Hillside Primary Calculation Policy: ADDITION

FS	Calculating strand: ADDITION	Y1 MUST
SHOULD	• Find one more or one less than a number from 1 to 10 (FS) Select two groups of objects to make a given total of objects (FS) • Begin to relate addition to combining two groups of objects (FS) • In practical activities and discussion begin to use the vocabulary involved in adding (FS)	

methods	Vocabulary

methods

Show me five fingers. Use both hands.

22 – 36 Months

Begin to make comparisons between quantities

Use the language of quantity such as more and a lot

Knows that a group of things changes in quantity when something is added

30 – 50 Months

Separate a group of 3 or 4 objects in different ways, beginning to recognise that the total is still the same

Show an interest in number problems

Compare two groups of objects, saying when they have the same number

40 – 60 + Months

Find the total number of items in two groups by counting all of them

In practical activities, begin to use the vocabulary involved in adding

Begins to identify own mathematical problems based on own interests and fascinations

Use language such as 'more' or 'fewer" to compare two numbers

Early Learning goals

Say which number that is one more than a given number.

Using quantities and objects they add or subtract single digit numbers and count on or back to find the answer

Vocabulary

FS vocabulary for 'calculating' … add, more, and, make, sum, total, altogether, score, double, one more, two more, ten more..., how many more to make... ?, how many more is... than...? take (away), leave, how many are left/left over? ,how many have gone? one less, two less... ten less... how many fewer is... than...? difference between, is the same as

add, more, make, sum, and, sum, total, altogether, score, double, one more, two more, ten more, how many more to make…?, how many more is .. than…?

Test Questions

I am going to add one more cube to this set of these four cubes. How many cubes will there be then? ☐ ☐ ☐ ☐

-

(Count 5 pennies into a purse and shut it.
Show 2 more pennies in your hand.)
How many pennies are there altogether?

Hop three spaces on this number track. Now hop two more. Where are you now?

Count 5 small toys into this cloth bag. How many objects in the bag? Now count 2 more small toys into the bag.

What number is one more than five? You can use the cubes to help you.

(Make a set of jacket cards. Arrange them randomly on a table.

Find two jackets that have four buttons altogether. Are there any other possibilities?

There are four cups on the table.
Put two more cups on the table.
How many cups altogether are on the table now?

I have two toys in a box.

How many small toys in the bag now?	I add four more toys to the box. How many toys are there in the box now?

Year 1	**Number: ADDITION**	**FS COULD / Y2 MUST**
SHOULD	**Read ,write and interpret mathematical statements involving addition (+) and equals (=)** **Represent and use number bonds within 20** **Add one and two digit numbers to 20, including zero** **Solve one step problems that involve addition, using concrete objects and pictorial representations and missing number problems**	

Written Methods

Using visual representations and practical equipment such as number tracks and counters / cubes to solve simple calculations in addition. Record using own pictorial representations and simple number sentences. Understand and use the signs add, and equals.

1	2	3	4	5	6	7	8	9	10

3 + 2 = 5

Use the hundred square to support mental calculations and a range of number lines to support recording of written calculations
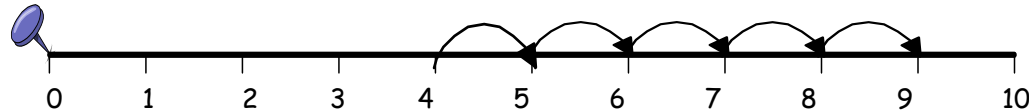
one digit number + one digit number 4 + 5 = 9
one digit number + two digit number or two-digit number + one-digit number 15 + 4 = 19
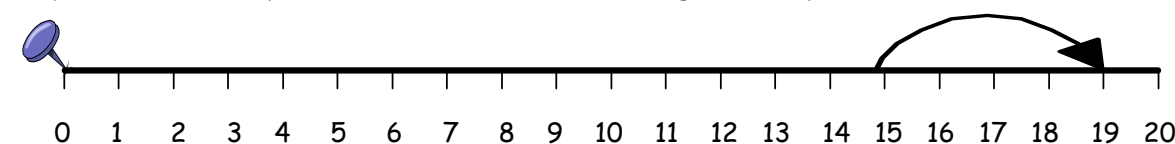multiple of 10 + one digit number 20 + 5 = 25
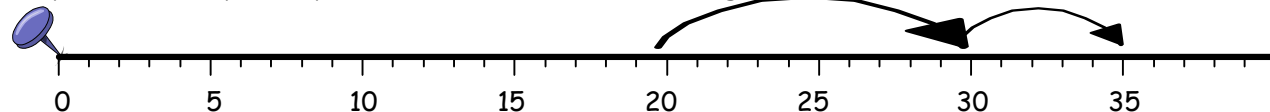multiple of 10 + two-digit number 20 + 15 = 35

