Hamilton Overview of Calculation Methods and Strategies – Addition and Subtraction DRAFT

Mental Addition

Year 1

Using Place value

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

23 + 10

1	2	3	4	5	6	7	8
11	12	13	14	15	16	17	18
21	22	23	24	25	26	27	
31	32	33	34	35	36	37	
41							

Counting on

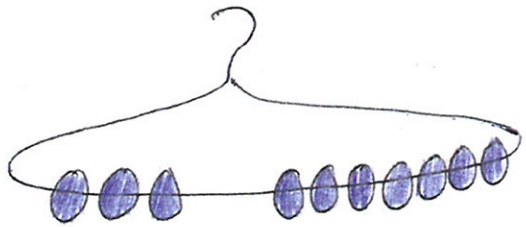
Count on in ones, *e.g. 11 + 2 =* *7 + 4 =*

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*



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

Year 2

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*

50 + 30 = 80

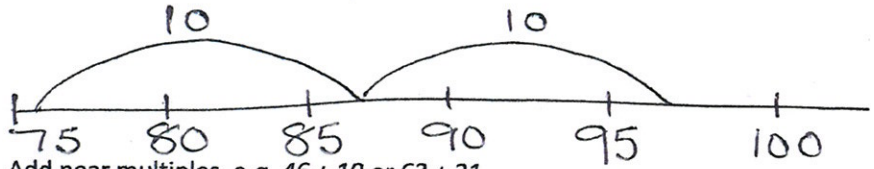
5 + 7 = 12

80 + 12 = 92

Counting on

Add ten and multiples of ten, *e.g. 76 + 20 as 76, 86, 96 or in one hop 76 + 20*

Add two 2-digit numbers by counting on in tens then in ones,
e.g. 55 + 37 as 55 add 30 (85) add 7 (92)



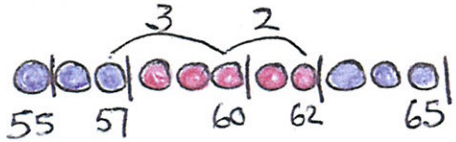
Add near multiples, e.g. *46 + 19 or 63 + 21*

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*

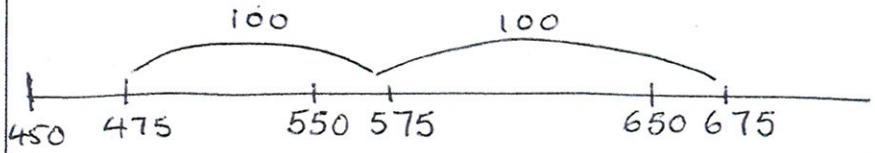
Hamilton Overview of Calculation Methods and Strategies – Addition and Subtraction DRAFT

Mental Addition

Year 3

Using Place value

Count in hundreds, *e.g. knowing 475 + 200 as 475, 575, 675*



Add multiples of 10, 100 and £1, *e.g. 746 + 200 or 746 + 40 or £6.34 + £5 as £6 + £5 and 34p*

Partitioning, e.g. *68 + 74 as 60 + 70 and 8 + 4 and combine the totals: 130 + 12 = 142 or £8.50 + £3.70 as £8 + £3 and 50p +70p and combine: £11 + £1.20*

Counting on

Add two 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 and 100, *e.g. 67 + 39 or 364 + 199*

Count on from 3-digit nos, *e.g. 247 + 34 as 247 + 30 (277) then 277 + 4 = 281*

Using number facts

Number bonds to 100, *e.g. 35 + 65, 46 + 54, 73 + 27, etc.*

Add to next ten and next hundred, *e.g. 176 + 4 = 180, 435 + 65 = 500, etc.*

Year 4

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

Counting on

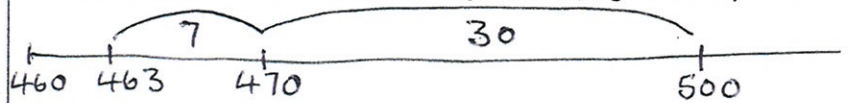
Add two 2-digit numbers by adding the multiple of ten then the ones, *e.g. 67 + 55 as 67 add 50 (117) add 5 (122)*

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 next whole number, *e.g. 4.6 + 0.4, 7.2 + 0.8*

Written Addition

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

	400	60	6
+300		50	8
	700	110	14

Expanded column addition with 'carrying'

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

400	60	6
+300	50	8
100	10	
800	20	4

347
286
495
21
1128

Compact column addition with 3-digit and 4-digit numbers

Recognise fractions which add to 1, *e.g. ¼ + ¾ or $^2/_5 + ^3/_5$*

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

1000	400	60	6
+4000	800	60	8
1000	100	10	
6000	300	30	4

Compact column addition with larger numbers.

