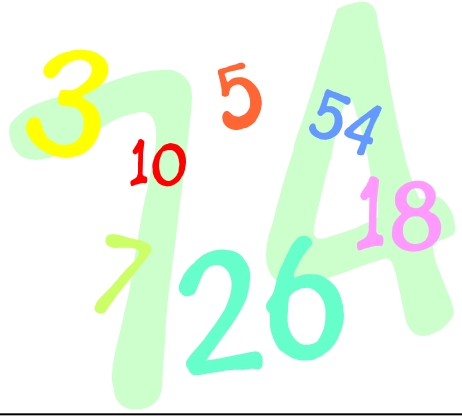
Times table square

x	1	2	3	4	5	6	7	8	9	10
1	1	2	3	4	5	6	7	8	9	10
2	2	4	6	8	10	12	14	16	18	20
3	3	6	9	12	15	18	21	24	27	30
4	4	8	12	16	20	24	28	32	36	40
5	5	10	15	20	25	30	35	40	45	50
6	6	12	18	24	30	36	42	48	54	60
7	7	14	21	28	35	42	49	56	63	70
8	8	16	24	32	40	48	56	64	72	80
9	9	18	27	36	45	54	63	72	81	90
10	10	20	30	40	50	60	70	80	90	100

Calculation Strategies

Year 3-6

A guide for parents



INTRODUCTION

In this booklet you will see a variety of ways of working out different calculations.
The booklet is designed to explain how some of the different methods of calculating are being taught in school. The methods may look different to what you are familiar with but they may be how your child will be learning to calculate at school.
The methods of calculating in this booklet follow on from some of the mental methods of calculating your child may be familiar with.

All calculations should be written horizontally at first, until children decide which way to work them out e.g.

45 + 13 = **NOT** vertically

~~45~~
~~+13~~

Children are becoming more familiar with the words, calculation and calculate as they are being used a lot more in schools. The word 'sum' should only be used when adding numbers together.

It is important to use the correct words when talking about the numbers in calculations. The numbers are said using the value of the number, for example;

45
+**1**3
50 add the tens first by saying **forty** add **ten** is **fifty**

972 ÷ 36 =
How many thirty sixes are there in 972?
What is the biggest 'chunk' (lot) of 36 I can get from 972?

36) 972
720 20 x 36
252

How many thirty sixes in 252?

36) 972
720 **20** x 36(10 x 36 = 360, double 360=720)
252
180 **5** x 36(10 x 36 = 360, halve 360=180)
72
72 **2** x 36

27 count up the 'chunks' or multiples of 36

The answer is 27

972 ÷ 36 = 27

The answer is 14 remainder 2

72 ÷ 5 = 14 r 2

This method can also be used with larger numbers:

```
 625
+ 48
  13
```

add the ones (or units) first

```
 625
 +48
  13
  60
```

add the tens by saying **twenty** add **forty** is **sixty**

```
 625
 +48
  13
  60
 600
```

add the hundreds, **six hundreds**

```
 625
 +48
  13
  60
 600
 673
```

total the numbers – add mentally
600 + 60 + 13

Children may be asked to use a more compact method for multiplication.

23 x 7

```
  23
  x7
   1
  2
```

seven times 3 is twenty one
put the **twenty** under the tens column
and the one in the ones column

```
  23
  x7
 161
  2
```

seven times **twenty** is one hundred
and forty plus the **twenty** underneath
makes **one hundred and sixty**.
put the **sixty** in the tens column and the one **hundred** in the hundreds column.

72 x 38

```
          72
        x 38
72 x 30 2160
```

30 x 2 = 60 and 30 x 70 = 2100

```
          72
        x 38
72 x 30 2160
72 x 8   576
        2736
        1
```

8 x 2 = 16 and 8 x 70 = 560
Then total the columns.

This calculation can also be done by multiplying by the ones first and then multiplying by the tens.

This compact method can also be used with larger numbers:

```
   587
 + 475
     2
   1
```

add the ones (or units), seven add five is twelve one ten under the tens column and 2 in the ones column.

```
   587
 + 475
    62
  1 1
```

add the tens, eighty add seventy is one hundred and fifty plus ten underneath is one hundred and sixty. one hundred under the hundreds column and sixty in the tens column

```
   587
 + 475
  1062
  1 1
```

add the hundreds, five hundreds add four hundreds is 9 hundreds, plus one hundred underneath is one thousand. One thousand in the thousand column and zero hundreds in the hundreds column.

The grids can be used to multiply larger numbers, remembering to multiply across each row, total each row and then add the totals of each row together.

4346 x 8

x	4000	300	40	6	
8	32000	2400	320	48	= 34768

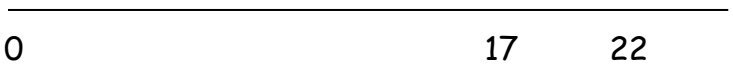
372 x 24

x	300	70	2
20	6000	1400	40
4	1200	280	8

```
   7440
 + 1488
   8928
```

The number line can also be used to subtract by counting up from the smaller number to the larger.

22 – 17 =



Start by marking zero and the two numbers on the number line.
We want to take 17 away, so we scribble away 17.