Fully marked and fully numbered number line – counting on in ones (4 + 5 = 9)

0 1 2 3 4 5 6 7 8 9 10

Fully marked and fully numbered number line – counting on in steps of more than one (15 + 4 = 19)

0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20

Fully marked and partially numbered number line – counting on in steps of more than one (20 + 15 = 35)

0   5   10   15   20   25   30   35
40

Vocabulary

problem, solution, calculate, calculation, number sentence, answer, method, explain, money, coin, pence, penny, pound, pay, change, buy, sell, price, spend

+, add, more, plus make, sum, total, altogether , score, double, near double, one more, two more... ten more, how many more to make...? how many more is... than...? how much more is...?=, equals, sign, is the same as

Test Questions

Kay has these coins.

How much money has she altogether?
KS1 1996 level 2c

There are three people on the bus. One more gets on. How many people are on the bus now?
Use these cubes.
Show me how to work out the answer.
[oral question]

Write the total.
      7 + 3 + 8 + 2 =
KS1 2004 level 2c

Write numbers in the shapes to add to 12.

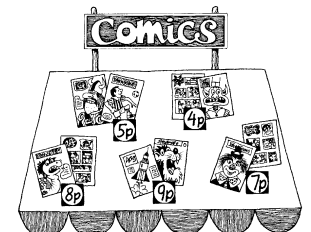Add these numbers:
5 and 6 and 2.
KS1 2001 level 2c [oral]

What is fifty-three add ten?
[oral question]

What is thirty-seven add five?(oral)

Write a number in the box to make this correct.
      2 + 8 = 6 + ☐
KS1 1999 level 2b

COMICS

Buy 2 different comics and spend 16p. Tick the 2 comics.

Year 2	Number: ADDITION	Y1 COULD / Y3 MUST

SHOULD	
	• **Solve problems with additon**
	• **Use concrete objects and pictorial representations**
	• **Apply increasing knowledge of mental and written methods**
	• **Recall and use addition bonds to 20**
	• **Use related facts up to 100**
	• **Add a two digit number and ones, a two digit number and tens, two two-digit numbers, three one-digit numbers**
	• **Show that addition can be done in any order**
	• **Recognise the inverse relationship between add and subtract**

Written Methods

+10   +10   +4

67   77   87   91
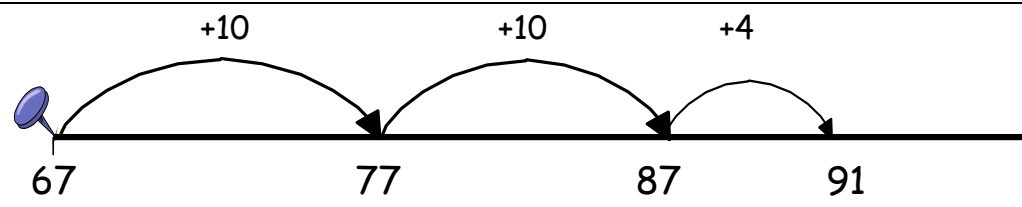
67 + 24 = 91

Using empty number line to record calculation strategies in addition and begin to record mental calculations using partitioning and recombining skills working with 2-digit numbers and extend to crossing the tens barrier.

? + 43 = 87
Calculate the value of the unknown using a 100 square. Count on in tens from 43 to 83 then count on in ones from 83 to 87.

Knowing and Using Number Facts Strand

Derive and recall all addition and subtraction facts for … each number to at

Vocabulary

calculate, calculation, inverse, answer, explain, method, sign, operation, symbol, number sentence, number line, mental calculation, written calculation, informal method, jottings, diagrams, pictures, images

+, add, addition, more, plus, make, sum, total altogether, score, double, near double, one more, two more... ten more... one hundred more, how many more to make...?, how many more is... than...?, how much more is...? =, equals, sign

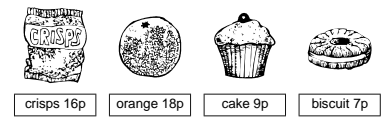is the same as, tens boundary, inverse

Test Questions

How much money is in the hand?

