



## 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.

### Y6

#### **End of Year Objective:**

**Add and subtract numbers mentally, including: two three-digit numbers where one or both are multiples of 10 or 100; two or three-digit numbers to or from a four digit number; two four-digit numbers (where there is no carrying or exchange involved); pairs of decimals to one decimal place**

#### **Rapid Recall:**

Children should be able to:

- Recall and use addition and subtraction facts for 1 (with decimal numbers to two decimal places)

#### **Mental Strategies**

##### ***Partition and combine multiples of thousands 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, Y3, Y4 and Y5 for more information).

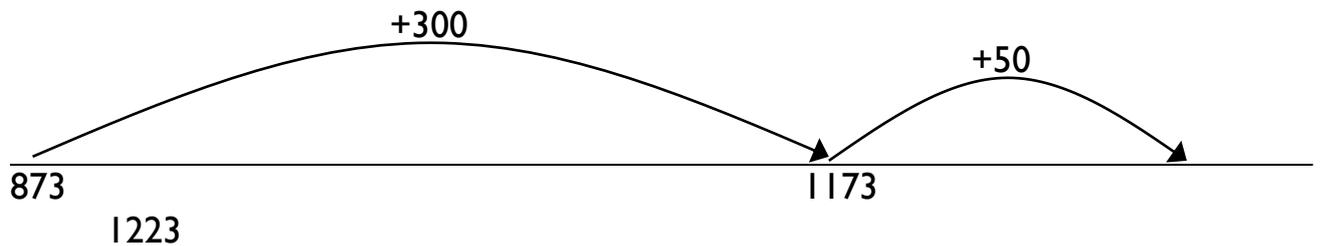
*Examples of calculations:*

5800 + 2400	5800 add 2000 and 400 = 5800 add 2000 add 400
873 + 350	873 add 300 and 50 = 873 add 300 add 50
4100 - 1600	4100 take away 1000 and 600 = 4100 take away 1000 take away 600
2132 - 440	2132 take away 400 and 40 = 2132 take away 400 take away 40
5124 + 1352	5124 add 1000 and 300 and 50 and 2 = 5124 add 1000 add 300 add 50 add 2 (crossing no boundaries)
7584 - 2351	7584 take away 2000 and 300 and 50 and 1 = 7584 take away 2000 take away 300 take away 50 take away 1 (crossing no boundaries)

*Prerequisite skills:*

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

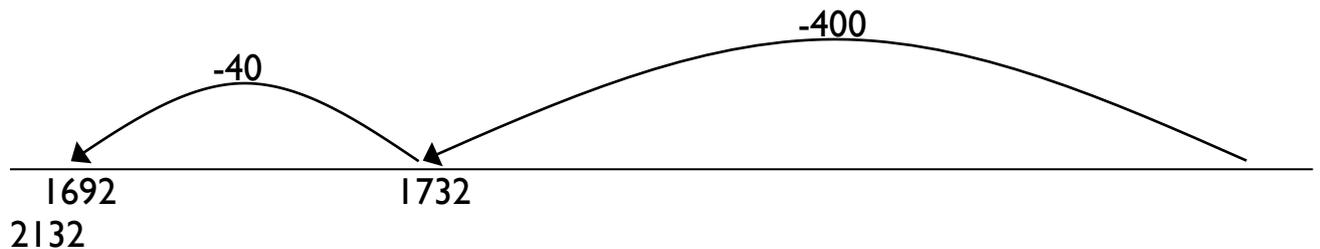
$873 + 350 = 1223$  (shown using a numberline)



$873 + 350 = 1223$  (shown using number sentences)

$$873 + 300 = 1173$$
$$1173 + 50 = 1223$$

$2132 - 440 = 1692$  (shown using a numberline)



$2132 - 440 = 1692$  (shown using number sentences)

$$2132 - 400 = 1732$$
$$1732 - 40 = 1692$$

***Partition and combine multiples of ones and tenths***

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. The calculations include crossing ones boundaries. (See Year 5 for more information)

