

## Year 4 ADDITION

**MENTAL CALCULATION.** Many strategies, including:

**Mental recall of number bonds**

$$6 + 4 = 10$$

$$\square + 3 = 10$$

$$25 + 75 = 100$$

$$19 + \square = 20$$

**Use near doubles**

$$6 + 7 = \text{double } 6 + 1 = 13$$

**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**

$$86 + 57 = 143 \text{ (by counting on in tens and then in ones)}$$

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

$$24 + 19 = 24 + 20 - 1 = 43$$

$$458 + 71 = 458 + 70 + 1 = 529$$

**Written method**

Children will begin to carry below the line.

$$\begin{array}{r} 625 \\ + 48 \\ \hline 673 \\ 1 \end{array}$$

$$\begin{array}{r} 783 \\ + 42 \\ \hline 825 \\ 1 \end{array}$$

$$\begin{array}{r} 367 \\ + 85 \\ \hline 452 \\ 11 \end{array}$$

*Using similar methods, children will:*

- ✓ *add several numbers with different numbers of digits;*
- ✓ *begin to add two or more three-digit sums of money, with or without adjustment from the pence to the pounds;*
- ✓ *know that the decimal points should line up under each other, particularly when adding or subtracting mixed amounts, e.g. £3.59 + 78p.*

## Year 4 SUBTRACTION

MENTAL CALCULATION. Many strategies, including:

**Mental recall of addition and subtraction facts**

$$10 - 6 = 4 \qquad 17 - \square = 11$$

$$20 - 17 = 3 \qquad 10 - \square = 2$$

**Find a small difference by counting up**

$$82 - 79 = 3$$

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

$$86 - 52 = 34 \text{ (counting back from 86 in tens and then in ones or counting on from 52 to 86)}$$

$$460 - 300 = 160 \text{ (counting back in hundreds from 460 or counting on from 300 to 460)}$$

**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**

$$36 + 19 = 55 \qquad 19 + 36 = 55$$

$$55 - 19 = 36 \qquad 55 - 36 = 19$$

## WRITTEN METHODS

**Partitioning and decomposition**

$$\begin{array}{r} 754 \\ - 86 \\ \hline \end{array}$$

$$\begin{array}{l} \text{Step 1} \quad 700 + 50 + 4 \\ \quad \quad - \quad \quad \quad 80 + 6 \\ \hline \end{array}$$

$$\begin{array}{l} \text{Step 2} \quad 700 + 40 + 14 \quad (\text{adjust from } T \text{ to } U) \\ \quad \quad - \quad \quad \quad 80 + 6 \\ \hline \end{array}$$

$$\begin{array}{l} \text{Step 3} \quad 600 + 140 + 14 \quad (\text{adjust from } H \text{ to } T) \\ \quad \quad - \quad \quad \quad 80 + 6 \\ \hline 600 + 60 + 8 = 668 \end{array}$$

This would be recorded by the children as

$$\begin{array}{l} \begin{array}{r} 600 \quad 140 \\ \cancel{700} + \cancel{50} + 14 \\ - \quad \quad \quad 80 + 6 \\ \hline 600 + 60 + 8 = 668 \end{array} \end{array}$$

## Year 4 Subtraction (cont.)

### **Decomposition**

$$\begin{array}{r} 6141 \\ \cancel{7}4 \\ - 86 \\ \hline 668 \end{array}$$

Children should:

- ✓ be able to subtract numbers with different numbers of digits;
- ✓ using this method, children should also begin to find the difference between two three-digit sums of money, with or without 'adjustment' from the pence to the pounds;
- ✓ know that decimal points should line up under each other.

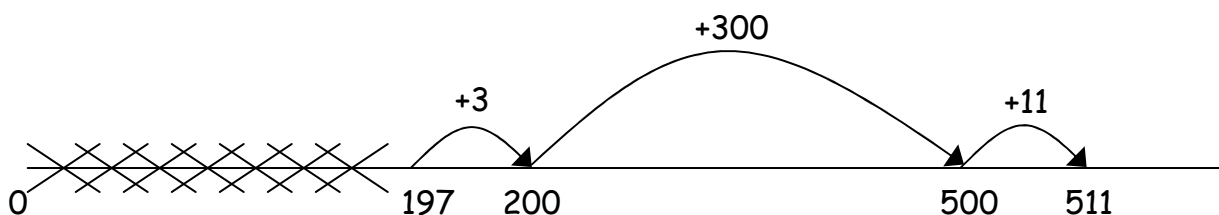
$$\begin{array}{r} \text{£}8.95 \\ - \text{£}4.38 \\ \hline \end{array} = \begin{array}{r} 8 + 0.9 + 0.05 \\ - 4 + 0.3 + 0.08 \\ \hline \end{array} \quad \text{leading to}$$
  
