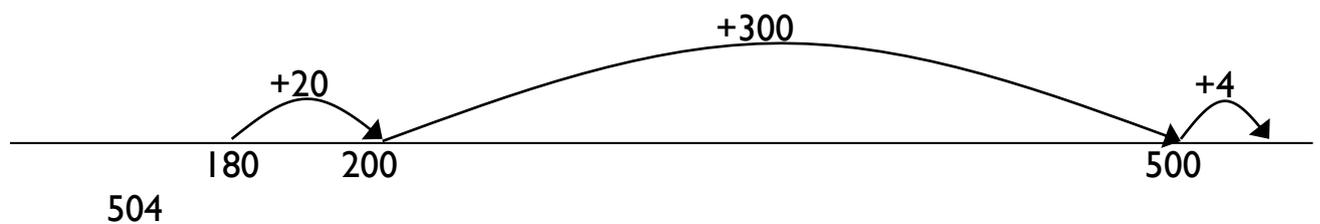
***Bridge through 10 when adding or subtracting a single digit number (partitioning, e.g. 58 + 5 = 58 + 2 + 3 or 76 – 8 = 76 – 6 - 2)***

In Y4, children need to build on their knowledge and understanding gained in Y3. *(See Y3 for more information).*

*Examples of calculations:*

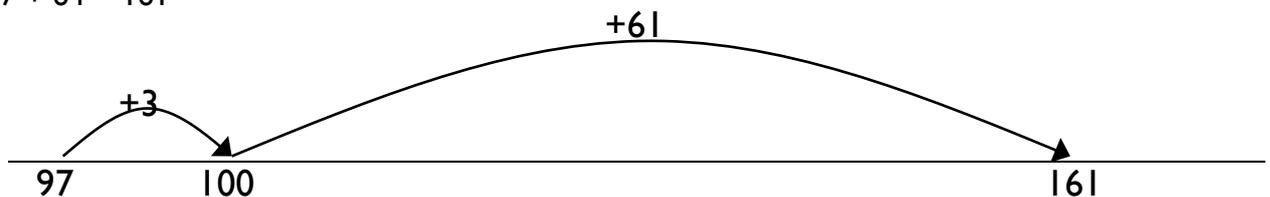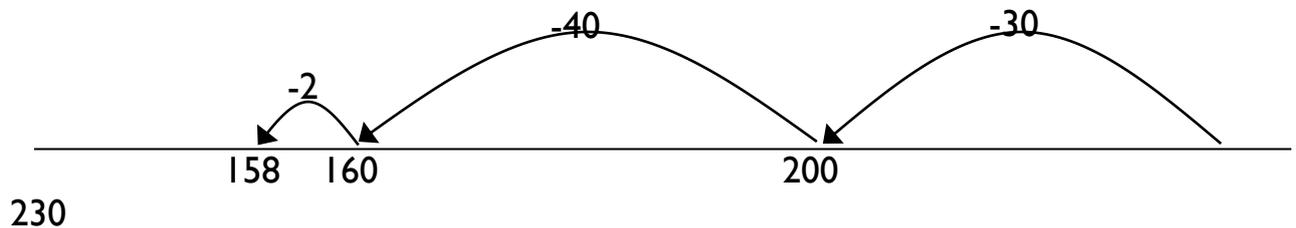| | |
|---|---|
| 48 + 35 | as 48 + 2 + 33 |
| 97 + 64 | as 97 + 3 + 61 |
| 103 – 25 | as 103 – 3 – 22 (using number bonds to 100) |
| 230 – 72 | as 230 – 30 – 40 – 2 |

*Prerequisite skills:*
- Partition numbers in different ways, e.g. 5 as 2 + 3 to enable 58 + 5 as 58 + 2 + 3
- Know, or quickly derive, number bonds to 10

Children could use empty numberlines to record the calculation.

97 + 64 = 161



230 – 72 = 158



***Add or subtract a multiple of 10 and adjust (for those numbers close to multiples of 10)***

In Y4, children need to build on their knowledge and understanding gained in Y3 *(See Y3 for more information)* to add and subtract numbers close to a multiple of 10 up to 89 to two and three-digit numbers.
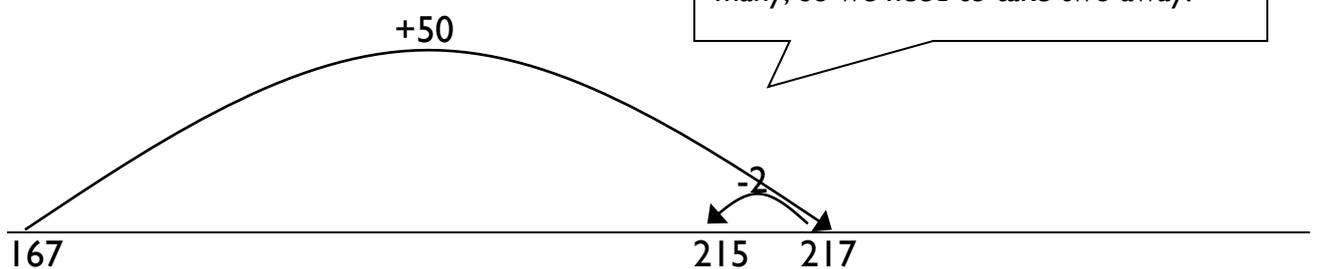
*Examples of calculations:*

| | |
|---|---|
| 84 + 28 | as 84 + 30 - 2 |
| 167 + 48 | as 167 + 50 - 2 |
| 96 - 38 | as 96 - 40 + 2 |
| 213 - 58 | as 213 - 60 + 2 |

*Prerequisite skills:*

- Identify the difference between the number being added and subtracted and the multiple of 10
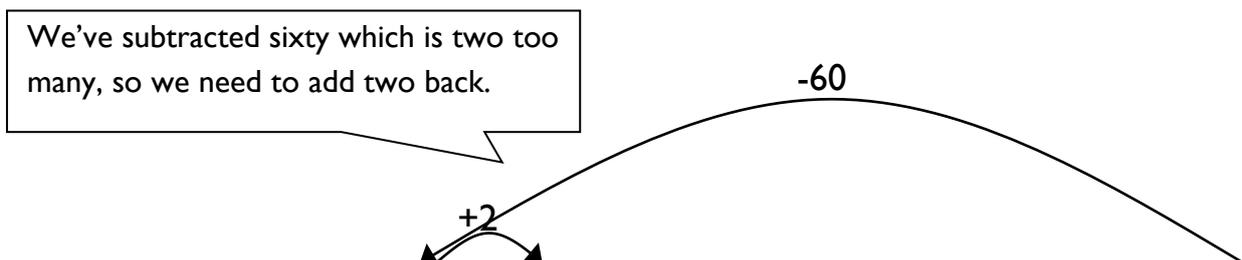- Understand that the adjustment needs to be the opposite of the operation carried out

167 + 48 = 215 (shown using a numberline)



We've added fifty which is two too many, so we need to take two away.

167 + 48 = 215 (shown using number sentences)

167 + 50 = 217
217 – 2 = 215

213 - 58 = 155 (shown using a numberline)



We've subtracted sixty which is two too many, so we need to add two back.

153    155

213

213 – 58 = 155 (shown using number sentences)

213 – 60 = 153
153 + 2 = 155