

'Core Calculation Skills'
is a set of guidance notes, provided by:
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for parents to help their children with
math calculations

Parents/Carers

These sheets provide a summary of the steps children need to go through to add, subtract, multiply and divide efficiently. Use the steps to help your child practise by giving them similar examples to those shown. **Children should practise as much as possible.**

Children must be able to do all the mental calculations shown to calculate efficiently. Only when they have achieved these should they be taught the standard written calculation methods at the end of each section.

This way, children will learn to look at a calculation and answer it quickly and accurately by asking themselves ...

- Can I do this in my head?
- Can I do this in my head using drawings or jottings?
- Do I need to use a written method?
- Do I need a calculator?

Addition

In summary, help your child to:

- 1) Add mentally a pair of one-digit numbers, crossing 10 *eg* $6 + 7 = 13$, $4 + 8 = 12$, $8 + 9 = 17$
- 2) Add mentally a one-digit number to any two-digit number, crossing the tens & hundreds boundary *eg* $36 + 7 = 43$, $94 + 8 = 102$, $198 + 9 = 207$
- 3) Add mentally 10 or a multiple of 10 to any two-digit number, crossing 100 *eg* $96 + 10 = 106$, $86 + 30 = 116$, $356 + 70 = 426$
- 4) Partition two- & three-digit numbers into multiples of 100, 10 & 1 *eg* $631 = 600 + 30 + 1$
- 5) Add mentally any pair of two-digit numbers *eg* $46 + 27 = 73$
Either by partitioning & counting up: $46 + 27 = 46 + 20 + 7 = 66 + 7 = 73$, demonstrated on the number line ...

Or by partitioning & adding the most significant digits first: $46 + 27 = (40 + 20) + (6 + 7) = 60 + 13 = 73$

- 6) Add mentally 'special cases' of pairs of two-digit numbers
By compensating: eg $36 + 19 = 36 + 20 - 1 = 55$
Using near doubles: eg $44 + 43 = \text{double } 43 + 1 = 86 + 1 = 87$
- 7) Add mentally pairs of multiples of 10 & 100 *eg* $48 + 35 = 83$ so $480 + 350 = 830$
- 8) Add mentally pairs of decimals *eg* $48 + 35 = 83$ so $4.8 + 3.5 = 8.3$
- 9) Use efficient written methods to add two- & three-digit numbers *eg* $465 + 258$

$$\begin{array}{r} 465 \\ + 258 \\ \hline 600 \\ 110 \\ 13 \\ \hline 723 \end{array}$$

$$\begin{array}{r} 465 \\ + 258 \\ \hline 13 \\ 600 \\ \hline 723 \end{array}$$

$$\begin{array}{r} 465 \\ + 258 \\ \hline 723 \\ 11 \end{array}$$

Progress from adding the most significant digits first, to adding the least significant digits in preparation for 'carrying', to carrying below the line

Subtraction

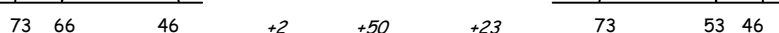
In summary, help your child to:

- 1) Subtract mentally a one-digit number from any two- or three-digit number, crossing 10 & 100
eg $78 - 5 = 73$, $45 - 8 = 37$, $204 - 8 = 196$
- 2) Subtract mentally 10 or a multiple of 10 from any two-digit or three-digit number, crossing 100
eg $107 - 10 = 97$, $116 - 30 = 86$, $426 - 70 = 356$
- 3) Partition two- & three-digit numbers into multiples of 100, 10 & 1 eg $631 = 600 + 30 + 1$
- 4) Subtract mentally any pair of two-digit numbers eg $73 - 27 = 46$
Either by counting up: $73 - 27$, start at 27, count up 3 then 40 then 3 = 46, demonstrated on the number line ...

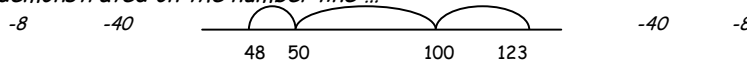
Or by partitioning & taking away: $73 - 27 = 73 - 7 - 20 = 66 - 20 = 46$ or $73 - 27 = 73 - 20 - 7 = 53 - 7 = 46$, demonstrated on the number line ...



