

## Maths

The skills you learn while studying Maths are useful in a very wide range of careers. Through the study of maths, you learn about things like:

- numbers, sequences and graphs
- collecting, processing and interpreting data
- solving problems
- shape, space and measures
- estimating and calculating the probability of events
- mathematical reasoning
- applying maths.

You can study Maths:

- at *GCSE, AS level* and *A level*
- as part of the *Cambridge Pre-U Diploma*
- at Standard level or Higher level in the *International Baccalaureate Diploma*
- in Further Maths at AS level and A level
- in *higher education* (HE).

Many people's jobs contain one or more of these elements - even jobs that, at first glance, seem to have little to do with maths. Many employers require, amongst other exam passes, a GCSE pass at grade C or above in Maths. You will also need GCSE Maths at grade C or above to apply for many further and higher education courses. It's also true that, even in jobs where ability in maths is not a requirement for entry, as you climb the ladder and take on more responsibility, number skills become more important, especially in areas such as handling *budgets*. If you are keen to use maths as a key feature of your work, this article will give you some ideas about a broad range of careers that you might be interested in.

<b>Data handling</b>	<p><b>Payroll Assistant</b> - Payroll assistants keep records of the number of hours worked by staff in an organisation. They calculate the correct salary or wage based on information such as rates of pay, bonuses, overtime and other factors, such as piecework. They also calculate income tax and National Insurance contribution deductions, and adjust wages according to changes in circumstances like promotion, general pay increases, maternity pay and sick leave. They use calculators, computer spreadsheets or specialist financial software packages to work out the correct rate of pay. Most employers prefer applicants with some GCSEs at grade C or above, including English and Maths.</p> <p><b>Post Office Counter Clerk</b> - Post office counter clerks provide a range of services, such as selling stamps, weighing parcels and giving advice to customers. They also process a range of other services, for example, foreign currency, lottery tickets, passport applications, travel insurance and banking services. Some counter clerks have administrative duties away from the counter, for example, looking after stock or keeping accounts. You will need to have number skills and be able to handle cash confidently. There are no formal entry requirements, although GCSEs at grade C or above in English and Maths might be preferred.</p>
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<b>Data interpretation</b>	<p><b>Airline Pilot</b> - Airline pilots have overall responsibility for the safety of an aircraft, crew and passengers. Before take-off, the pilots (there are usually two - a captain and a co-pilot) plan the flight. This involves activities such as obtaining weather forecasts, planning routes and calculating the weight and balance of the aircraft. Most of the information is produced by a computer but the pilot must be able to understand the data and interpret it. Pilots then perform various checks, to make sure all the controls and instruments are working properly. Taking off and landing are the most difficult parts of the job; pilots must handle the controls themselves while monitoring the instruments and making any necessary changes. Pilots must be alert at all times to any changes in circumstances, including weather conditions. The minimum requirement for entry to training is usually five GCSEs at grade C or above, including Maths. However, as competition for places is strong, many applicants have A levels or are graduates.</p> <p><b>Retail Buyer</b> - Retail buyers purchase goods from importers, manufacturers, wholesalers or fashion houses, to sell at a profit. The success of the business depends on providing the right goods at the right price, in the right place, at the right time. To do this, retail buyers must keep to their budget and work out whether the goods will sell once the firm's mark-up is added to the cost price. They take into consideration store policy, public demand and the economic situation. Data provided by electronic point-of-sale systems must be looked at carefully and past sales figures analysed. Buyers have to anticipate trends, find new sources of supply, and negotiate with suppliers. They discuss contracts, arrange delivery dates so that goods arrive on time and warehouses are not overstocked, and then monitor the profitability of the goods. Retail buyers usually have a degree.</p> <p><b>Market Research Analyst</b> - Market research analysts try to make sense of large amounts of data; this helps companies and organisations to judge people's opinions about particular products or topics of discussion. Analysts interpret computerised data that has been collected by market research interviewers. They then present their conclusions in a report that can be readily understood by the customer. Their report usually includes tables, graphs and charts. Market research analysts must give reasons for their conclusions and recommendations, as these might be used to help an organisation decide on issues like product design and advertising policy. Most entrants are graduates with good number, analytical, IT and communication skills.</p>
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Problem solving - numerical	<p><b>Accountant</b> (Industry and Commerce) - Accountants in industry and commerce help organisations to manage their finances, by producing and examining financial records and statements to make sure they provide an accurate financial picture. Accountants working for a company might specialise in financial or management accountancy.</p> <p><b>Financial accountants</b> concentrate on financial matters of daily concern such as dealing with internal audits, tax, wages and record keeping. They record all the costs of a company including human resources, transport and materials. Management accountants advise on the financial implications of long-term plans. They analyse and interpret the information needed for planning and controlling a company's income and expenditure. They might, for example, help to decide if it is worth investing in sponsorship and advertising, taking into account factors such as the economic climate, changes in interest rates and the relative strength of competitors. Many applicants have a degree. They then combine on-the-job training with part-time study and written exams for a professional qualification. It is also possible to start training with A levels or equivalent.</p>
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Problem solving - mathematical	<p><b>Operational Researcher</b> - Operational researchers use logical and mathematical methods to analyse and solve management problems. They help organisations to find more efficient ways to do things, reduce costs or improve the quality of products. Operational researchers provide help both with immediate problems and with longer-term planning and forecasting. Operational researchers use their analytical skills in many different situations. For example, they might:</p> <ul style="list-style-type: none"> <li>• help a supermarket to decide where to locate a new superstore</li> <li>• calculate the different prices to charge for seats on an aircraft</li> <li>• help a company to decide how many people it needs to recruit</li> <li>• plan how to re-route a bus service</li> <li>• help to make sure that crowds flow safely to and from a football stadium.</li> </ul> <p>Almost all entrants are graduates. At degree level, operational research is usually combined with maths, statistics, computing or management science. Many entrants also have a postgraduate qualification in operational research or decision sciences.</p> <p><b>Computer Games Programmer</b> - Computer games programmers turn the ideas and specifications of games designers into games and apps for different types of computer, console, tablet, mobile phone, social network platform, and so on. They do this by writing computer code or using a range of programming tools that generate code for them. Computer games are extremely complicated, so there is usually a team of programmers working on each one. The programming is divided into a number of tasks, with each one given to a different programmer. Advanced programming skills, preferably in a number of different computer languages, are essential. Games programmers need mathematical ability in order to program the movement of three-dimensional objects. Many programmers have a degree in a subject such as computer games programming, computer science, maths or physics.</p>
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**Therapeutic Radiographer** - Therapeutic radiographers use radiation to treat diseases, especially cancer. They control complex equipment that delivers the radiation, usually X-rays, to the diseased part of the body. Before the treatment begins, they explain the process, and possible side-effects, to the patient. As the treatment goes on, they give the patient support, information and reassurance. Therapeutic radiographers work out the location and size of the tumour, and the radiation dose needed, working to avoid damage to healthy, surrounding parts of the body. Treatment usually takes place over a number of days or weeks, with rest periods in between. The radiographer positions the patient under the equipment, which they then control to treat the cancer from different angles. Throughout treatment, radiographers keep careful track of the patient's progress, talking to them about their concerns and helping them to cope with any side-effects caused by the effect of radiation on surrounding normal cells. To enter this career, you'll need a degree or postgraduate qualification in therapeutic radiography, leading to registration with the Health Professions Council.