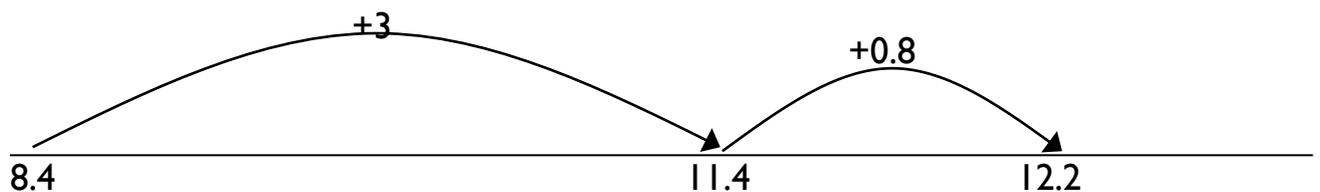
Examples of calculations:

$8.4 + 3.8$                        $8.4$  add 3 and 0.8 =  $8.4$  add 3 add 0.8  
 $13.2 - 4.5$                        $13.2$  take away 4 and 0.5 =  $13.2$  take away 4 take away 0.5

Prerequisite skills:

- Count forwards and backwards in tenths and ones
- Understand place value of decimal numbers

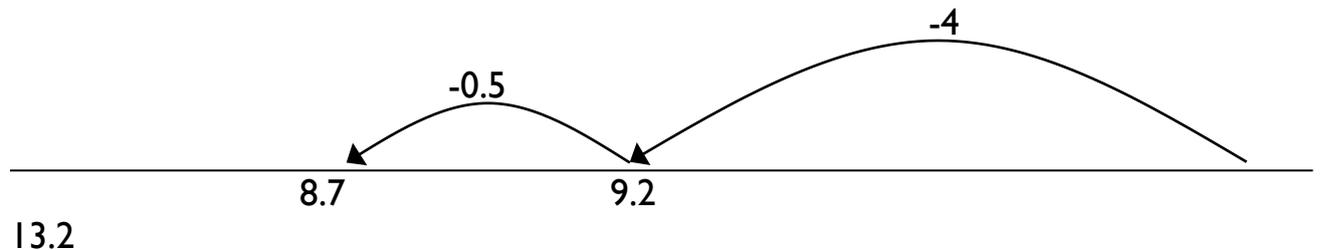
$8.4 + 3.8 = 12.2$  (shown using a numberline)



$8.4 + 3.8 = 12.2$  (shown using number sentences)

$8.4 + 3 = 11.4$   
 $11.4 + 0.8 = 12.2$

$13.2 - 4.5 = 8.7$  (shown using a numberline)



$13.2 - 4.5 = 8.7$  (shown using number sentences)

$$13.2 - 4 = 9.2$$
$$9.2 - 0.5 = 8.7$$

**Identify and use knowledge of number bonds within a calculation and identify related facts, e.g.  $680 + 430$ ,  $6.8 + 4.3$ ,  $0.68 + 0.43$  can all be worked out using the related calculation  $68 + 43$**

In Y6, children need to build on their knowledge and understanding gained in Y5 (See Y5 for more information) Children should use their knowledge of the number system to help them use related facts to calculate, e.g. 0.68 is one hundred times smaller than 68, 0.43 is a hundred times smaller than 43, so the answer to  $0.68 + 0.43$  will be a hundred times smaller than  $68 + 43$ .

*Examples of calculations:*

$0.62 + 0.38$	using knowledge of $62 + 38 = 100$
$0.75 + 0.56$	using knowledge of $75 + 56 = 131$
$2.8 + 0.43$	using knowledge of $280 + 43 = 323$
$1 - 0.41$	using knowledge of $100 - 41 = 59$
$0.92 - 0.35$	using knowledge of $92 - 35 = 57$
$8.3 - 0.52$	using knowledge of $830 - 52 = 778$

*Prerequisite skills:*

- Know, or quickly derive, number bonds to 1, 10, 100 1000
- Identify number bonds within other numbers, e.g. identifying
- $7 + 3$  within the calculations  $257 + 343$  or  $1.7 + 2.3$

**Find differences by counting up through the next multiple of 0.1, 1, 10, 100 or 1000**

In Y6, children need to build on their knowledge and understanding gained in Y5 to find differences that cross 0.1, 10, 100 and 1000 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.

