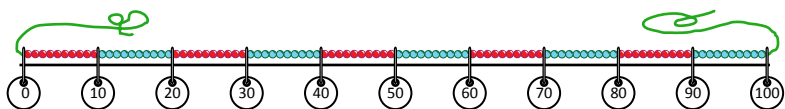


Addition and subtraction are inverse operations. Right from the start children should be taught these as related operations. There are four number sentences (two using + and two using -) which can be written to express the relationship between 4 and 6 and 10. It is key to a good understanding of addition and subtraction that  $6 + [] = 10$  and  $10 - 6 = []$  are seen as ways of expressing the same question.

## + Addition

### Using place value

Count on in ones/counting in tens, e.g. knowing  $45 + 1$  or  $45 + 10$  without counting on in ones.



$$45 + \square = 50 \quad 65 + \square = 70$$

$$85 + \square = 90$$

### Counting on

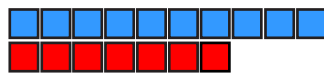
Count on in ones, e.g.  $11 + 2 =$  and  $7 + 4 =$   
Count on in tens, e.g.  $45 + 20$  as  $45, 55, 65$

### Using number facts

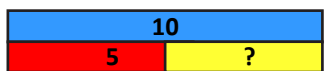
'Story' of 4, 5, 6, 7, 8 and 9, e.g.  $7 = 7 + 0$  or  $6 + 1$  or  $5 + 2$  or  $4 + 3$ .  
Number bonds to 10, e.g.  $5 + 5$ ,  $6 + 4$ ,  $7 + 3$ ,  $8 + 2$ ,  $9 + 1$ ,  $10 + 0$ .



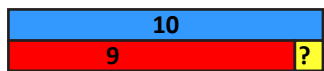
$$6 + \square = 10$$



$$7 + \square = 10$$



$$5 + \square = 10$$



$$9 + \square = 10$$

Patterns using known facts, e.g.  $4 + 3 = 7$  so we know  $24 + 3$ ,  $44 + 3$ ,  $74 + 3$ , etc.

Bead strings and 1-100 number grid help counting on/back in tens.

## - Subtraction

### Using place value

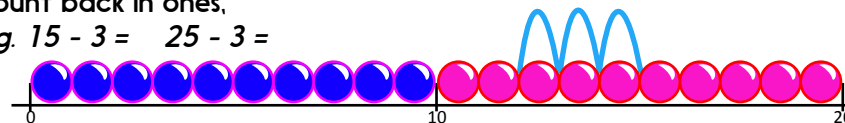
Count back in 1s/Count back in 10s.  
Say one less than any number to 100.  
Say 10 less without counting back in ones.

$$33 - 10 = 23$$

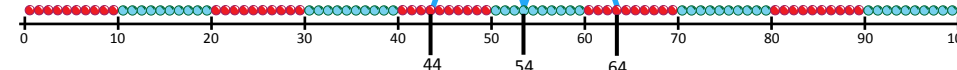
1	2	3	4	5
11	12	13	14	15
21	22	23	24	25
31	32	33	34	35
41	42	43	44	45

### Subtracting by taking away

Count back in ones,  
e.g.  $15 - 3 =$   $25 - 3 =$



Count back in tens.

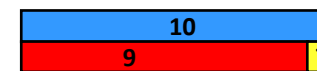


### Using number facts

'Story' of 4, 5, 6, 7, 8 and 9, e.g.  $7 - 1 = 6$ ,  $7 - 2 = 5$ ,  $7 - 3 = 4$ , etc.  
Number bonds to 10, e.g.  $10 - 1 = 9$ ,  $10 - 2 = 8$ ,  $10 - 3 = 7$ , etc.



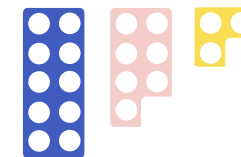
$$10 - \square = 7$$



$$10 - \square = 9$$

Missing number sentences,  $3 + [] = 7$ , link addition and subtraction.

