add, subtract, multiply and divide using commutative, associative and distributive laws	
understand and use inverse operations	
use brackets and the hierarchy of operations	
round numbers to the nearest 10, 100, 1000 or million	
round numbers to the nearest whole number	
round to a given number of decimal places	
round to a given number of significant figures	
choose an appropriate degree of accuracy to round to based on the figures in the question	
convert an ordinary number into standard form	
convert a standard form number into ordinary form	
order and calculate with numbers in standard form	
interpret standard form on a calculator	
use a calculator effectively for standard form calculations	
write down the maximum or minimum figure for a value rounded to a given accuracy	
combine upper or lower bounds appropriately to achieve an overall maximum or minimum for a situation	
work with practical problems involving bounds including in statistics, e.g. finding the midpoint of a class interval such as $10 < t \leq 20$ in order to estimate a mean	
use a calculator for calculations involving four rules	
use a calculator for checking answers	
enter complex calculations, for example, to estimate the mean of a grouped frequency distribution	
enter a range of calculations including those involving money and statistical measures	
understand and use functions including $+$, $-$, $\times$, $\div$, x^2, x^3, x^n, $\sqrt{x}$, $\sqrt[3]{x}$, memory, brackets and trigonometrical functions	
understand the calculator display, knowing how to interpret the display, when the display has been rounded by the calculator and not to round during the intermediate steps of calculation	

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interpret the display, for example for money interpret 3.6 as £3.60	
Identify equivalent fractions	
simplify a fraction by cancelling all common factors using a calculator where appropriate. For example, simplifying fractions that represent probabilities	
understand whether a value is a percentage, a fraction or a decimal	
convert values between percentages, fractions and decimals in order to compare them; for example, with probabilities	
use fractions to interpret or compare statistical diagrams or data sets	
interpret a fraction or decimal as a multiplier when solving problems	
convert between fractions, decimals and percentages to find the most appropriate method of calculation in a question; for example, finding 62% of £80	
calculate a fraction of a quantity	
calculate with decimals	
apply the four rules to fractions using a calculator	
calculate with fractions and decimals in a variety of contexts including statistics and probability	
calculate with compound interest in problems	
understand the meaning of ratio notation	
interpret a ratio as a fraction	
simplify ratios to the simplest form $a : b$ where a and b are integers	
use ratio and proportion to solve statistical and number problems	
solve problems involving repeated proportional change	
use notations and symbols correctly	
understand that letter symbols represent definite unknown numbers in equations, defined quantities or variables in formulae, and in functions they define new expressions or quantities by referring to known quantities	
understand phrases such as ‘form an equation’, ‘use a formula’ and ‘write an expression’ when answering a question	
interpret any of the statistical graphs described in full in the topic ‘Data Presentation and Analysis’ specification reference S3.2	
Understand and use the statistical problem solving process which involves • specifying the problem and planning • collecting data • processing and presenting the data • interpreting and discussing the results	

answer questions related to any of the bullet points above	
know the meaning of the term ‘hypothesis’	
write a hypothesis to investigate a given situation	
discuss all aspects of the data handling cycle within one situation	
include sampling as part of their understanding of the DHC. Candidates will be expected to choose suitable sampling methods and discuss bias	
discuss their findings in depth with awareness of their significance	
decide whether data is qualitative, discrete or continuous and use this decision to make sound judgements in choosing suitable diagrams for the data	
understand the difference between grouped and ungrouped data	
understand the advantages of grouping data and the drawbacks	
distinguish between data that is primary and secondary	
understand how and why bias may arise in the collection of data	
offer ways of minimising bias for a data collection method	
write or criticise questions and response sections for a questionnaire	
suggest how a simple experiment may be carried out	
have a basic understanding of how to collect survey data	
understand the data collection methods observation, controlled experiment, questionnaire, survey and data logging	
know where the different methods might be used and why a given method may or not be suitable in a given situation	
design and use data collection sheets for different types of data	
tabulate ungrouped data into a grouped data distribution	
interrogate tables or lists of data, using some or all of it as appropriate	
design and use two-way tables	
complete a two-way table from given information	
draw any of the above charts or diagrams	
draw composite bar charts as well as dual and multiple bar charts	
understand which of the diagrams are appropriate for different types of data	

complete an ordered stem-and-leaf diagram	
use lists, tables or diagrams to find values for the above measures	
find the mean for a discrete frequency distribution	
find the median for a discrete frequency distribution or stem-and-leaf diagram	
find the mode or modal class for frequency distributions	
calculate an estimate of the mean for a grouped frequency distribution, knowing why it is an estimate	
find the interval containing the median for a grouped frequency distribution	
calculate quartiles and inter-quartile range from a small data set using the positions of the lower quartile and upper quartile respectively and calculate inter-quartile range	
read off lower quartile, median and upper quartile from a cumulative frequency diagram or a box plot	
find an estimate of the median or other information from a histogram	
choose an appropriate measure according to the nature of the data to be the ‘average’	
interpret any of the types of diagram listed in S3.2	
obtain information from any of the types of diagram listed in S3.2	
find patterns in data that may lead to a conclusion being drawn	
look for unusual data values such as a value that does not fit an otherwise good correlation	
recognise and name positive, negative or no correlation as types of correlation	
recognise and name strong, moderate or weak correlation as strengths of correlation	
understand that just because a correlation exists, it does not necessarily mean that causality is present	
draw a line of best fit by eye for data with strong enough correlation, or know that a line of best fit is not justified due to the lack of correlation	
use a line of best fit to estimate unknown values when appropriate	
compare two diagrams in order to make decisions about an hypothesis	
compare two distributions in order to make decisions about an hypothesis by comparing the range, or the inter-quartile range if available, and a suitable measure of average such as the mean or median	
use words to indicate the chances of an outcome for an event	
use fractions, decimals or percentages to put values to probabilities	
place probabilities or outcomes to events on a probability scale	

work out probabilities by counting or listing equally likely outcomes	
estimate probabilities by considering relative frequency	
place probabilities or outcomes to events on a probability scale	
list all the outcomes for a single event in a systematic way	
list all the outcomes for two events in a systematic way	
use two way tables to list outcomes	
use lists or tables to find probabilities	
understand when outcomes can or cannot happen at the same time	
use this understanding to calculate probabilities	
appreciate that the sum of the probabilities of all possible mutually exclusive outcomes has to be 1	
find the probability of a single outcome from knowing the probability of all other outcomes	
determine when it is appropriate to add probabilities	
determine when it is appropriate to multiply probabilities	
understand the meaning of independence for events	
understand conditional probability	
understand the implications of with or without replacement problems for the probabilities obtained	
complete a tree diagram to show outcomes and probabilities	
use a tree diagram as a method for calculating probabilities for independent or conditional events	
understand and use the term relative frequency	
consider differences where they exist between the theoretical probability of an outcome and its relative frequency in a practical situation	
understand that experiments rarely give the same results when there is a random process involved	
appreciate the ‘lack of memory’ in a random situation, e.g. a fair coin is still equally likely to give heads or tails even after five heads in a row	
understand that the greater the number of trials in an experiment the more reliable the results are likely to be	
understand how a relative frequency diagram may show a settling down as sample size increases enabling an estimate of a probability to be reliably made; and that if an estimate of a probability is required, the relative frequency of the largest number of trials available should be used	