Use expanded and compact column addition to add amounts of money.

5347
2286
+1495
121
9128

Add like fractions, *e.g. $^3/_8 + ^1/_8 + ^1/_8$*

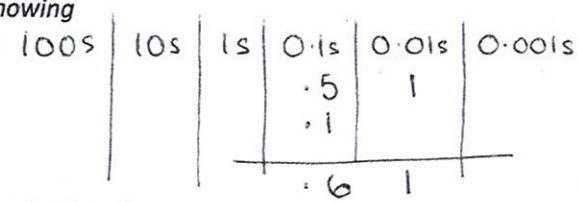
Hamilton Overview of Calculation Methods and Strategies – Addition and Subtraction DRAFT

Mental Addition

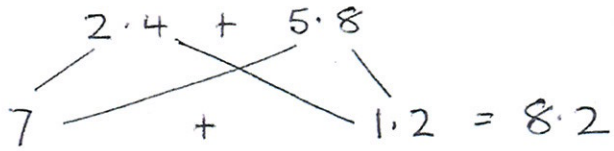
Year 5

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*

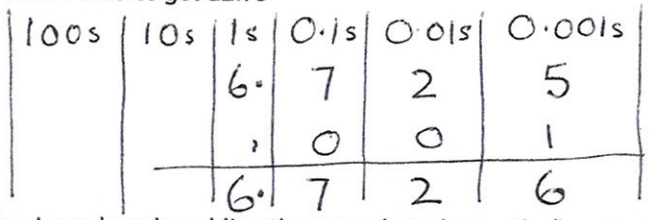
Add to next ten from a decimal number, *e.g. 7.8 + 2.2 = 10*

Year 6

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*



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)*

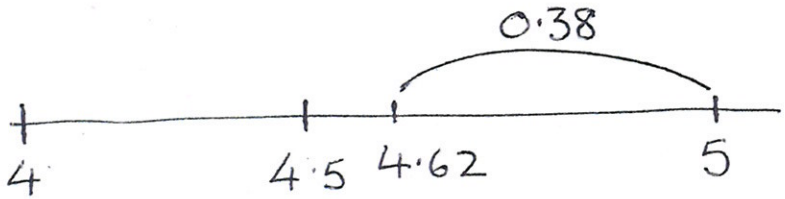
Add near multiples of 1, *e.g. 6.345 + 0.999 or 5.673 + 0.9*

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

Using number facts

Number bonds to 1 and to 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*



Hamilton Overview of Calculation Methods and Strategies – Addition and Subtraction DRAFT

	Year 5	Year 6
Written Addition	Expanded column addition for money leading to compact column addition for adding several amounts of money 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 Adding fractions with related denominators, *e.g.* $\frac{1}{4} + \frac{3}{8} = \frac{5}{8}$	Compact column addition for adding several large numbers and decimal numbers with up to two places Compact column addition with money Add fractions with unlike denominators, *e.g.* $\frac{3}{4} + 1/3 = 1\ 1/12$ *or* $13/12$ $2\frac{1}{4} + 1\ 1/3 = 3\ 7/12$

£14 60p 4p
£28 70p 8p
+ £12 20p 6p
£1 10p
£55 60p 8p

15.68
+27.86
11.1
43.54

£14·64
+ £28·78
£12·26
11·1
£55·68

Hamilton Overview of Calculation Methods and Strategies – Addition and Subtraction DRAFT

Mental Subtraction

Year 1

Using Place value

Count back in ones / Count back in tens, *e.g. knowing 53 – 1 or 53 – 10 without counting back in ones*

33 – 10

1	2	3	4	5	6
11	12	13	14	15	16
21	22	23	24	25	26
31	32	33	34	35	

Taking away

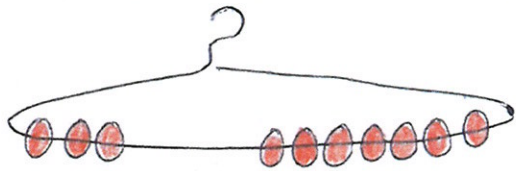
Count back in ones, *e.g. 11 – 3 =* *15 – 4 =*

