Year 6   ADDITION

<u>MENTAL CALCULATION</u>.   Many strategies, including:

Mental recall of number bonds

6 + 4 = 10   □ + 3 = 10

25 + 75 = 100   19 + □ = 20

Use near doubles

6 + 7 = double 6 + 1 = 13

Addition using partitioning (splitting up) and recombining

34 + 45 = (30 + 40) + (4 + 5) = 79

Counting on or back in repeated steps of 1, 10, 100, 1000

86 + 57 = 143 (by counting on in tens and then in ones)

Add the nearest multiple of 10, 100 and 1000 and adjust

24 + 19 = 24 + 20 – 1 = 43

458 + 71 = 458 + 70 + 1 = 529

<u>WRITTEN METHODS</u>

Children should use the carrying method for numbers with more digits.

	7648		6584		42
	+ 1486		+ 5848		6432
	9134		12432		786
	1 11		1 11		3
					+ 4681
					11944
					1 2 1

Using similar methods, children will

✓   *add several numbers with different numbers of digits;*

✓   *begin to add two or more decimal fractions with up to four digits and either one or two decimal places;*

✓   *know that decimal points should line up under each other, particularly when adding or subtracting mixed amounts, e.g. 401.2 + 26.85 + 0.71*

```
   401 . 2
    26 . 85
+    0 . 71
```

Year 6   SUBTRACTION

MENTAL CALCULATION.   Many strategies, including:

Mental recall of addition and subtraction facts

10 – 6 = 4   17 - □ = 11

20 - 17 = 3   10 - □ = 2

Find a small difference by counting up

82 – 79 = 3

Counting on or back in repeated steps of 1, 10, 100, 1000

86 - 52 = 34 (counting back from 86 in tens and then in ones **or** counting on from 52 to 86)

460 - 300 = 160 (counting back in hundreds from 460 **or** counting on from 300 to 460)

Subtract the nearest multiple of 10, 100 and 1000 and adjust

24 - 19 = 24 - 20 + 1 = 5

458 - 71 = 458 - 70 - 1 = 387

Use the relationship between addition and subtraction

36 + 19 = 55   19 + 36 = 55

55 – 19 = 36   55 – 36 = 19

WRITTEN METHODS

Decomposition

$$
\begin{array}{r}
{}^{5\ 13\ 1}\\
\cancel{6}\cancel{4}67\\
-\ \underline{2684}\\
3783
\end{array}
$$

Where numbers in the calculation are close together or near to multiples of 10, 100 etc, counting on using a number line should be used.

3002 – 1997 = 1005

Children should:

✓   *be able to subtract numbers with different numbers of digits;*

✓   *be able to subtract two or more decimal fractions with up to three digits and either one or two decimal places;*

✓   *know that decimal points should line up under each other.*

✓   ***Double check*** *answers by **ADDING** e,g, 25 - 7 = 18   because 7 + 18 = 25*

Year 6 MULTIPLICATION

<u>MENTAL CALCULATIONS</u>.   Many strategies, including:
Doubling and halving
Applying the knowledge of doubles and halves to known facts.
e.g. 8 x 4 is double 4 x 4

Using multiplication facts

<u>Years 5 & 6</u> Derive and recall quickly all multiplication facts up to 10 x 10. Some pupils
manage x11 and x12 tables too.

Children should be able to use their tables knowledge to derive other facts.
e.g. If I know 3 x 7 = 21, what else do I know?
 30 x 7 = 210,   300 x 7 = 2100, 3000 x 7 = 21 000,   0.3 x 7 = 2.1 etc

Use closely related facts already known
13 x 11 = (13 x 10) + (13 x 1)
        = 130 + 13
        = 143

Multiplying by 10 or 100
Knowing that the effect of multiplying by 10 is a shift in the digits one place to the left.
Knowing that the effect of multiplying by 100 is a shift in the digits two places to the left.