- 5) Subtract mentally a two-digit number from a three-digit number eg $123 - 48 = 75$
Either by counting up: $123 - 48$, start at 48, count up 2 then 50 then 23 = 75, demonstrated on the number line ...



Or by partitioning & taking away: $123 - 48 = 123 - 8 - 40 = 115 - 40 = 75$ or $123 - 48 = 123 - 40 - 8 = 83 - 8 = 75$, demonstrated on the number line ...



- 6) Subtract mentally 'special cases' of pairs of two-digit numbers & two- & three-digit numbers

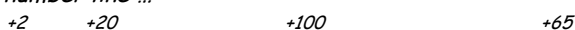
By compensating: eg $126 - 68 = 126 - 70 + 2 = 58$

Finding $123 - 115 = 75$ counting up: eg $204 - 197$, start at 123, count up 83 then 75 then 14 = 7

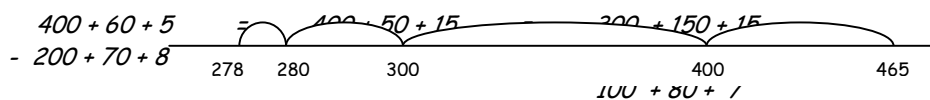
- 7) Subtract mentally pairs of multiples of 10 & 100 eg $95 - 38 = 57$ so $950 - 380 = 570$
- 8) Subtract mentally pairs of decimals eg $95 - 38 = 57$ so $9.5 - 3.8 = 5.7$

- 9) Use efficient written methods to subtract two- & three-digit numbers eg $465 - 278$

Either by counting up: $465 - 278$, start at 278, count up 2 then 20 then 100 then 65 = 187, demonstrated on the number line ...



Or by using a written method eg $465 - 278$:



Leading to decomposition:

$$\begin{array}{r} 3 \quad 1 \quad 5 \quad 1 \\ 4 \quad 6 \quad 5 \\ - 2 \quad 7 \quad 8 \\ \hline 1 \quad 8 \quad 7 \end{array}$$

Multiplication

In summary, help your child to:

- 1) Know multiplication facts up to 10×10 eg $4 \times 6 = 24$, $5 \times 9 = 45$, $7 \times 8 = 56$
- 2) Recognise multiples of numbers to 10 up to the tenth multiple eg numbers in the 5 times table always end in 5 or 0, here are four numbers in the 6 times table - 6, 24, 42, 54 etc
- 3) Double two-digit numbers eg double $43 = 86$, double $47 = 94$, double $57 = 114$
- 4) Multiply & divide whole numbers & decimals by 10, 100 or 1,000 eg $23 \times 100 = 2,300$, $4.6 \times 10 = 46$, $49 \div 10 = 4.9$
- 5) Use multiplication facts up to 10×10 to multiply pairs of multiples of 10 & 100 eg $3 \times 6 = 18$ so $30 \times 60 = 18 \times 10 \times 10 = 1,800$, $5 \times 8 = 40$ so $50 \times 800 = 40 \times 10 \times 100 = 40,000$
- 6) Use doubles of two-digit numbers to calculate doubles of multiples of 10 & 100 eg double $36 = 72$ so double $360 = 720$, double $78 = 156$ so double $780 = 1,560$
- 7) Use multiplication facts up to 10×10 to find related multiplication facts involving decimals eg $3 \times 6 = 18$ so $0.3 \times 6 = 18 \div 10 = 1.8$, $5 \times 8 = 40$ so $0.5 \times 0.8 = 40 \div 100 = 0.4$
- 8) Use doubles of two-digit numbers to calculate doubles of decimals eg double $36 = 72$ so double $3.6 = 7.2$, double $78 = 156$ so double $0.78 = 1.56$
- 9) Multiply mentally a two-digit number by a one-digit number eg $23 \times 4 = (20 \times 4) + (3 \times 4) = 80 + 12 = 92$, $86 \times 7 = (80 \times 7) + (6 \times 7) = 560 + 42 = 602$, demonstrated by the 'grid method' of multiplication ...

