CALCULATIONS

Pupils should be taught to:	As outcomes, Year 7 pupils should, for example:
Carry out more complex calculations using the facilities on a calculator	Use, read and write, spelling correctly: calculator, display, key, enter, clear, memory...  Know how to: • Key in money calculations, and measurements of time, e.g. 4 hours 15 minutes is keyed in as 4.25 hours. • Input a negative number. • Use the bracket keys and select the correct key sequence to carry out calculations involving more than one step, e.g. to calculate 364 ÷ (23 + 17). • Find whole-number remainders after division. • Convert units of time, e.g. 1000 minutes to hours and minutes. • Use the square and square root keys. • Consider the approximate size of an answer before and after a calculation and, where necessary, check it appropriately, e.g. by performing the inverse operation. For example: • Use a **calculator** to work out: a. $7.6 - (3.05 - 1.7)$ b. $\frac{8.4 - 3.7}{8.4 + 3.7}$
Interpret the display on a calculator in different contexts (fractions, decimals, money, metric measures, time)	Know how to: • Recognise a negative number in the display. • Recognise how brackets are displayed. • Interpret the display in the context of a problem, e.g. 109.2 may mean £109.20 in the context of money, 109 metres and 20 centimetres in the context of length, and 109 minutes and 12 seconds in the context of time. • Read the display of, say, 91.333 3333 after dividing 822 by 9 as '91 pointthreerecurring', and know that 0.3333333 represents one third. • Interpret a rounding error, e.g. when calculating 2 ÷ 7 × 7 some calculators may display 1.999999 instead of 2. For example: • Convert 950 hours to days and hours. The display after dividing 950 by 24 will be 39.583 333. Subtract 39 from the answer to give the fraction of a day, then multiply by 24 to convert the fraction of a day back to hours. **See Y456 examples (pages 70–1).** **Link to rounding numbers to one decimal place (pages 42–5).**

As outcomes, Year 8 pupils should, for example:

Use vocabulary from previous year and extend to: sign change key…

Know how to:
- Use the sign change or +/- key where appropriate.
- Use the memory and/or bracket keys, and select the correct key sequence to carry out complex calculations.
- Key in fractions, recognise the equivalent decimal form, and use this to compare and order fractions.
- Use the fraction key, including to enter time, e.g. 3 hours 25 minutes = $3\frac{25}{60}$ hours.
- Use the cube and cube root keys, if available.
- Consider the approximate size of an answer before and after a calculation and, where necessary, check it appropriately.

Use a **calculator** to evaluate correctly complex expressions such as those with brackets or where the memory function could be used.

For example:

- Use a calculator to work out

  $4 \times (6.78)^2$

Know how to:
- Recognise recurring decimals when they are rounded on the calculator, e.g. $2 \div 3$ is displayed as 0.666 66667.
- Recognise that if, for example, $\sqrt{3}$ is shown to be 1.732051 then $(1.732051)^2 \approx 3$.

Link to rounding numbers to one or two decimal places (pages 42–5), converting fractions to decimals (pages 64–5), working with integers, powers and roots (pages 48–59).

As outcomes, Year 9 pupils should, for example:

Use vocabulary from previous years and extend to: constant… reciprocal…

Know how to:
- Use the constant, π, sign change, power (x^y), root and fraction keys to evaluate expressions.
- Use the reciprocal key ($\frac{1}{x}$).

For example:
- Add on 101 repeatedly using the constant key. How long is the digit pattern maintained? Explain why.
- Find the circumference of a circle with radius 8 cm to two decimal places.
- Calculate 6^7, $\sqrt[4]{625}$, $\sqrt{(\frac{57.6}{\pi})}$, $\sqrt{(15.5^2 - 3.7^2)}$.
- Use a calculator to work out the answer as a fraction for $\frac{12}{19} + \frac{17}{22}$.

Use a **calculator** to evaluate more complex expressions such as those with nested brackets or where the memory function could be used.

For example:

- Use a calculator to work out:

  a. $\dfrac{45.65 \times 76.8}{1.05 \times (6.4 - 3.8)}$

  b. $4.6 + (5.7 - (11.6 \times 9.1))$

  c. $\{(4.5)^2 + (7.5 - 0.46)\}^2$

  d. $\dfrac{5 \times \sqrt{(4.5^2 + 6^2)}}{3}$

Understand how a **scientific calculator** presents large and small numbers in standard form, linking to work in science.

Link to multiplying by powers of 10 and writing numbers in standard form (page 39).

Use a **calculator** to investigate sequences involving a reciprocal function, such as:

$$x \rightarrow \frac{1}{x - 1}$$

Link to reciprocals (pages 82–3).

Link to rounding numbers to one or two decimal places (pages 42–5), converting fractions to decimals (pages 64–5), working with integers, powers and roots (pages 48–59).