KS1 2000 level 2b

------------Janet spent 23p. Put a circle around the 2 items she bought.

crisps 16p   orange 18p   cake 9p   biscuit 7p

Work out the sum of 13 and 7.
KS1 2002 level 2c [oral]
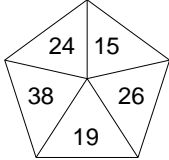

Add these three numbers: five and five and five.
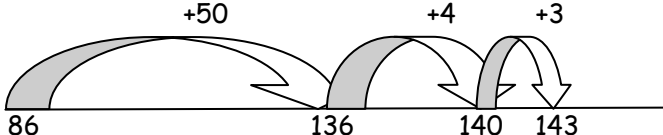KS1 2003 level 2c [oral]

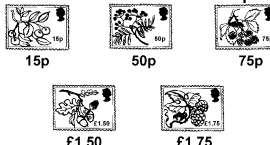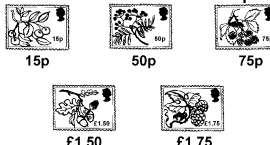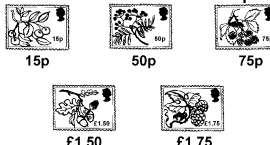Tim is thinking of a number. It is 10 more than 20. What number is Tim thinking of?
KS1 1999 level 2c [oral]

-Write a number in the box to make this correct.

2 + 8 = 6 + ☐

She used 3 coins to pay the 23p. Put a circle around each coin she used.

KS1 1997 level 2b

-------------Write four different numbers to make these correct.

$$\square + \triangle = 17$$
$$\diamond + \bigcirc = 17$$

KS1 2003 level 2c

KS1 1999 level 2b

-

Tick (✓) the two numbers which total 50.

24 | 15
38 | 26
19

KS1 2002 level 2a

-

Write the answer.
150 + 56 =
KS1 2005 level 3

Year 3	number: ADDITION	Y2 COULD / Y4 MUST
SHOULD	Add mentally a three-digit number and ones, a three digit number and tens, a three digit numbers and 100s Add up to three digits, using formal methods of columnar addition Estimate the answer, use the inverse to check Solve problems, including missing number problems, using number facts, place value and more complex addition	

Written Methods

For all methods, start with two digit numbers, extend to three digit numbers and continue to calculations with missing digits.

Using the empty number line to count on in multiples of 100, 10 and 1

+50   +4   +3

86   136   140 143

As soon as children are ready progress to the vertical expanded column method

Partitioning adding the **least significant digits** first, in preparation for the compact standard method, then recombining - in vertical format
86   3 6 7

Knowing and Using Number Facts Strand

Derive and recall all addition facts for each number to 20…

1 (0+1, 1+0, 20-19, 19-18, 18-17, 17-16, 16-15, 15-14, 14-13, 13-12, 12-11, 11-10, 10-9, 9-8, 8-7, 6-5, 5-4, 4-3, 3-2, 2-1, 1-0)

2 (0+2, 1+1, 2+0, 20-18, 19-17, 18-16, 17-15, 16-14, 15-13, 14-12, 13-11, 12-10, 11-9, 10-8, 9-7, 8-6, 7-5, 6-4, 5-3, 4-2, 3-1, 2-0)

and all numbers to 20

… sums of multiples of 10
0+100, 10+90, 20+80, 30+70, 40+60, 50+50, 60+40, 70+30,

Vocabulary

problem, solution, calculate, calculation, inverse, answer, method, explain, predict, estimate, reason, operation, symbol, number sentence, equation, mental calculation, written calculation, informal method, jottings, number line, pound (£), penny/pence (p), note, coin, units of measurement and their abbreviations

+, add, addition, more, plus, make, sum, total, altogether, score, double, near double, one more, two more... ten more... one hundred more, how many more to make ...?, how many more is... than ...?, how much more is...?=, equals, sign, is the same as ten boundary, hundreds boundary, inverse

Test Questions

Here is a set of stamps.

15p   50p   75p

£1.50   £1.75

What number must I add to thirty-six to make one hundred?
Y4 optional test 2003 Mental test level 3

+ 57	+ 4 9 7
13	1 4
130	1 5 0
143	7 0 0
	8 6 4

The NUMBER LINE method may continue to be used, only in a very few cases where it is appropriate for individual children.

