

Mathematics skills for GCSE science qualifications

Candidates need to have been taught and to have acquired competence in the areas of mathematics set out below in order to develop the knowledge, understanding and skills set out in the subject content.

Candidates are permitted to use calculators in all assessments.

Candidates are expected to understand and use units appropriately. However, not all questions need to reward the appropriate use of units.

Candidates should be able to:

- appreciate number, size and scale and the relationship between units
- make estimates of the results of simple calculations
- evaluate expressions incorporating the four operations, +, -, \times , \div , either singly or in conjunction with one another, quoting the answer to an appropriate number of significant figures
- evaluate expressions involving decimals, positive whole number powers, fractions and percentages using an appropriate number of significant figures
- understand and use simple direct proportion and simple ratios
- find arithmetic means
- understand and use common measures and simple compound measures such as speed
- plot and draw graphs (line graphs, bar charts, pie charts, scatter graphs) from suitable data, selecting appropriate scales for the axes
- understand that a measurement given to a whole number may be inaccurate by up to one half in either direction
- change the subject of an equation
- substitute numerical values into simple formulae and simple equations using appropriate units for physical quantities
- translate information between graphical and numeric form
- extract information from charts, graphs and tables – for example determine the slope and intercept of a straight line graph

- simple correlations
- understand and use estimates of probability
- work out areas, perimeters and volumes of simple shapes
- measure and use angles

In addition, higher tier candidates will be expected to be able to:

- evaluate expressions involving fractional and negative powers
- understand and use the symbols: =, <, <<, >>, >, ~
- understand and use inverse proportion
- understand and find mean, mode and median
- plot and draw histograms
- interpret, order and calculate with numbers written in standard index form
- understand that $y = mx + c$ represents a straight line and that m represents the slope and c the intercept
- use calculators to handle $\sin x$, $\cos x$, $\tan x$ when x is expressed in degrees
- Percentiles and deciles