Patterns using known facts,  
e.g.  $10 - 7 = 3$  so we know  $30 - 7 = ?$



Addition and subtraction are inverse operations. Right from the start children should be taught these as related operations. There are four number sentences (two using + and two using -) which can be written to express the relationship between 4 and 6 and 10. It is key to a good understanding of addition and subtraction that  $6 + [] = 10$  and  $10 - 6 = []$  are seen as ways of expressing the same question.

## + Addition

### Using place value

Know 1 more or 10 more than any number, e.g. 1 more than 67 or 10 more than 85.

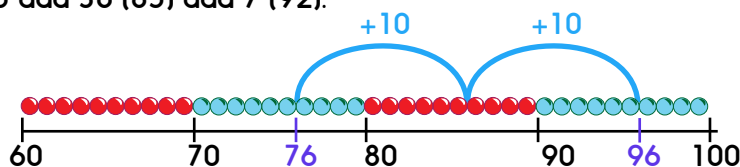
Partitioning, e.g.  $55 + 37$  as  $50 + 30$  and  $5 + 7$  finally combining the two totals:  $80 + 12$ .

$$\begin{array}{r} 50 + 30 = 80 \\ 5 + 7 = 12 \\ \hline 80 + 12 = 92 \end{array}$$

Bead strings and 1-100 number grid help counting on/back in tens.

### Counting on

Add ten and multiples of ten, e.g.  $76 + 20$  as  $76, 86, 96$  or in one hop  $76 + 20 = 96$ . Add two 2-digit numbers by counting on in tens and then in ones, e.g.  $55 + 37$  as  $55$  add  $30$  ( $85$ ) add  $7$  ( $92$ ).

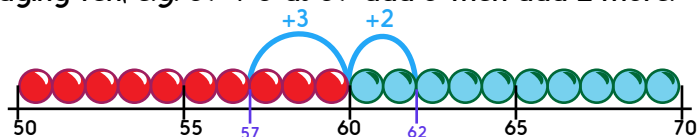


Add near multiples, e.g.  $46 + 19$  or  $63 + 21$ .

### Using number facts

Know pairs of numbers which make the numbers up to and including 10, e.g.  $8 = 4 \& 4, 3 \& 5, 2 \& 6, 1 \& 7$  and  $10 = 5 \& 5, 4 \& 6, 3 \& 7, 2 \& 8, 1 \& 9, 0 \& 10$ . Patterns of known facts, e.g.  $6 + 3 = 9$ , so we know  $36 + 3 = 39, 66 + 3 = 69, 53 + 6 = 59$ .

Bridging ten, e.g.  $57 + 5$  as  $57$  add  $3$  then add  $2$  more.



Adding three or more single-digit numbers, spotting bonds to 10 or doubles, e.g.  $6 + 7 + 4 + 2$  as  $10 + 7 + 2$ .

Missing number sentences,  $3 + [] = 7$ , link addition and subtraction.

## - Subtraction

### Using place value

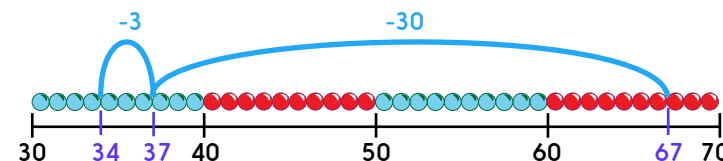
Know 1 less or 10 less than any number, e.g. 1 less than 74 or 10 less than 82.

Partitioning, e.g.  $55 - 32$  as  $50 - 30$  and  $5 - 2$  combining the answers:  $20 + 3$ .

$$\begin{array}{r} 50 - 30 = 20 \\ 5 - 2 = 3 \\ \hline 55 - 32 = 23 \end{array}$$

### Taking away

Subtract ten and multiples of ten, e.g.  $76 - 20$  as  $76, 66, 56$  or in one hop  $76 - 20 = 56$ . Subtract two 2-digit numbers by counting back in tens then in ones, e.g.  $67 - 33$  as  $67$  subtract  $30$  ( $37$ ) then count back  $3$  ( $34$ ).