x	20	3	Total
4	80	12	92

x	80	6	Total
7	560	42	602

- 10) Use efficient written methods to multiply two- & three-digit numbers eg 23×64

Either using the 'grid method' ...

x	20	3	Total
60	1,200	180	1,380
4	80	12	92
Total	1,280	92	1,472

Or by using a written method eg 23×64 :

$$\begin{array}{r}
 64 \\
 \times 23 \\
 \hline
 12 \quad (3 \times 4) \\
 180 \quad (3 \times 60) \\
 80 \quad (20 \times 4) \\
 \underline{1,200} \quad (20 \times 60) \\
 \underline{1,472} \\
 1
 \end{array}$$

Leading to 'long multiplication':

$$\begin{array}{r}
 64 \\
 \times 23 \\
 \hline
 192 \quad (3 \times 64) \\
 \underline{1,380} \quad (20 \times 64) \\
 \underline{1,472} \\
 1
 \end{array}$$

Division

In summary, help your child to:

- 1) Count on or back in steps of constant size *eg count in 6s up to 60 & back ie 6, 12, 18, 24, 30, 36, 42, 48, 54, 60, 54, 48, 42, 36, 30, 24, 18, 12, 6*
- 2) Know division facts up to 10×10 *eg $32 \div 4 = 8$, $42 \div 6 = 7$, $72 \div 8 = 9$*
- 3) Use doubles of two-digit numbers to find corresponding halves *eg twice $47 = 94$ so 94 halved is 47*
- 4) Multiply & divide whole numbers & decimals by 10, 100 & 1,000 *eg $56 \div 10 = 5.6$, $720 \div 10 = 72$, $8,430 \div 1,000 = 8.43$*
- 5) Use division facts up to 10×10 to divide pairs of multiples of 10 & 100 *eg $320 \div 4 = (32 \div 4) \times 10 = 8 \times 10 = 80$, $4,200 \div 6 = (42 \div 6) \times 100 = 7 \times 100 = 700$*
- 6) Use halves of two-digit & three-digit even numbers to calculate halves of multiples of 10 & 100 *eg half of $36 = 18$ so half of $360 = 180$, half of $174 = 97$ so half of $1,740 = 970$*
- 7) Use division facts up to 10×10 to find related division facts involving decimals *eg $3.2 \div 4 = (32 \div 4) \div 10 = 8 \div 10 = 0.8$, $0.42 \div 6 = (42 \div 6) \div 100 = 7 \div 100 = 0.07$*
- 8) Use halves of two-digit & three-digit even numbers to calculate halves of multiples of decimals *eg half of $36 = 18$ so half of $3.6 = 1.8$, half of $174 = 97$ so half of $1.74 = 0.97$*
- 9) Divide two-digit numbers by a one-digit number where the answer is a one-digit number with a remainder *eg $26 \div 6 = 4$ remainder 2, $57 \div 8 = 7$ remainder 1, $76 \div 9 = 8$ remainder 4*
- 10) Use efficient written methods to divide a three-digit number by a one-digit number *eg $261 \div 7 = 37$ remainder 2*

Either using the 'chunking' method of repeated subtraction ...

$ \begin{array}{r} 7) \ 261 \\ - \ 70 \\ \hline 191 \\ - \ 70 \\ \hline 121 \\ - \ 70 \\ \hline 51 \\ - \ 49 \\ \hline 2 \\ \text{Answer: } 37 \text{ remainder } 2 \end{array} $	<i>or more quickly</i>	$ \begin{array}{r} 7) \ 261 \\ - \ 210 \\ \hline 51 \\ - \ 49 \\ \hline 2 \\ \text{Answer: } 37 \text{ remainder } 2 \end{array} $
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Or by partitioning ...

$$\begin{aligned}
 261 \div 7 &= (210 + 51) \div 7 \\
 &= (210 \div 7) + (51 \div 7) \\
 &= 30 + 7 \text{ remainder } 2 \\
 &= 37 \text{ remainder } 2
 \end{aligned}$$

Leading to 'short division':

$$\begin{array}{r}
 \overline{37} \text{ remainder } 2 \\
 7) \ 2 \ 26 \ 51
 \end{array}$$