

CALCULATIONS

Pupils should be taught to:

Consolidate understanding of the operations of multiplication and division, their relationship to each other and to addition and subtraction; know how to use the laws of arithmetic

As outcomes, Year 7 pupils should, for example:

Use, read and write, spelling correctly: operation, commutative, inverse, add, subtract, multiply, divide, sum, total, difference, product, multiple, factor, quotient, divisor, remainder...

Understand addition, subtraction, multiplication and division as they apply to whole numbers and decimals.

Multiplication

Understand that:

- Multiplication is equivalent to and is more efficient than repeated addition.
- Because multiplication involves fewer calculations than addition, it is likely to be carried out more accurately.

Compare methods and accuracy in examples such as:

- Find the cost of 38 items at £1.99 each.
- Conclude it is easier to calculate $£2 \times 38$ then compensate by 38p than to add £1.99 a total of 38 times, or calculate 1.99×38 .

Understand the effect of multiplying by 0 and 1.

Division

Recognise that:

- $910 \div 13$ can be interpreted as 'How many 13s in 910?', and calculated by repeatedly subtracting 13 from 910, or convenient multiples of 13.
- Division by 0 is not allowed.
- A quotient (the result obtained after division) can be expressed as a remainder, a fraction or as a decimal, e.g.
 $90 \div 13 = 6 \text{ R } 12$
or $90 \div 13 = 6\frac{12}{13}$
or $90 \div 13 = 6.92$ (rounded to two decimal places)
The context often determines which of these is most appropriate.

Decide in the context of a problem how to express and interpret a quotient – that is:

- whether to express it with a remainder, or as a fraction, or as a decimal;
- whether to round it up or down;
- what degree of accuracy is required.

For example:

- Four small cars cost a total of £48 623. What should a newspaper quote as a typical cost of a small car?
An appropriate answer is rounded: about £12000 each.
- 107 pupils and staff need to be taken to the theatre. How many 15-seater minibuses should be ordered?
 $7\frac{2}{15}$ minibuses is not an appropriate answer for this example. To round $7\frac{2}{15}$ down to 7 would leave 2 people without transport. 8 minibuses is the appropriate answer.
- How many boxes of 60 nails can be filled with 340 nails?
 $340 \div 60 = 5 \text{ R } 40$ or $5\frac{2}{3}$, but the appropriate answer is obtained by rounding down to 5, ignoring the remainder.

See Y456 examples (pages 52–7).