

CALCULATIONS

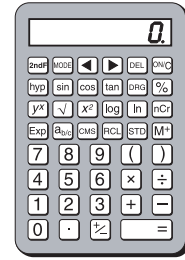
Pupils should be taught to:

Carry out more complex calculations using the facilities on a calculator

Interpret the display on a calculator in different contexts (fractions, decimals, money, metric measures, time)

As outcomes, Year 7 pupils should, for example:

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 $364 \div (23 + 17)$.
- 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. $8.4 - 3.7$
 $8.4 + 3.7$

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 point three recurring', and know that 0.333333 represents one third.
- Interpret a rounding error, e.g. when calculating $2 \div 7 \times 7$ 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 ($1/x$).

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 , $\sqrt[4]{625}$, $\sqrt{(57.6/\pi)}$, $\sqrt{(15.5^2 - 3.7^2)}$.
- 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:

$$\text{a. } \frac{45.65 \times 76.8}{1.05 \times (6.4 - 3.8)} \qquad \text{c. } \{(4.5)^2 + (7.5 - 0.46)\}^2$$

$$\text{b. } 4.6 + (5.7 - (11.6 \times 9.1)) \qquad \text{d. } \frac{5 \times \sqrt{(4.5^2 + 6^2)}}{3}$$

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 \(pages 48–59\).](#)