$$\begin{array}{r} = 8 + 0.8 + 0.15 \\ - 4 + 0.3 + 0.08 \\ \hline 4 + 0.5 + 0.07 \\ \hline \end{array} \quad (\text{adjust from T to U}) \quad \begin{array}{r} 8.85 \\ - 4.38 \\ \hline \end{array}$$
  
$$= \text{£}4.57$$

Alternatively, children can set the amounts to whole numbers, i.e.  $895 - 438$  and convert to pounds after the calculation.

**NB** If your children have reached the concise stage they will then continue this method through into years 5 and 6. They will not go back to using the expanded methods.

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

$$511 - 197 = 314$$



## **Year 4 MULTIPLICATION**

**MENTAL CALCULATIONS.** Many strategies, including:

### **Doubling and halving**

Applying the knowledge of doubles and halves to known facts.

e.g.  $8 \times 4$  is double  $4 \times 4$

### **Using multiplication facts**

Derive and recall all multiplication facts up to  $10 \times 10$

Children should be able to use their tables knowledge to derive other facts.

e.g. If I know  $3 \times 7 = 21$ , what else do I know?

$30 \times 7 = 210$ ,  $300 \times 7 = 2100$ ,  $3000 \times 7 = 21\ 000$ ,  $0.3 \times 7 = 2.1$  etc

### **Use closely related facts already known**

$$\begin{aligned} 13 \times 11 &= (13 \times 10) + (13 \times 1) \\ &= 130 + 13 \\ &= 143 \end{aligned}$$

### **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)**

$$\begin{aligned} 23 \times 4 &= (20 \times 4) + (3 \times 4) \\ &= 80 + 12 \\ &= 102 \end{aligned}$$

### **Use of factors**

$$8 \times 12 = 8 \times 4 \times 3$$

## **Written Methods**

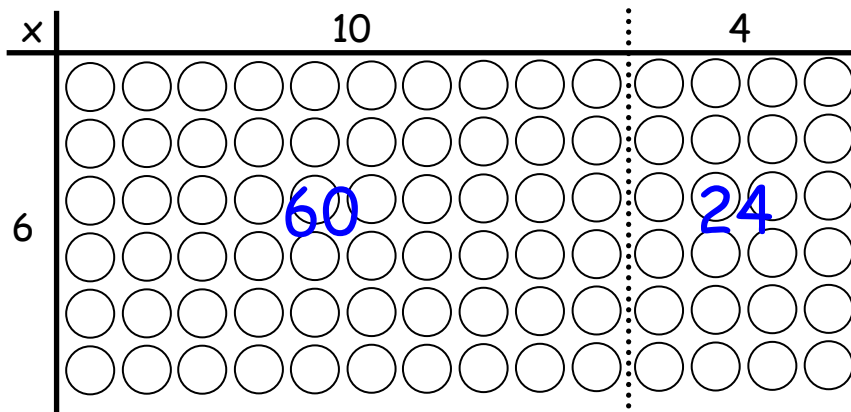
### **Arrays**

Children should be able to model a multiplication calculation using an array. This knowledge will support with the development of the grid method.

$$\begin{array}{ccccc} \bigcirc & \bigcirc & \bigcirc & \bigcirc & \bigcirc \\ \bigcirc & \bigcirc & \bigcirc & \bigcirc & \bigcirc \\ \bigcirc & \bigcirc & \bigcirc & \bigcirc & \bigcirc \end{array} \quad 5 \times 3 = 15$$
  
$$3 \times 5 = 15$$

## Year 4 Multiplication (cont.)

Children will continue to use arrays where appropriate leading into the grid method of multiplication.