Count back in tens, *e.g. 53 – 20 as 53, 43, 33*

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.*



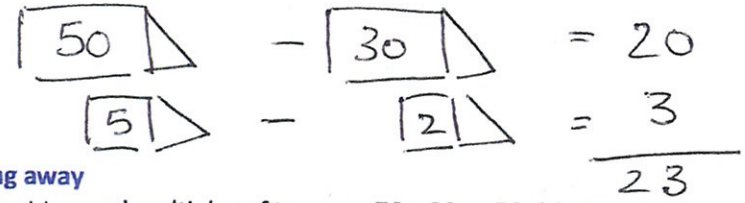
Patterns using known facts, *e.g. 7 – 3 = 4 so we know 27 – 3 =, 47 – 3 =, 77 – 4 =, etc.*

Year 2

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*



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)

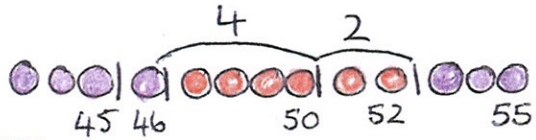
Subtracting near multiples, *e.g. 74 – 21 or 57 – 19*

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*

Hamilton Overview of Calculation Methods and Strategies – Addition and Subtraction DRAFT

Mental Subtraction

Year 3

Taking away

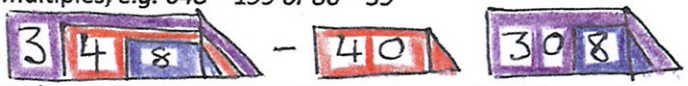
Use place value to subtract, *e.g. 348 – 300 or 348 – 40 or 348 – 8*

Taking away multiples of 10, 100 and £1, *e.g. 476 – 40 = 436, 476 – 300 = 176, £4.76 – £2 = £2.76*

Partitioning, e.g. *68 – 42 as 60 – 40 and 8 – 2 or £6.84 – £2.40 as £6 – £2 and 80p – 40p*

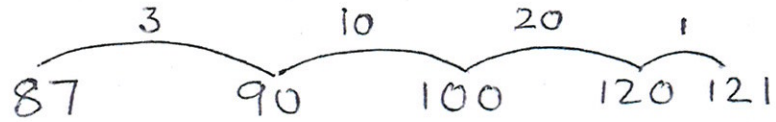
Count back in hundreds, tens then ones, *e.g. 763 – 121 as 763 – 100 (663) then subtract 20 (643) then subtract 1 (642)*

Subtract near multiples, *e.g. 648 – 199 or 86 – 39*



Counting up

Find a difference between two numbers by counting up from the smaller to the larger, *e.g. 121 – 87*



Using number facts

Number bonds to 100, *e.g. 100 – 35 = 65, 100 – 48 = 52, etc.*

Year 4

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*

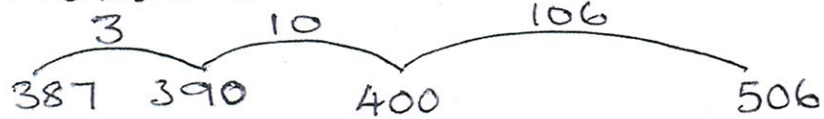
Partitioning, e.g. *£5.87 – £3.04 as £5 – £3 and 7p – 4p or 7493 – 2020 as 7000 – 2000 and 90 – 20*

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*



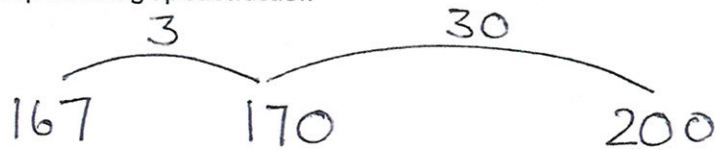
Using number facts

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

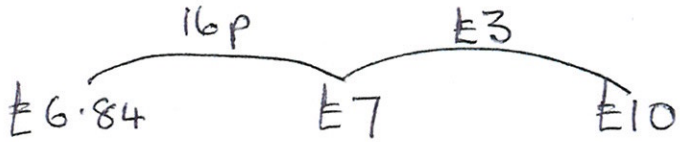
Number bonds to £1 and £10, *e.g. £1.00 – 86p = 14p or £10 – £3.40 = £6.60*