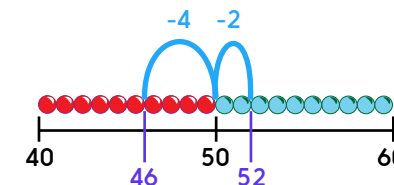


Subtracting near multiples, e.g.  $74 - 21$  or  $57 - 19$ .

### Using number facts

Know pairs of numbers which make the numbers up to and including 10, e.g.  $10 - 6 = 4, 8 - 3 = 5, 5 - 2 = 3$ , etc. Patterns of known facts, e.g.  $9 - 6 = 3$ , so we know  $39 - 6 = 33, 69 - 6 = 63, 89 - 6 = 83$ .

Bridge ten, e.g.  $52 - 6$  as  $52$  subtract  $2$  then subtract  $4$  more.



### Counting up

Find a difference between two numbers on a line, e.g.  $51 - 47$ .



Addition and subtraction are inverse operations. Right from the start children should be taught these as related operations. There are four number sentences (two using + and two using -) which can be written to express the relationship between 4 and 6 and 10. It is key to a good understanding of addition and subtraction that  $6 + [] = 10$  and  $10 - 6 = []$  are seen as ways of expressing the same question.

## + Written Addition

### Written methods

Build on partitioning to develop expanded column addition with two 3-digit numbers.

$$\begin{array}{r} 400 \quad 60 \quad 6 \\ + 300 \quad 50 \quad 8 \\ \hline 700 \quad 110 \quad 14 \end{array}$$

Expanded column addition with 'carrying'.

$$\begin{array}{r} 400 \quad 60 \quad 6 \\ + 300 \quad 50 \quad 8 \\ \hline 100 \quad 10 \\ \hline 800 \quad 20 \quad 4 \end{array}$$

Compact column addition with two or more 3-digit numbers or towers of 2-digit numbers.

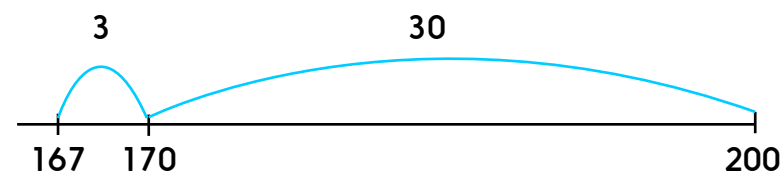
$$\begin{array}{r} 347 \\ + 286 \\ + 495 \\ \hline 21 \\ \hline 1128 \end{array}$$

Compact column addition with 3-digit numbers

Recognise fractions which add to 1, e.g.  $\frac{1}{4} + \frac{3}{4}$  or  $\frac{2}{5} + \frac{3}{5}$ .

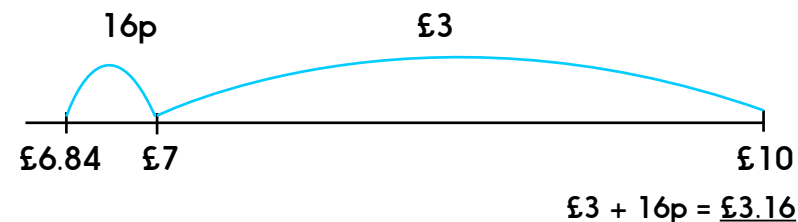
## - Written Subtraction

Develop counting up subtraction.



Counting up subtraction is a crucial mental strategy.

Use counting up subtraction to find change from £1 and £10.



Recognise complements of any fraction to 1, e.g.  $1 - \frac{1}{4} = \frac{3}{4}$  or  $1 - \frac{2}{3} = \frac{1}{3}$ .

Important to see the visual image of fractions totalling one whole.

Addition and subtraction are inverse operations. Right from the start children should be taught these as related operations. There are four number sentences (two using + and two using -) which can be written to express the relationship between 4 and 6 and 10. It is key to a good understanding of addition and subtraction that  $6 + [] = 10$  and  $10 - 6 = []$  are seen as ways of expressing the same question.