$$(6 \times 10) + (6 \times 4)$$

$$60 + 24$$

$$84$$

### Grid method

#### TU x U

(Short multiplication - multiplication by a single digit)

$$23 \times 8$$

Children will approximate first

$23 \times 8$  is approximately  $25 \times 8 = 200$

$$\begin{array}{r} \times \quad 20 \quad 3 \\ 8 \quad \boxed{160} \quad \boxed{24} \end{array}$$

$$\begin{array}{r} 160 \\ + \quad 24 \\ \hline 184 \end{array}$$

## Year 4 DIVISION

**MENTAL CALCULATIONS.** Many strategies, including:

### **Doubling and halving**

Knowing that halving is dividing by 2

Derive and recall division facts for all tables up to  $10 \times 10$

### **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**

$378 \div 21$  is  $378 \div 3 = 126$  so  $378 \div 21 = 18$   
 $126 \div 7 = 18$

### **Use related facts**

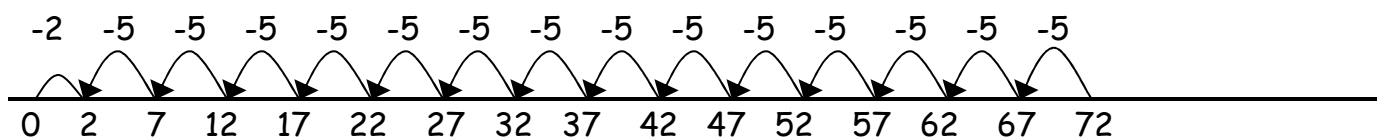
Given that  $1.4 \times 1.1 = 1.54$

What is  $1.54 \div 1.4$ , or  $1.54 \div 1.1$ ?

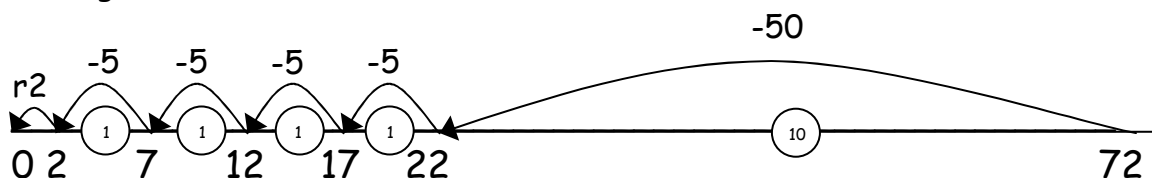
## WRITTEN METHODS

Children will develop their use of repeated subtraction to be able to subtract multiples of the divisor. Initially, these should be multiples of 10s, 5s, 2s and 1s - numbers with which the children are more familiar.

$$72 \div 5$$



Moving onto:



## Year 4 Division (cont.)

Then onto the vertical method:

### Short division $TU \div U$ using the Chunking Method

$$72 \div 3$$

$$\begin{array}{r} 3 \overline{) 72} \\ - 30 \\ \hline 42 \\ - 30 \\ \hline 12 \\ - 6 \\ \hline 6 \\ - 6 \\ \hline 0 \end{array}$$

Answer : 24

Diagram illustrating the chunking method for  $72 \div 3$ . A vertical oval on the right contains the following labels:  $10x$ ,  $10x$ ,  $2x$ , and  $2x$ . An arrow points from the bottom of the oval to the number 24, which is the final answer.

Leading to subtraction of other multiples.

$$96 \div 6$$

$$\begin{array}{r} 16 \\ 6 \overline{) 96} \\ - 60 \\ \hline 36 \\ - 36 \\ \hline 0 \end{array}$$

Answer : 16

Diagram illustrating the chunking method for  $96 \div 6$ . A vertical oval on the right contains the following labels:  $10x$  and  $6x$ . An arrow points from the bottom of the oval to the number 16, which is the final answer.

Any remainders should be shown as integers, i.e. 14 remainder 2 or 14 r 2.

Children need to be able to decide what to do after division and round up or down accordingly. They should make sensible decisions about rounding up or down after division. For example  $62 \div 8$  is 7 remainder 6, but whether the answer should be rounded up to 8 or rounded down to 7 depends on the context.

e.g. I have 62p. Sweets are 8p each. How many can I buy?

Answer: 7 (the remaining 6p is not enough to buy another sweet)

Apples are packed into boxes of 8. There are 62 apples. How many boxes are needed?

Answer: 8 (the remaining 6 apples still need to be placed into a box)