Written Subtraction

Develop counting up subtraction



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



Recognise complements of any fraction to 1, *e.g. 1 – ¼ = ¾ or 1 – ²/₃ = ¹/₃*

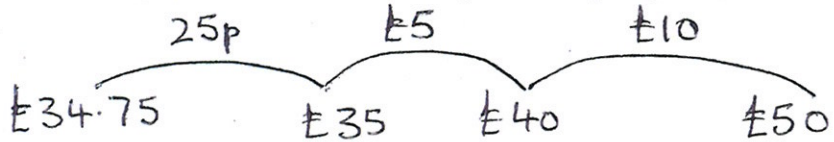
Expanded column subtraction

	600	110	16
	~~700~~	~~20~~	~~6~~
–	300	50	8
	300	60	8

Begin to use compact column subtraction

	6	11	16
	~~7~~	~~2~~	~~6~~
–	3	5	8
	3	6	8

Use counting up subtraction to find change from £10, £20, £50 and £100



Subtract like fractions, *e.g. ³/₈ – ¹/₈ = ²/₈*

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Mental Subtraction

Year 5

Taking away

Use place value to subtract decimals, *e.g. 4.58 – 0.08 or 6.26 – 0.2, etc.*

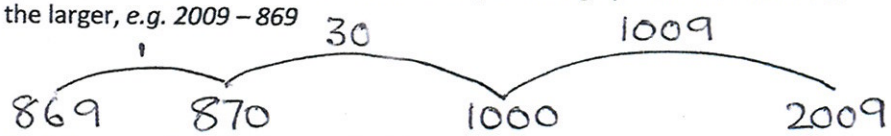
Take away multiples of powers of 10, *e.g. 15,672 – 300 or 4.82 – 2 or 2.71 – 0.5 or 4.68 – 0.02*

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*



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*

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

Year 6

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*

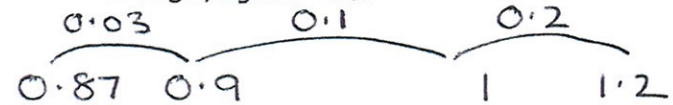
Partition or count back, *e.g. 3964 – 1051 or 5.72 – 2.01*

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*

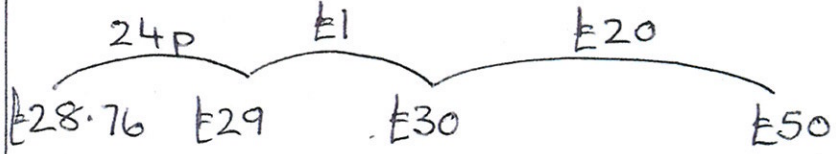
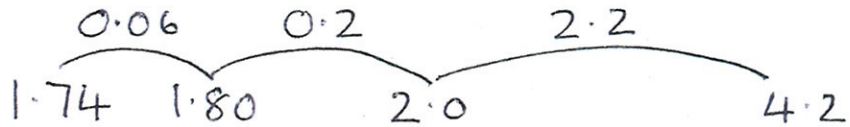
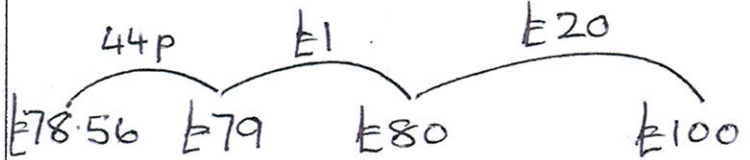
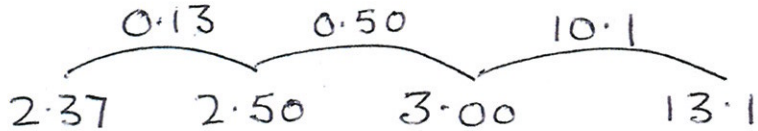


Using number facts

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.*

Hamilton Overview of Calculation Methods and Strategies – Addition and Subtraction DRAFT

	Year 5	Year 6
Written Subtraction	Compact column subtraction for numbers with up to 5 digits 0 15 13 1 14 ~~1~~ ~~6~~ ~~3~~ ~~2~~ ~~4~~ − 8 5 1 6 7 8 0 8 Continue to use counting up subtraction for subtractions involving money, including finding change or, *e.g. £50 - £28.76*  Use counting up subtraction to subtract decimal numbers, *e.g. 4.2 – 1.74*  Subtracting fractions with like denominators, *e.g. 1¼ - ⅜ as 1²/₈ - ³/₈ or* $^{10}/_{8} - {}^{3}/_{8} = {}^{7}/_{8}$	Compact column subtraction for large numbers 2 14 7 15 ~~3~~ ~~4~~ 6 ~~8~~ ~~5~~ − 1 6 4 5 8 1 8 2 2 7 Use counting up subtraction when dealing with money, *e.g. £100 – £78.56 or £45.23 – £27.57*  Use counting up subtraction to subtract decimal numbers, *e.g. 13.1 – 2.37*  Subtracting fractions with unlike denominators, *e.g. 1¼ - ²/₃ as 1³/₁₂ - ⁸/₁₂ or* $^{15}/_{12} - {}^{8}/_{12} = {}^{7}/_{12}$