## + Addition

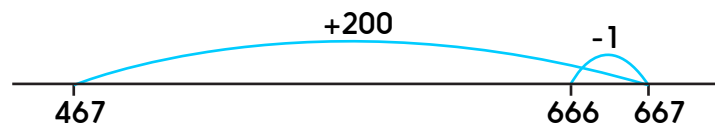
### Using place value

Count in thousands, e.g. knowing  $475 + 200$  as 475, 575, 675.  
Partitioning, e.g.  $746 + 203$  as  $700 + 200$  and  $46 + 3$   
or  $134 + 707$  as  $130 + 700$  and  $4 + 7$ .

PV and number facts are central to mental strategies.

### Counting on

Add 2-digit numbers by adding the multiple of ten then the ones, e.g.  $67 + 55$  as 67 add 50 (117) add 5 (122).  
Add near multiples of 10, 100 and 1000, e.g.  $467 + 199$  or  $3462 + 2999$ .



Count on to add 3-digit numbers and money, e.g.  $463 + 124$  as  $463 + 100$  (563) + 20 (583) + 4 = 587 or  $£4.67 + £5.30$  as  $£9.67$  add 30p.

### Using number facts

Number bonds to 100 and to next multiple of 100, e.g.  $463 + 37$ ,  $1353 + 47$ .

Number bonds to £1 and to the next whole pound, e.g.  $£3.45 + 55p$ .  
Add to the next whole number, e.g.  $4.6 + 0.4$  or  $7.2 + 0.8$ .

Counting up is essential for money calculations and, later, decimals.

## - Subtraction

### Taking away

Use place value to subtract, e.g.  $4748 - 4000$  or  $4748 - 8$ , etc.

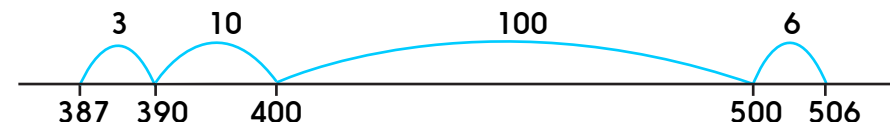
Take away multiples of 10, 100, 1000, £1, 10p or 0.1, e.g.  $8392 - 50$  or  $6723 - 3000$  or  $£3.74 - 30p$  or  $5.6 - 0.2$ .

Partitioning, e.g.  $£5.87 - £3.04$  as  $£5 - £3$  and  $7p - 4p$  or  $7493 - 2020$  as  $7000 - 2000$  and  $90 - 20$ .

Count back, e.g.  $6482 - 1301$  as  $6482 - 1000$ , then  $- 300$ , then  $- 1$  (5181).  
Subtract near multiples, e.g.  $3522 - 1999$  or  $£34.86 - £19.99$ .

### Counting up

Find a difference between two numbers by counting up from the smaller to the larger, e.g.  $506 - 387$ .



$100 + 10 + 6 + 3 = \underline{119}$

### Using number facts

Number bonds to 10, 100 and derived facts, e.g.  $100 - 76 = 24$ ,  $1.0 - 0.6 = 0.4$ .

100	
76	24

Number bonds to £1 and £10, e.g.  $£1.00 - 86p = 14p$  or  $£10 - £3.40 = £6.60$ .

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### + Written Addition

Build on expanded column addition to develop compact column addition with larger numbers.

$$\begin{array}{r} 1000 \ 400 \ 60 \ 8 \\ + 4000 \ 800 \ 60 \ 6 \\ \hline 1000 \ 100 \ 10 \\ \hline 6000 \ 300 \ 30 \ 4 \end{array}$$

Expanded methods firm up a robust understanding of place value.

