

Key Stage 2 Calculation

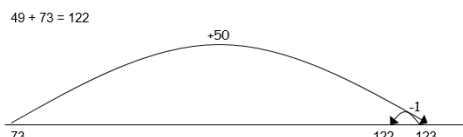
Year 3, 4, 5 & 6

Year 3 Calculation Guidelines

ADDITION

Understand that any number can be added first.

Number line: **compensation**



The **INFORMAL EXPANDED METHOD**:

$$46 + 87 = 133$$

$$\begin{array}{r} \text{T U} \\ 46 \\ + 87 \\ \hline 13 \\ \hline 120 \\ \hline 133 \end{array}$$

Label hundreds, tens and units etc. to help support place value understanding if needed.

$$\begin{array}{r} 40 + 6 \\ 80 + 7 \\ \hline 120 + 13 = 133 \end{array}$$

$$\begin{array}{r} \text{H T U} \\ 267 \\ + 85 \\ \hline 12 \\ \hline 140 \\ \hline 200 \\ \hline 352 \end{array}$$

$$\begin{array}{r} 200 + 60 + 7 \\ 80 + 5 \\ \hline 200 + 140 + 12 = 352 \end{array}$$

Formal compact column addition - no carrying:

$$\begin{array}{r} \text{H T U} \\ 352 \\ + 427 \\ \hline 788 \end{array}$$

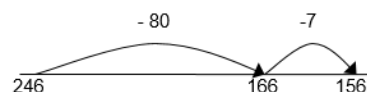
Formal compact column addition - carrying (carry digits below the line, using words 'carry ten' or 'carry one more hundred', not 'carry one'.)

$$\begin{array}{r} 358 \\ + 73 \\ \hline 431 \\ \hline 11 \end{array}$$

SUBTRACTION

Empty number lines, subtracting in convenient, partitioned steps:

$$246 - 87 = 246 - 80 - 7$$



The **INFORMAL EXPANDED METHOD**:

Expanded Method: Partitioning

$$189 - 57$$

$$\begin{array}{r} 100 + 80 + 9 \\ 50 + 7 \\ \hline 100 + 30 + 2 = 132 \end{array}$$

Progressing from the expanded method to compact column method:

Exchange:

$$71 - 46$$

$$\begin{array}{r} \text{Step 1: } 70 + 1 \\ - 40 + 6 \end{array}$$

The calculation should be read as e.g. take 6 from 1.

Step 2:

$$\begin{array}{r} 60 + 11 \\ - 40 + 6 \\ \hline 20 + 5 = 25 \end{array}$$

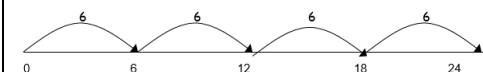
Step 3:

$$\begin{array}{r} 61 \\ - 46 \\ \hline 25 \end{array}$$

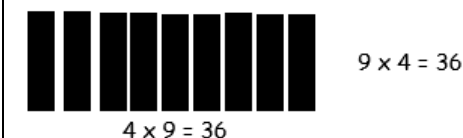
MULTIPLICATION

Repeated addition:

$$6 \times 4:$$



Arrays:



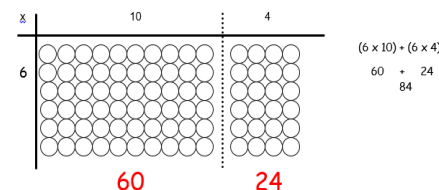
Scaling:

e.g. Find a ribbon that is 4 times as long as the blue ribbon



Grid method:

$$14 \times 6 = 84$$



$$14 \times 6 = 84$$

	10	4
6	60	24

$$60 + 24 = 84$$

Short multiplication:

$$\begin{array}{r} 23 \\ \times 8 \\ \hline 184 \end{array}$$

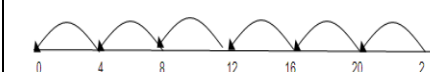


$$\begin{array}{r} 23 \\ \times 8 \\ \hline 184 \end{array}$$

DIVISION

Repeated subtraction:

$$24 \div 4 = 6$$

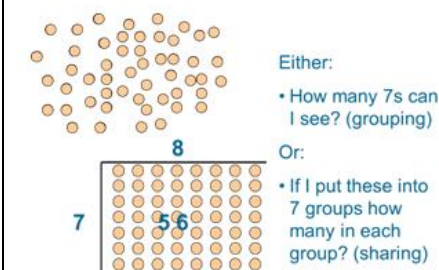


Partitioning:

Informal recording for $84 \div 7$ might be:

$$\begin{array}{r} 84 \\ 70 + 14 \\ \div 7 \\ \hline 10 + 2 = 12 \end{array}$$

Arrays:



Short division: bus stop method:

$$98 \div 7 \text{ becomes}$$

$$\begin{array}{r} 14 \\ 7 \overline{) 98} \end{array}$$

Answer: 14

Year 4 Calculation Guidelines

ADDITION

Column addition up to 4-digits:

$$\begin{array}{r} 3587 \\ + 675 \\ \hline 4262 \\ 111 \end{array}$$

IMPORTANT NOTE:

Carry digits are recorded below the line, using words 'carry ten' or 'carry one more hundred', not 'carry one'.

SUBTRACTION

Subtract numbers with up to 4 digits using column subtraction:
(children may use expanded method until they are comfortable):

Th	H	T	U
1000	1600	130	13
2000	700	40	3
-	800	+ 50	+ 7
1000	800	80	6

↓

Th	H	T	U
1	16	13	13
2	7	4	3
-	8	5	7
1	8	8	6

MULTIPLICATION

Multiplying 2-digit and 3-digit numbers by 1-digit number:

SHORT MULTIPLICATION:

$$346 \times 9 = 3114$$

$$\begin{array}{r} 346 \\ \times 9 \\ \hline 54 \quad (6 \times 9 = 54) \\ 360 \quad (40 \times 9 = 360) \\ 2700 \quad (300 \times 9 = 2700) \\ \hline 3114 \\ 11 \end{array}$$

$$\begin{array}{r} 346 \\ \times 9 \\ \hline 3114 \\ 45 \end{array}$$

DIVISION

Dividing 2-digit and 3-digit numbers by 1-digit number:

Using **short division** (the bust stop method!)

98 ÷ 7 becomes

$$\begin{array}{r} 14 \\ 7 \overline{) 98} \\ \underline{7} \\ 28 \\ \underline{28} \\ 0 \end{array}$$

Answer: 14

128 divided by 8 becomes:

$$\begin{array}{r} 16 \\ 8 \overline{) 128} \\ \underline{8} \\ 48 \\ \underline{48} \\ 0 \end{array}$$

Year 5 Calculation Guidelines

ADDITION

Column addition beyond 4-digits:

$$\begin{array}{r} 43587 \\ + 5675 \\ \hline 49262 \\ 111 \end{array}$$

IMPORTANT NOTE:

Carry digits are recorded below the line, using words 'carry ten' or 'carry one more hundred', not 'carry one'.

SUBTRACTION

Subtract numbers with more than 4 digits using column subtraction:

$$\begin{array}{r} \text{Th} \quad \text{H} \quad \text{T} \quad \text{U} \\ 4 \quad 11 \quad 15 \quad 11 \\ \cancel{5} \quad \cancel{2} \quad \cancel{8} \quad \cancel{1} \\ - 3 \quad 7 \quad 9 \quad 5 \\ \hline 1 \quad 4 \quad 6 \quad 6 \end{array}$$

MULTIPLICATION

Short multiplication: Up to 4 digits by one-digit number

2741 × 6 becomes

$$\begin{array}{r} 2 \quad 7 \quad 4 \quad 1 \\ \times \quad \quad \quad 6 \\ \hline 1 \quad 6 \quad 4 \quad 4 \quad 6 \\ 4 \quad 2 \end{array}$$

Answer: 16 446

Long multiplication:

TU x TU
24 x 16

$$\begin{array}{r} 2 \\ 24 \\ \times 16 \\ \hline 144 \\ + 240 \\ \hline 384 \end{array}$$

HTU x TU
124 x 16

$$\begin{array}{r} 1 \quad 2 \\ 1 \quad 2 \quad 4 \\ \times \quad 2 \quad 6 \\ \hline 7 \quad 4 \quad 4 \\ 2 \quad 4 \quad 8 \quad 0 \\ \hline 3 \quad 2 \quad 2 \quad 4 \\ 1 \quad 1 \end{array}$$

DIVISION

Short division: (bus stop method)

Divide numbers up to 4 digits by a one-digit number

98 ÷ 7 becomes

$$\begin{array}{r} 1 \quad 4 \\ 7 \overline{) 98} \end{array}$$

Answer: 14

Remainders:

432 ÷ 5 becomes

$$\begin{array}{r} 8 \quad 6 \quad \text{r} 2 \\ 5 \overline{) 432} \end{array}$$

Answer: 86 remainder 2

496 ÷ 11 becomes

$$\begin{array}{r} 4 \quad 5 \quad \text{r} 1 \\ 11 \overline{) 496} \end{array}$$

Answer: 45 $\frac{1}{11}$

Year 6 Calculation Guidelines

ADDITION

Column addition beyond 4-digits:

$$\begin{array}{r} 43587 \\ + 5675 \\ \hline 49262 \\ 111 \end{array}$$

IMPORTANT NOTE:

Carry digits are recorded below the line, using words 'carry ten' or 'carry one more hundred', not 'carry one'.

Adding 3 or more numbers together with column method:

$$\begin{array}{r} 47 \\ + 32 \\ + 24 \\ \hline 103 \\ 1 \end{array}$$

Adding decimals:

$$\begin{array}{r} 124.90 \\ + 117.25 \\ \hline 242.15 \\ 11 \end{array}$$

Where there are digits missing – you could use zeros to help with layout and place value understanding.

SUBTRACTION

Subtract numbers with more than 4 digits using column subtraction:

$$\begin{array}{r} \text{Th} \quad \text{H} \quad \text{T} \quad \text{U} \\ 4 \quad 11 \quad 15 \quad 11 \\ \underline{5 \quad 2 \quad 8 \quad 1} \\ - 3 \quad 7 \quad 9 \quad 5 \\ \hline 1 \quad 4 \quad 6 \quad 6 \end{array}$$

MULTIPLICATION

Long multiplication:

Multiply multi-digit numbers up to 4 digits by a two-digit numbers:

$$\begin{array}{r} 1 \quad 2 \\ 1 \quad 2 \quad 4 \\ \times \quad 2 \quad 6 \\ \hline 7 \quad 4 \quad 4 \\ 2 \quad 4 \quad 8 \quad 0 \\ \hline 3 \quad 2 \quad 2 \quad 4 \\ 1 \quad 1 \end{array}$$

DIVISION

Short division: REMAINDERS:

432 ÷ 5 becomes

$$\begin{array}{r} 8 \quad 6 \quad \text{r} 2 \\ 5 \overline{) 4 \quad 3 \quad 2} \end{array}$$

Answer: 86 remainder 2

496 ÷ 11 becomes

$$\begin{array}{r} 4 \quad 5 \quad \text{r} 1 \\ 11 \overline{) 4 \quad 9 \quad 6} \end{array}$$

Answer: 45 $\frac{1}{11}$

Long division:

432 ÷ 15 becomes

$$\begin{array}{r} 2 \quad 8 \\ 15 \overline{) 4 \quad 3 \quad 2} \quad 15 \times 20 \\ \underline{3 \quad 0 \quad 0} \\ 1 \quad 3 \quad 2 \\ \underline{1 \quad 2 \quad 0} \quad 15 \times 8 \\ 1 \quad 2 \end{array}$$

Answer: 28 remainder 12

OR:

As a fraction:

$$\frac{12}{15} = \frac{4}{5}$$

Answer: 28 $\frac{4}{5}$ Decimal: 28.8