80+20, 90+10, 100+0

...and number pairs that total 100
e.g. 51+49, 25+75, 83+17

David posts a parcel. It costs £1.90. He uses two of these stamps. Which two stamps does he use? KS2 1997 Paper B level 3

What is the sum of six, eight and nine? Y3 optional test 2003 Mental test level 3

What must be added to eighty-three to make one hundred? Y3 optional test 2003 Mental test level 3

In a large fish tank there are twenty-one red fish and nine blue fish. How many fish are there altogether? Y3 optional test 1998 Mental test level 3

Write the missing number in the box
456 + ☐ = 710

KS1 2003 level 3

What is the total of one hundred and twenty and seventy?
Y4 optional test 2003 Mental test level 3

Each side of this square must add up to 80.
Write in the missing numbers.

30	40	
		50
20	40	20

KS2 1998 Paper A level 3

Year 4	number: **ADDITION**	**Y3 COULD / Y5 MUST**

SHOULD	Add 4 digits using the formal method of addition where appropriate
	Estimate and use inverse operations to check answers to a calculation
	Solve addition two step problems in contexts, deciding which operation to use and why

Written Methods

Knowing and Using Number Facts Strand

Use knowledge of addition facts and use place value to derive sums and differences of pairs of multiples of 10

ThHTU + ThHTU adding **least significant** digits first. Where calculations are set out in columns use place value correctly (units under units, tens under tens…)

DECIMALS: Add two or more three-digit sums of money adjusting the pence / pounds.

```
  £ 4 . 2 1
+ £ 3 . 8 7
  £ 8 . 0 8
      1
```

Vocabulary

calculate, calculation, equation, operation, symbol, inverse, answer, method, explain, predict, reason, reasoning, pattern, relationship, decimal, decimal point, decimal place, pound (£), penny/pence (p), units of measurement and abbreviations, degrees Celsius

add, addition, more, plus, increase, sum, total, altogether, score, double, near double, how many more to make…? is the same as, equals, sign tens boundary, hundreds boundary, inverse

			Test Questions	

	By year 4 the majority of children must be using the compact formal column method
	
	   3 5 8
	 + 7 3
	 4 3 1
	  1 1
	
	Carried digits to placed under answer box
	
	Add several whole numbers with different numbers of digits.
	   8 3
	  2 5 6
	    4
	 + 5 7
	  4 0 0
	  2 2
			How much must I add to four pounds ninety to make six pounds?
			KS2 2003 Mental test level 3
			--- 	
			In a bag there are eighty-one red counters and thirty-seven yellow counters. How many counters are there altogether?
			Y5 optional test 1998 Mental test level 3
			--- 	
			These are the prices of sandwiches, drinks and fruit.
				Emma is 21 years old today. Her father is 24 years older. How old is Emma's father?
				KS1 2005 level 3 [oral]
				--- 	
				Add together thirty-eight, twenty-three and forty-four.
				KS2 1999 Mental test level 3
				--- 	
				Write what the two missing digits could be
				☐62 + ☐95 = 757
				KS2 1997 Paper A level 4
				--- 	
				Add together fifty-three, fifty-five and fifty-seven.
				KS2 2002 Mental test level 3
				--- 	
				Calculate 584 + 79.
				Y5 optional test 2003 Paper A level 3
				--- 	
				Circle three numbers which add to make 190.
				  10 30 50 70 90
				KS2 2001 Paper B level 3

Sandwiches		Drinks		Fruit	
ham	£1.45	milk	55p	apple	15p
tuna	£1.70	cola	45p	pear	20p
salad	£1.20	juice	65p	melon	25p

Shereen buys a tuna sandwich, milk and a pear. How much does she pay?

Mike has 80p to spend on a fruit and a drink. What two things can he buy for exactly 80p?

KS2 2004 Paper A level 3

Year 5	Calculating strand: ADDITION	Y4 COULD / Y6 MUST
SHOULD	• Add whole numbers with more than four digits, including using formal methods • Add increasingly large numbers mentally • Use rounding to check answers to calculations and determine levels of accuracy • Solve addition multistep problems	

	Written Methods		Vocabulary
Knowing and Using Number	ThHTU + ThHTU and more than 4 digits and decimals	DECIMALS: Add two or more decimal fractions	calculate, calculation, equation, operation, symbol, inverse, answer, method, strategy, explain, predict, reason, reasoning, pattern, relationship, decimal, decimal point, decimal place, estimate, approximate, pound (£), penny/pence (p),

Facts Strand	using a standard written method exchanging units, and tens, and hundreds	with up to 3 digits and the same number of decimal places.	units of measurement and abbreviations, degrees Celsius