Compact column addition with larger numbers.

$$\begin{array}{r} 5347 \\ 2286 \\ + 1495 \\ \hline 121 \\ \hline 9128 \end{array}$$

Use expanded and compact column addition to add amounts of money, e.g.  $\pounds 3.24 + \pounds 2.58$ .

$$\begin{array}{r} \pounds 3 \ 20\text{p} \ 4\text{p} \\ \pounds 2 \ 50\text{p} \ 8\text{p} \\ \hline \pounds 5 \ 70\text{p} \ 12\text{p} \ \pounds 5.82 \end{array} \qquad \begin{array}{r} \pounds 3.24 \\ + \pounds 2.58 \\ \hline \pounds 5.82 \end{array}$$

Add like fractions, e.g.  $\frac{3}{8} + \frac{1}{8} + \frac{1}{8}$ .

### - Written Subtraction

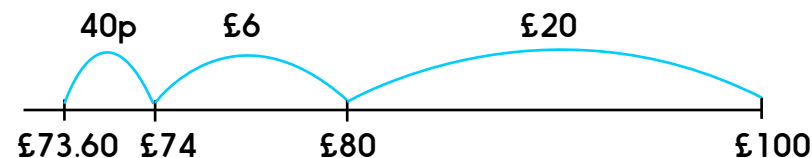
Expanded column subtraction.

$$\begin{array}{r} 600 \ 110 \ 16 \\ \cancel{700} \ \cancel{20} \ \cancel{6} \\ - 300 \ 50 \ 8 \\ \hline 300 \ 60 \ 8 \end{array}$$

Begin to use column subtraction.

$$\begin{array}{r} 6 \ 11 \ 16 \\ - 3 \ 5 \ 8 \\ \hline 3 \ 6 \ 8 \end{array}$$

Use counting up subtraction to find change from  $\pounds 10$ ,  $\pounds 20$ ,  $\pounds 50$  and  $\pounds 100$ , e.g.  $\pounds 100 - \pounds 73.60$ .



$$\pounds 20 + \pounds 6 + 40\text{p} = \pounds 26.40$$

Subtract like fractions, e.g.  $\frac{3}{8} - \frac{1}{8} = \frac{2}{8}$ .

Stress that decimals and fractions are parts of a whole.

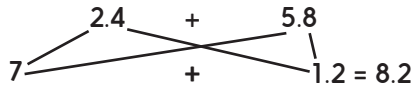
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**+ Addition**

**Using place value**

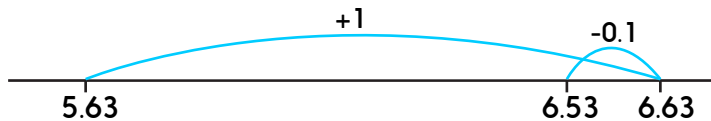
Count in 0.1s, 0.01s, e.g. knowing what 0.1 more than 0.51 is.

Partitioning, e.g.  $2.4 + 5.8$  as  $2 + 5$  and  $0.4 + 0.8$  and combine the totals:  $7 + 1.2 = 8.2$ .



**Counting on**

Add two decimal numbers by adding the ones then the tenths/hundredths, e.g.  $5.72 + 3.05$  as 5.72 add 3 (8.72) then add 0.05 (8.77).  
Add near multiples of 1, e.g.  $6.34 + 0.99$  or  $5.63 + 0.9$ .

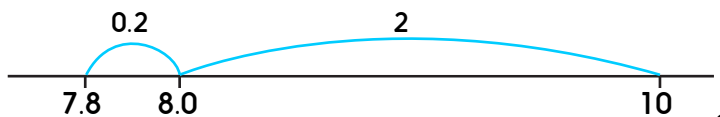


Count on from large numbers, e.g.  $6834 + 3005$  as  $9834 + 5$ .

**Using number facts**

Number bonds to 1 and to the next whole number, e.g.  $0.4 + 0.6$  or  $5.7 + 0.3$ .

Add to the next ten from a decimal number, e.g.  $7.8 + 2.2 = 10$ .



$2 + 0.2 = 2.2$

Subtracting by counting up is much less error prone.

Knowledge of number bonds underpins mental strategies.