How many do we have left?
Count up from 17 to the next multiple of 10, which is 20.
Count up from 20 to 22.

Find the total of the jumps to give the answer:

3 + 2 = 5

The answer is 5. 22 – 17 = 5

This method of counting up from the smaller to the larger number is often used when finding the difference between two numbers.

Total the numbers and write the answer at the side:

x	30	2
3	**90**	**6**

= **96**

Another method used to subtract (take away) is a method called decomposition.
This method partitions each number and takes each part of one number away from each part of the other number.
e.g.

784 – 35 =

Each number is partitioned into hundreds, tens and ones and set out in this way:

784	=	700	80	4
-35		-	30	5

Starting with the ones, take 5 away from 4. There isn't enough, we need to exchange one ten for ten ones.
The tens column becomes ten less and the ones column becomes ten more:

700	**70**	**14**
-	30	5

We can now take 5 away from 14:

700	70	**14**
-	30	**5**
		9

Move to the tens column, can we take thirty from seventy?
Yes.

700	**70**	14
-	**30**	5
	40	9

Children use partitioning when multiplying larger numbers.

32 x 3 =

30 x 3 + 2 x 3

multiply the tens
30 x 3 = 90 (3 x 3 = 9 and 9 x 10 = 90)

multiply the ones
3 x 2 = 6

add the totals together
90 + 6 = 96

This method can be used to subtract numbers with different numbers of digits:

347 – 89 =

Partition each number:

300	40	7	
	- 80	9	
300	**30**	**17**	exchange one ten
	- 80	9	for ten ones and
		8	subtract 9 from 17
200	**130**	17	exchange one hundred
	- 80	9	for ten tens and
	50	8	subtract 80 from 130
200	130	17	subtract zero
	- 80	9	hundreds from 200
200	50	8	

Recombine the numbers to give the answer

347 – 89 = 258

This expanded method then leads to a more compact method.

754 – 286 =

Partition each number:

700	50	4	754	
- 200	80	6	- 286	
700	40	14	7 $4^{1}4$	exchange one ten
-200	80	6	- 2 8 6	
600	140	14	$6^{1}4^{1}4$	exchange one
- 200	80	6	- 2 8 6	hundred
400	60	8	4 6 8	

Multiplication

Early multiplication skills begin in reception with counting in different steps.

Learning and recalling multiplication tables begins in year 2. Children in year 2 are still encouraged to count in twos, fives and tens, and also in threes and fours.

A strategy to help children learn multiplication tables facts from counting is to say or show the child a multiplication fact such as:

6 x 2 =

Ask the child to put up six fingers and count across the six fingers in twos.
Six lots of 2 is 12

Also with 7 x 10 =
Ask the child to put up seven fingers and count across the fingers in tens.
Seven lots of 10 is 70

It is important for children to know that 10 x 7 will give the same answer as 7 x 10, let them show this with their fingers.

Move to the hundreds column, can we take no hundreds from seven hundreds? Yes.

700	70	14
-	30	5
700	40	9

The numbers are put back together (recombined) to give the answer.

784 – 35 = 749

Numbers are partitioned when using the grid method to multiply.

32 x 3 =

Thirty two is partitioned into tens and ones and put into the grid:

	30	**2**

The multiplying number is then put into the grid

x	30	2
3		

Multiply the largest number first and write the answer in the box underneath:

x	**30**	2
3	90	

Multiply the next number and write the answer in the box underneath:

x	30	**2**
3	90	6

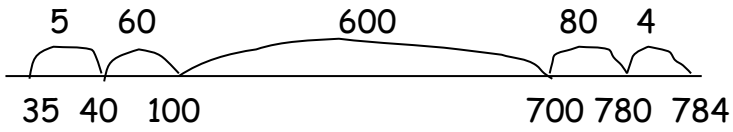
This method can also be used with larger numbers.
A year 4 example:

784 – 35 =

This can still be started by marking zero and the two numbers on the number line and complete as before:

0 35 784

or, children can simply mark the two numbers on the number line and count up to find the answer.



Start with the largest number when adding to find the total e.g.
600 + 80 + 60 + 5 + 4 = 749
The answer is 749. 784 – 35 = 749
This method of counting up can also be recorded vertically:

784	
-35	
5	count up from 35 to make 40
60	count up from 40 to make 100
600	count up from 100 to make 700
80	count up from 700 to make 780
4	count up from 780 to 784
749	Find the total as before by adding the largest numbers first.

The size of the grid increases as the size of the numbers increase:

72 x 38 =

Both numbers are partitioned into tens and ones before multiplying.

Multiply by the tens first:

x	**70**	2
30	2100	
8		

x	70	**2**
30	2100	60
8		

Multiply by the ones (units)

x	**70**	2
30	2100	60
8	560	

x	70	**2**
30	2100	6
8	560	16

Total the rows

x	70	2	
30	**2100**	**60**	= **2160**
8	**560**	**16**	= **576**
	2736		

then total the columns to get the answer.

SUBTRACTION

An empty number line can be used to subtract (take away) two numbers.