Facts Strand

Use knowledge of place value and addition of two-digit numbers to derive sums of decimals… e.g.
6.5 ± 2.7

doubles of decimals… e.g.
double 0.34

using a standard written method exchanging units, and tens, and hundreds

Add several numbers with different numbers of digits.

```
  2 1 8 7
    6 7 1
    4 6 8
      5 8
+       9
  3 3 9 3
  1 2 3
```

with up to 3 digits and the same number of decimal places.

```
  7 2 . 5 Km
+ 5 4 . 6 Km
1 2 7 . 1 Km
        1
```

```
  2 . 3 5 Sec
+ 9 . 6 1 Sec
1 1 . 9 6 Sec
```

units of measurement and abbreviations, degrees Celsius

add, addition, more, plus, increase, sum, total, altogether
score, double, near double, how many more to make…? equals, sign, is the same as, tens boundary, hundreds boundary , units boundary, tenths boundary , inverse

Test Questions

What number is one hundred and ninety-nine more than four hundred and twenty-eight.
Y5 optional test 2003 Mental test level 4

The table shows the cost of coach tickets to different cities.

		Hull	York	Leeds
Adult	single	£12.50	£15.60	£10.25
	return	£23.75	£28.50	£19.30
Child	single	£8.50	£10.80	£8.25
	return	£14.90	£17.90	£14.75

What is the total cost for a return journey to York for one adult and two children?
How much more does it cost for two adults to make a single journey to Hull than to Leeds? KS2 2002 Paper B level 4

Write a number in the box to make this correct.

$$6.45 = 6 + 0.4 + \square$$

These tins show the amounts collected for a charity.

£3.45 £8.74 £7.96 £10.05 £9.38

What was the total amount collected?
Y5 optional test 1998 Paper B level 3

Add three point five to four point eight.
KS2 2000 Mental test level 4

Write in the missing digits.

```
  2 □ 8
+ 2 9 □
  5 5 5
```

KS2 1995 Paper B level 4

Write the same number in each box to make this correct.

$$\square + \square + \square = 10.5$$

Y5 optional test 2003 Paper A level 4

Year 6	number: ADDITION	Y5 COULD
SHOULD	Perform mental calculations , including with mixed operations and large numbers Use knowledge of the order of operations to carry out calculations involving the four operations Solve addition multi-step problems in contexts, deciding which operations and methods to use and why.	

Written Methods			Vocabulary

ThHTU + ThHTU using standard written method with exchanging.
 	
  7 6 4 8
+ 1 4 8 6
  9 1 3 4
   1 1 1
 	
Also extend to 5 digit numbers
	Add several numbers with different numbers of digits.
	
	    6 4 3 2
	    4 6 8 1
	      7 8 6
	       4 2
	+ 3
	 1 1 9 4 4
	   1 2 1
		DECIMALS: Add two decimal fractions with up to 4 digits and one or two decimal places.
		
		  1 2 4 . 9 Km
		+ 7 . 2 5 Km
		  1 3 2 . 1 5 Km
		   1 1
			calculate, calculation, equation, operation, symbol, inverse, answer, method, strategy, explain, predict, reason, reasoning, pattern, relationship, decimal, decimal point, decimal place, estimate, approximate, pound (£), penny/pence (p), units of measurement and abbreviations, degrees Celsius
			
			add, addition, more, plus, increase , sum, total, altogether , score , double, near double, how many more to make…?, is the same as, equals, sign
			tens boundary, hundreds boundary
			units boundary, tenths boundary, inverse

include	include …	Test Questions	

Use refined efficient methods for column addition to add and subtract integers and decimals of any size including a mixture of large and small numbers with differing numbers of decimal places.
 	
(
	DECIMALS: Add more than two decimal fractions with up to 4 digits and one or two decimal places.
	
	  4 0 1 . 2
	   2 6 . 8 5
	+ 0 . 7 1
	  4 2 8 . 7 6
	    1
		Write a number in the box to make this correct.
		0.627 = 0.6 + 0.02 + ☐
		-- 	
		What is the sum of eight point five and eight point six?
		KS2 2002 Mental test level 4
		-- 	
		Circle two numbers which add to make 0.12.
		   0.1 0.5 0.05 0.7 0.07 0.2
		-- 	
		In the chart any three numbers in a line, across or down, have a total of 18.45. Write the missing number.
		
		| 2.46
			8.61	7.38

11.07		1.23
4.92	3.69	9.84 | KS2 1997 Paper A level 4 -- Write in the missing digits 4☐4 + 38☐ = 851 KS2 2004 Paper A level 4 -- Add three point five to four point eight. KS2 1999 Mental test level 4	Tick (✓) the two numbers which have a total of 10. 0.01 0.11 1.01 9.09 9.9 9.99 KS2 2005 Paper A level 4 ------------------------------------ Circle the two numbers which add up to 1. 0.1 0.65 0.99 0.45 0.35 KS2 1999 Paper A level 5 ------------------------------------ Each shape stands for a number. The numbers shown are the totals of the line of four numbers in the row or column. Find the remaining totals.