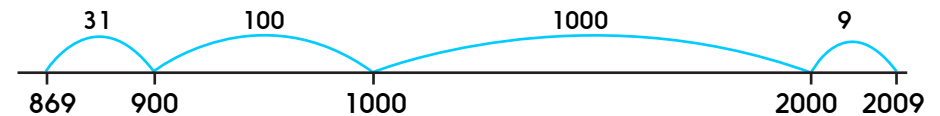
**- Subtraction**

**Taking away**

Using place value to subtract decimals, e.g.  $4.58 - 0.08$  or  $6.26 - 0.2$ , etc.  
Take away multiples of powers of 10, e.g.  $15,672 - 300$  or  $4.82 - 2$  or  $2.71 - 0.5$  or  $4.68 - 0.02$ .  
Partition or count back, e.g.  $3964 - 1051$  or  $5.72 - 2.01$ .  
Subtract near multiples, e.g.  $86,456 - 9999$  or  $3.58 - 1.99$ .

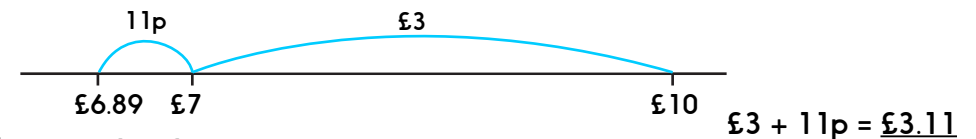
**Counting up**

Find a difference between two numbers by counting up from the smaller to the larger, e.g.  $2009 - 869$ .



$1000 + 100 + 31 + 9 = 1140$

Find change using shopkeepers' addition, e.g. buy toy for £6.89 using £10.



**Using number facts**

Derived facts from number bonds to 10 and 100, e.g.  $2 - 0.45$  using  $45 + 55 = 100$  or  $3.00 - 0.86$  using  $86 + 14 = 100$ .

100	
86	14

Number bonds to £1, £10 and £100, e.g.  $£4.00 - £3.86p = 14p$  or  $£100 - £66$  using  $66 + 34 = £100$ .

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## + Written Addition

Expanded column addition for money leading to compact column addition for adding several amounts of money.

$$\begin{array}{r}
 \text{£}14 \quad 60\text{p} \quad 4\text{p} \\
 \text{£}28 \quad 70\text{p} \quad 8\text{p} \\
 + \text{£}12 \quad 20\text{p} \quad 6\text{p} \\
 \text{£}1 \quad 10\text{p} \\
 \hline
 \text{£}55 \quad 60\text{p} \quad 8\text{p} \quad \text{£}55.68
 \end{array}$$

Expanded version first embeds understanding of place value.

Compact column addition to add pairs of 5-digit numbers.

Continue to use column addition to add towers of several larger numbers.

Use compact addition to add decimal numbers with up to two places.

$$\begin{array}{r}
 15.68 \\
 + 27.86 \\
 \hline
 11.1 \\
 \hline
 43.54
 \end{array}$$

Adding fractions with related denominators, e.g.  $\frac{1}{4} + \frac{3}{8} = \frac{5}{8}$ .

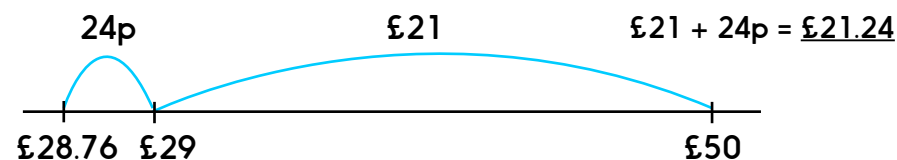
Equivalent fractions are the basis for + and - fractions.