22 – 7 =

Start by marking 22 on the number line.

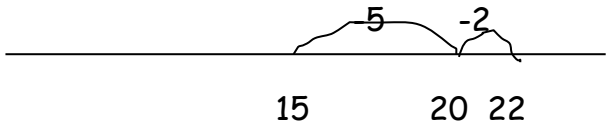
It's easier for children to work around the multiples of 10 and 100 when calculating.

Encourage your child to count back to the nearest multiple of 10, which in this example is 20.

How many have you subtracted (counted back)? 2

How many more do you need to subtract (count back)? 5.

Count back 5.



How many have you subtracted (counted back)? 7

What's the answer? The answer is 15.

22 – 7 = 15

Another way of setting out multiplication is as a vertical calculation.

23 x 7

	23	
	x7	
20 x 7	140	multiply the tens saying **twenty** times 7
3 x 7	21	multiply the ones
	161	total the columns

this method can also be used with larger numbers:

4346 x 8

	4346	
	x8	
4000 x 8	32000	**4 thousand** multiplied by 8
300 x 8	2400	**3 hundred** multiplied by 8
40 x 8	320	**forty** multiplied by 8
6 x 8	48	six multiplied by 8
	34768	total the columns

72 x 38

	72	
	x 38	
70 x 30	2100	
2 x 30	60	
70 x 8	560	
2 x 8	16	
	2736	total the numbers

This method can then lead to a more compact method:

62**5**	add the ones (or units),
+ 4**8**	five add eight is thirteen
3	one ten under the tens column and
1	3 in the ones column.

6**2**5	add the tens, twenty add forty is
+ **4**8	sixty, plus ten underneath, seventy.
7 3	Put the seventy in the tens column.
1	

625	add the hundreds, six hundreds.
+ 48	Put the six hundreds in the hundreds
673	column.
1	

DIVISION

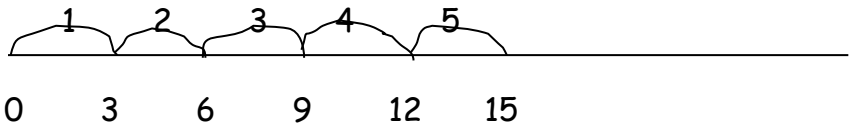
Early division begins with sharing in practical activities.

Children need to recognise that

15 ÷ 3 =

can mean 15 shared between 3
or
How many lots of 3 are there in 15?

We can use a number line to find out how many threes there are in fifteen, by counting forwards or backwards in threes.



15 ÷ 3 = 5

The same method can be used to add the smallest part of the number first and the largest part of the number last. e.g.

$$\begin{array}{r} 4\mathbf{5} \\ +\ 1\mathbf{3} \\ \hline \mathbf{8} \end{array}$$

add the ones (or units) first

$$\begin{array}{r} \mathbf{4}5 \\ +\mathbf{1}3 \\ \hline 8 \\ \underline{\mathbf{50}} \end{array}$$

add the tens by saying **forty** add **ten** is **fifty**

$$\begin{array}{r} 45 \\ +\ 13 \\ \hline \mathbf{50} \\ \underline{\mathbf{8}} \\ \underline{\mathbf{58}} \end{array}$$

total the numbers

This chunking method can be used with different numbers:

256 ÷ 7 =

How many sevens are there in 256?
If 10 lots of 7 are 70, what's the biggest chunk (lot) of 7 I can get from 256?

30 lots of 7 = 210, so I can take off 30 lots of 7

```
  256
- 210    30 x 7
   46
```

How many sevens are there in 46?
6 x 7 = 42, take off 6 lots of 7

```
  256
- 210    30 x 7
   46
- 42      6 x 7
    4
        36      count up the 'chunks' of 7
```

The answer is 36 remainder 4

256 ÷ 7 = 36 r 4

ADDITION

A method of adding is to partition the numbers into parts, add the parts and then recombine to find the total.

45 + 13 =

Partition the numbers into tens and ones:

40 + 5 + 10 + 3

Add the tens together:

40 + 10 = 50

Add the ones together:

5 + 3 = 8

Recombine the numbers to give the total:

50 + 8 = 58

How to copy to produce a Key Stage 2 A5 booklet

- Place each sheet face up in the following order:

Front page

Pages 1 and 26

Pages 25 and 2

Pages 3 and 24

Pages 23 and 4

Pages 5 and 22

Pages 21 and 6

Pages 7 and 20

Pages 19 and 8

Pages 9 and 18

Pages 17 and 10

Pages 11 and 16

Pages 15 and 12

Pages 13 and 14

- Now turn each alternate sheet upside down, still with the print facing up.
- Set the photocopier to copy 1→ 2 pages to print pages back to back
- Use the double sided pages to make required number of booklets
- Fold each booklet into A5 size

The following pages need to be back to back:

Front page and pages 1 and 26

Pages 25 and 2 and pages 3 and 24

Pages 23 and 4 and pages 5 and 22

Pages 21 and 6 and pages 7 and 20

Pages 19 and 8 and pages 9 and 18

Pages 17 and 10 and pages 11 and 16

Pages 15 and 12 and pages 13 and 14