Analysis of the grading of the difficulty of the calculation, independent of method used. **Simpler calculations should be done mentally.**

No exchanging		Extra digit in answer		Exchange units to tens		Exchange tens to hundreds		Exchange units to tens and tens to hundreds		More than two numbers to be added	
23 +42	315 +624	94 +73	561 +718	47 +25	237 +516	371 +485	293 +541	376 +485	295 +547	35 62 +24	237 148 +516

Year 6+	number: ADDITION	
COULD **End of year expectations in bold**	• Make and justify estimates and approximations to calculations (Y6/7) • Consolidate and extend mental methods of calculation to include decimals, fractions and percentages (Y6/7) • Use standard column procedures to add integers and decimals (Y6/7)	

Rules & Laws of arithmetic summary – see guidance paper 'methods of calculation' for more detail			Test Questions
Rules of arithmetic	**Instructions**	**Examples**	*(Children will require addition skills to answer these questions – no 'pure' L5 addition questions)* Write the largest whole number to make this statement true. 50 + ☐ < 73 KS2 2004 Paper B level 5 -- ------What is one-half added to three-quarters? KS2 2003 Mental test level 4 -- ------ k, m and n each stand for a whole number. They add together to make 1500. Calculate the numbers k, m and n. KS2 2003 Paper B level 5 -- ---- Write in what the missing numbers could
Brackets	Always carry out first any calculations that are within brackets	40 – (3 + 2) = 40 – 5 = 35 20 ÷ (18 – 13) = 20 ÷ 5 = 4	
Multiplication and division	After working out those calculations in the brackets do the multiplication and division calculations next before addition and subtraction. If the expression involves only multiplication and division calculations work from left to right or reorder moving a number with its associated operation.	5 x 2 – 8 ÷ 2 = 10 – 4 = 6 9 x 8 ÷ 3 = 72 ÷ 3 = 24 9 x 8 ÷ 3 = 9 ÷ 3 x 8 = 3 x 8 = 24	
Addition and subtraction	Finally do the addition and subtraction calculations. If the expression involves only addition and subtraction calculations work from left to right or reorder moving a number with its associated operation.	25 + 19 – 11 – 18 = 44 – 11 – 19 = 33 – 19 = 14 25 + 19 – 11 – 18 = 25 – 11 + 19 – 18 = 13 + 1 = 14	
Laws of arithmetic	**Description**	**Examples**	
Commutative laws for addition and multiplication	When adding two numbers the order of the numbers can be reversed. When multiplying two numbers the order of the two numbers can be reversed.	4 + 18 = 18 + 4 5 x 7 = 7 x 5	
Associative laws for addition and multiplication	When adding three or more numbers any adjacent pair of numbers can be added first. When multiplying three or more numbers, any pair of adjacent numbers can be multiplied together first.	3 + 6 + 4 = (3 + 6) + 4 = 3 + (6 + 4) 3 x 4 x 5 = (3 x 4) x 5 = 3 x (4 x 5)	

| **Distributive laws** for multiplication and division over addition and subtraction | When a sum or difference is being multiplied by a number, each number in the sum or difference can be multiplied first and the products are then used to find the sum or difference.
When a sum or difference is being divided by a number, each number in the sum or difference can be divided first and the dividends are then used to find the sum or difference. | $(30 + 8) \times 7 = (30 \times 7) + (8 \times 7)$

$(30 - 3) \times 9 = (30 \times 9) - (3 \times 9)$

$(20 + 8) \div 4 = (20 \div 4) + (8 \div 4)$
$(60 - 12) \div 3 = (60 \div 3) - (12 \div 3)$ | be.
$170 + \square = 220 - \square$
KS2 2002 Paper B level 5

Write three decimals, each greater than zero, which add together to make a total of 0.01
$\square + \square + \square = 0.01$
KS2 1999 Paper C level 6

A yoghurt costs forty-five pence. How many yoghurts can be bought for five pounds? |