## - Written Subtraction

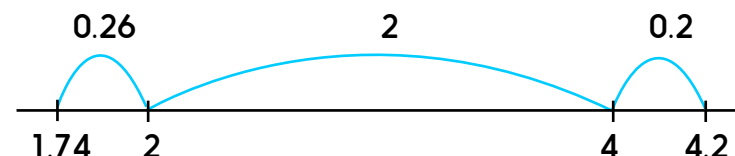
Compact column subtraction for numbers with up to 5 digits, e.g.  $16,324 - 8516$ .

$$\begin{array}{r}
 0 \quad 15 \quad 13 \quad 1 \quad 14 \\
 - \cancel{1} \quad \cancel{6} \quad \cancel{3} \quad 2 \quad 4 \\
 \hline
 8 \quad 5 \quad 1 \quad 6 \\
 \hline
 7 \quad 8 \quad 0 \quad 8
 \end{array}$$

Continue to use counting up subtraction for subtractions involving money, including finding change or, e.g.  $\text{£}50 - \text{£}28.76$ .



Use counting up subtraction to subtract decimal numbers, e.g.  $4.2 - 1.74$ .



$$2 + 0.26 + 0.2 = \underline{2.46}$$

Subtracting fractions with related denominators, e.g.  $1\frac{1}{4} - \frac{3}{8}$  as  $1\frac{2}{8} - \frac{3}{8}$  or  $1\frac{0}{8} - \frac{3}{8} = \frac{5}{8}$ .



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## + Addition

### Using place value

Count in 0.1s, 0.01s, 0.001s, e.g. knowing what 0.001 more than 6.725 is.  
Partitioning, e.g.  $9.54 + 3.25$  as  $9 + 3$  and  $0.5 + 0.2$  and  $0.04 + 0.05$  to get 12.79.

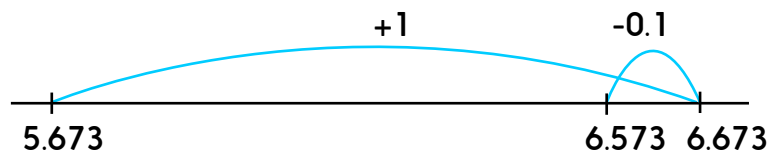
10s	1s	.	0.1s	$\frac{1}{10}$ s	0.01s	$\frac{1}{100}$ s
	9	.	5		4	
	3	.	2		5	
1	2	.	7		9	

Subtracting by counting up is much less error prone.

### Counting on

Add two decimal numbers by adding the ones then the tenths/hundredths or thousandths, e.g.  $6.314 + 3.006$  as 6.314 add 3 (9.314) then add 0.006 (9.32).

Add near multiples of 1, e.g.  $6.345 + 0.999$  or  $5.673 + 0.9$ .



Count on from large numbers, e.g.  $16,375 + 12,003$ .

### Using number facts

Number bonds to 1 and to the next multiple of 1, e.g.  $0.63 + 0.37$  or  $2.355 + 0.645$ .  
Add to next ten, e.g.  $4.62 + 0.38$ .

5	
4.62	?

Knowledge of number bonds underpins mental strategies.

## - Subtraction

### Taking away

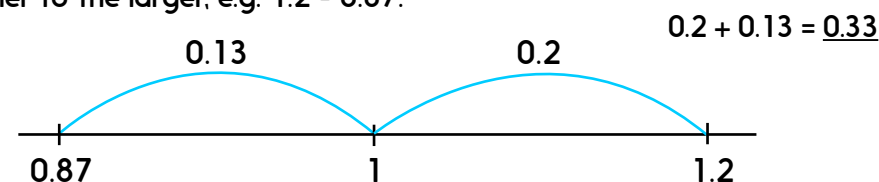
Use place value to subtract decimals, e.g.  $7.782 - 0.08$  or  $16.263 - 0.2$ , etc.  
Take away multiples of powers of 10, e.g.  $132,956 - 400$  or  $686,109 - 40,000$  or  $7.823 - 0.5$ .

Partition or count back, e.g.  $3964 - 1051$  or  $5.72 - 2.01$ .

Subtract near multiples, e.g.  $360,078 - 99,998$  or  $12.831 - 0.99$ .

### Counting up

Count up to subtract numbers from multiples of 10, 100, 1000, 10,000  
Find a difference between two decimal numbers by counting up from the smaller to the larger, e.g.  $1.2 - 0.87$ .