Partitioning (splitting up)
23 x 4 = (20 x 4) + (3 x 4)
        = 80 + 12
        = 102

Use of factors
8 x 12 = 8 x 4 x 3

<u>WRITTEN METHODS</u>

ThHTU x U   (<u>**Short multiplication**</u> – multiplication by a single digit)

For example: 4346 x 8

Children will approximate first: 4346 x 8 is approximately 4346 x 10 = 43460

Year 6 Multiplication (cont.)
THEN EITHER   the Grid method

×	4000	300	40	6
8	32000	2400	320	48

```
   32000
 +  2400
 +   320
 +    48
   34768
```

OR the traditional method

```
    4346
 × ___ 8
   34768
    2 3 4
```

HTU x TU (**Long multiplication** – multiplication by more than a single digit)

For example: 372 x 24

Children will approximate first: 372 x 24 is approximately 400 x 25 = 10000

THEN EITHER   the Grid method

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

```
    6000
 + 1400
 + 1200
 +  280
 +   40
 +    8
   8928
```

Year 6 Multiplication (cont.)

OR the traditional methods

```
        372                    or              372
    X    24                               x     24
    _____                              _____
        1488  (372 x 4)                       7440  (372 x 20)
        7440  (372 x 20)                      1488  (372 x 4)
    _____                              _____
        8928                                  8928
    _____                              _____
```

Using similar methods, they will be able to multiply decimals with up to two decimal places by a single digit number and then two digit numbers, approximating first. They should know that the decimal points line up under each other.

For example: 4.92 x 3

Children will approximate first: 4.92 x 3 is approximately 5 x 3 = 15

THEN EITHER   the Grid method

x	4	0.9	0.02
3	12	2.7	0.06

```
            12
        +    2.7
        +   0.06
           14.76
```

OR the traditional method

```
            4.92
        X      3
        _____
           14.76
        _____
```

N.B. The **Grid Method** of multiplication is encouraged by some High School maths teachers.

Year 6 DIVISION

MENTAL CALCULATIONS.   Many strategies, including:

Doubling and halving
Knowing that halving is dividing by 2

Deriving and recalling division facts

<u>Year 5 & 6</u>   Derive and recall quickly division facts for all tables up to 10 x 10. Some pupils manage x11 and x12 tables too.

Dividing by 10 or 100
Knowing that the effect of dividing by 10 is a shift in the digits one place to the right.
Knowing that the effect of dividing by 100 is a shift in the digits two places to the right.

Use of factors
378 ÷ 21   is   378 ÷ 3 = 126   so   378 ÷ 21 = 18
                                  126 ÷ 7 = 18

Use related facts
Given that 1.4 x 1.1 = 1.54
What is 1.54 ÷ 1.4, or 1.54 ÷ 1.1?

<u>WRITTEN METHODS</u>
Children will continue to use written methods to solve short division TU ÷ U and HTU ÷ U.
Eg   196 divided by 6

$$\begin{array}{r} 32 \text{ r } 4 \\ \hline 6)\,196 \end{array}$$

Long division HTU ÷ TU e.g.   972 ÷ 36

<u>Either</u> by the Chunking Method

$$\begin{array}{r} 27 \\ \hline 36\,)\ \ 972 \\ -\ \ 720 \quad (20x) \\ \hline 252 \\ -\ \ 252 \quad (7x) \\ \hline 0 \end{array}$$

Answer :   27

Any remainders should be shown as fractions, i.e. if the children were dividing 32 by 10, the answer should be shown as $3\,^2/_{10}$ which could then be written as $3\,^1/_5$ in its lowest terms.

Year 6 Division (cont.)

Or the traditional long division method

```
        27
36 ) 972
    -72
     252
    -252
     000
```

Extend to decimals with up to two decimal places. Children should know that decimal points line up under each other.

87.5 ÷ 7

```
        12.5
7 )  87.5
   -  70.0    10x
      17.5
   -  14.0     2x
       3.5
   -   3.5    0.5x
         0
```

Answer :   12.5

Or   the traditional method

```
            12.5
7) 87.5
```