*Examples of calculations:*

$$8.2 - 3.46$$
$$14.23 - 7.58$$

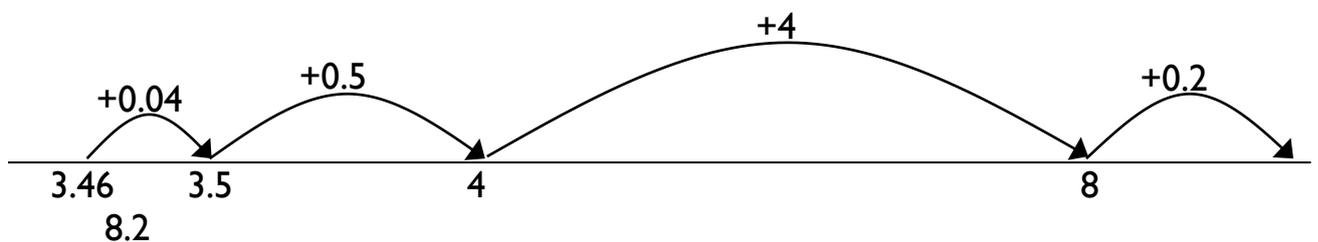
*Prerequisite skills:*

- 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

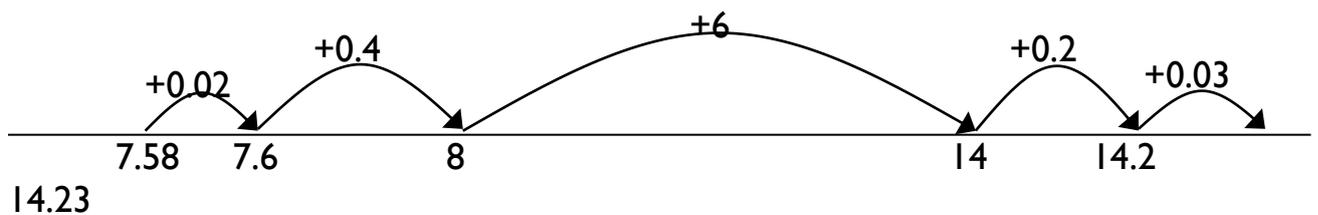
- Place numbers appropriately on an unmarked numberline
- Count forwards and backwards in ones and tens

Children could use empty numberlines to record the calculation.

$$8.2 - 3.46 = 4.74$$



$$14.23 - 7.58 = 6.65$$



**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 Y6, children bridge using decimals to one place. To do this, it is essential that children can partition decimal numbers in different ways, e.g. 2.5 into 2 and 0.5, 2.5 into 1 and 1.5, 2.5 into 2.1 and 0.4, etc.

Examples of calculations:

$$1.5 + 1.7 \quad \text{as } 1.5 + 0.5 + 1.2$$

$$0.7 + 0.56 \quad \text{as } 0.7 + 0.3 + 0.26$$

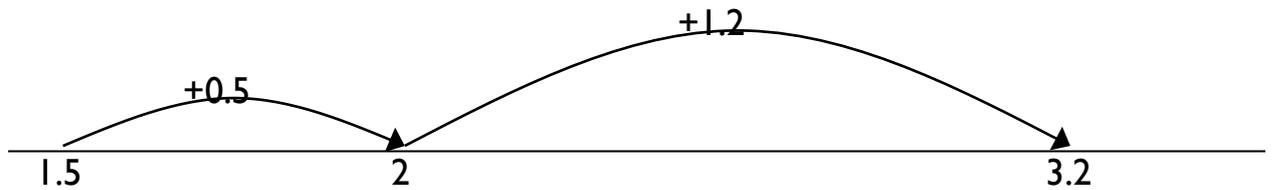
$$8.3 - 2.7 \quad \text{as } 8.3 - 2.3 - 0.4$$

Prerequisite skills:

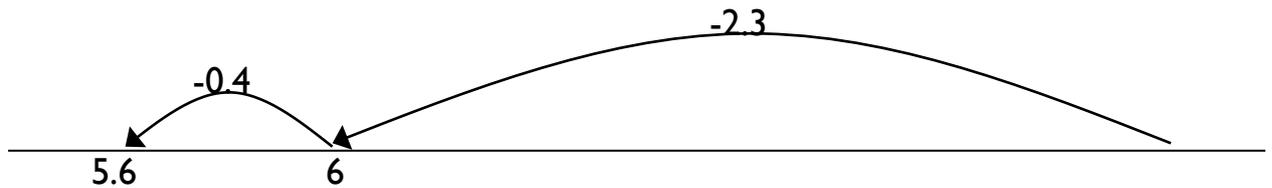
- Partition numbers in different ways, e.g. 5 as 2 + 3 to enable  $58 + 5$  as  $58 + 2 + 3$
- Know, or quickly derive, number bonds to 10

Children could use empty numberlines to record the calculation.

$$1.5 + 1.7 = 3.2$$



$$8.3 - 2.7 = 5.6$$



$$8.3$$

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

In Y6, children adjust calculations using decimals to one place.

Examples of calculations:

$$5.6 + 3.9 \quad \text{- as } 5.6 + 4 - 0.1$$

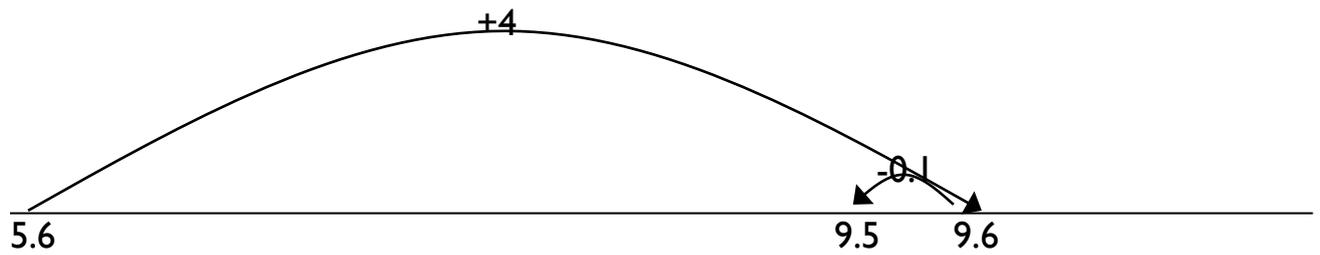
$$7.5 - 4.8 \quad \text{- as } 7.5 - 5 + 0.2$$

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

We've added four which is nought point one too many, so we need to take nought point one away.

$5.6 + 3.9 = 9.5$  (shown using a numberline)

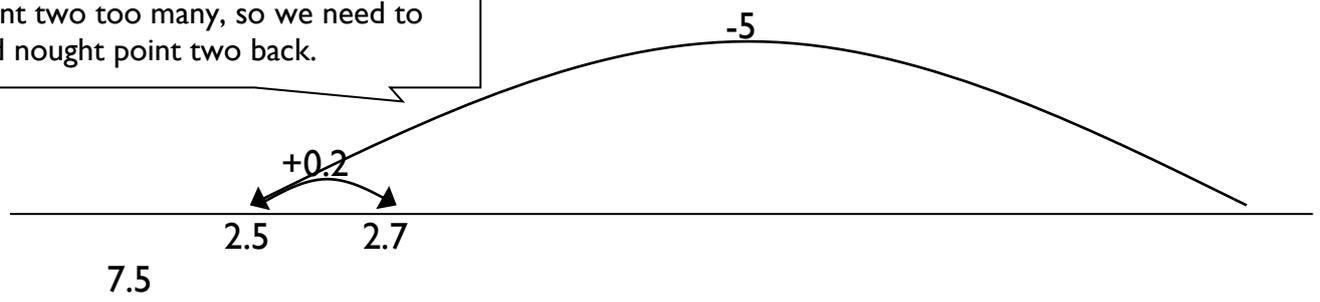


$5.6 + 3.9 = 9.5$  (shown using number sentences)

$$5.6 + 4 = 9.6$$
$$9.6 - 0.1 = 9.5$$

$7.5 - 4.8 = 2.7$  (shown using a numberline)

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



$7.5 - 4.8 = 2.7$  (shown using number sentences)

$$7.5 - 5 = 2.5$$
$$2.5 + 0.2 = 2.7$$