### Using number facts

Derived facts from number bonds to 10 and 100, e.g.  $0.1 - 0.075$  using  $75 + 25 = 100$  or  $5 - 0.65$  using  $65 + 35 = 100$ .

Number bonds to £1, £10 and £100, e.g.  $£7.00 - £4.37$  or  $£100 - £66.20$  using  $20p + 80p = £1$  and  $£67 + £33 = £100$ .

£100	
£67	£33

Addition and subtraction are inverse operations. Right from the start children should be taught these as related operations. There are four number sentences (two using + and two using -) which can be written to express the relationship between 4 and 6 and 10. It is key to a good understanding of addition and subtraction that  $6 + [] = 10$  and  $10 - 6 = []$  are seen as ways of expressing the same question.

## + Written Addition

Compact column addition for adding several large numbers and decimals with up to two places.

Compact column addition with money.

$\pounds 14.64$	$\pounds 14$	$60\text{p}$	$4\text{p}$	
$\pounds 28.78$	$\pounds 28$	$70\text{p}$	$8\text{p}$	
$+$ $\pounds 12.26$	$+$ $\pounds 12$	$20\text{p}$	$6\text{p}$	
<u><math>11.1</math></u>	<u><math>\pounds 1</math></u>	<u><math>10\text{p}</math></u>		
$\pounds 55.68$	$\pounds 55$	$60\text{p}$	$8\text{p}$	$\pounds 55.68$

Adding fractions with unlike denominators,

e.g.  $\frac{3}{4} + \frac{1}{3} = 1 \frac{1}{12}$  or  $2 \frac{1}{4} + 1 \frac{1}{3} = 3 \frac{7}{12}$

$$\begin{aligned} \frac{3}{4} + \frac{1}{3} &= \frac{9}{12} + \frac{4}{12} \\ &= \frac{13}{12} \\ &= 1 \frac{1}{12} \end{aligned}$$

Children must be able to do expanded as well as compact to show understanding.

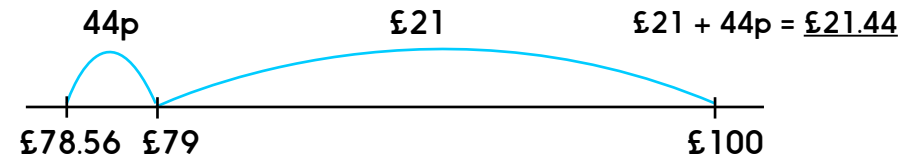
Understanding equivalent fractions is absolutely key here.

## - Written Subtraction

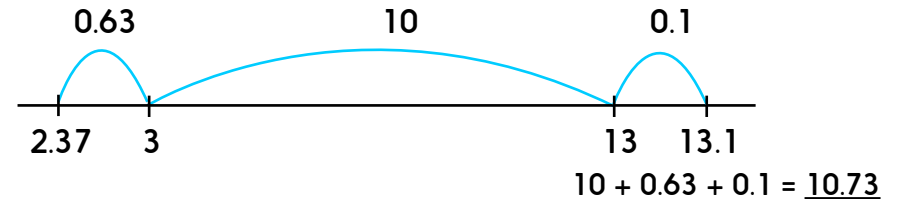
Compact column subtraction for large numbers.

$$\begin{array}{r} 214715 \\ - 34688 \\ \hline 16458 \\ \hline 18227 \end{array}$$

Use counting up subtraction when dealing with money, e.g.  $\pounds 100 - \pounds 78.56$  or  $\pounds 45.23 - \pounds 27.57$ .



Use counting up subtraction to subtract decimal numbers, e.g.  $13.1 - 2.37$ .



Subtracting fractions with unlike denominators,

$$\begin{aligned} \text{e.g. } 1\frac{1}{4} - \frac{2}{3} &= \frac{5}{4} - \frac{2}{3} \\ &= \frac{15}{12} - \frac{8}{12} \\ &= \frac{7}{12} \end{aligned}$$