**Assistant Quantity Surveyor** - Assistant quantity surveyors assist quantity surveyors in costing building projects. Before a project begins, they estimate quantities and costs of materials, labour, plant, taxes and the likely maintenance costs for a new building or civil engineering project. They may, for example, work out the amount of steel and concrete required for a bridge, the number of bricks and roof tiles for a housing estate and the quantity of glass for an office block. They then prepare a list of all the items required for a project and a list of quantities. Contractors use this list to work out their bids for the project. Assistant quantity surveyors also do measurement work on construction sites, measuring the work that has been completed at various stages of the project. These measurements are used to calculate actual costs for labour and so on. You train as an assistant quantity surveyor by becoming a trainee with a firm and studying for a relevant qualification such as an Edexcel (BTEC) National Certificate, or by taking a full-time college course.

<b>Working on probabilities</b>	<p><b>Actuary</b> - Actuaries are employed to advise financial institutions, such as insurance or pension companies, on risk management. They use mathematical theories to analyse financial problems, in order to predict future risks for long-term financial planning. This information is used to calculate the premiums payable for insurance policies or for checking that an insurance company has enough money to pay future claims, for example. Many actuaries are employed by pension companies to make sure that there is enough money in the fund to meet the commitments to current policyholders. Their work could also involve advising on investments on the stock market. Others work in the public sector, for example, the Government Actuary's Department, advising on social policy. To become an actuary, you usually need a good honours degree. Employers look for people with good numerical skills; many actuarial trainees are maths graduates. People with other numerate degrees, such as actuarial science, statistics, economics or physics, need a good A level grade in maths.</p> <p><b>Meteorologist</b> - Meteorologists study the atmosphere and how it affects the Earth. They use their findings to understand and predict weather and climate. They collect data on atmospheric conditions such as pressure, wind, temperature, humidity and cloud level. They use weather stations on land and ships, radar and satellites to collect data at fixed times of the day. As well as providing advice to the public in the form of weather forecasts, meteorologists advise government, industry, agriculture and the armed forces. Some meteorologist's study and measure global climate change over longer periods, assessing the implications of this for the environment. Meteorologists are graduates. There are some specialist degrees in meteorology. Many entrants have first degrees in maths or physics, followed by a specialist postgraduate qualification.</p>
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<b>Applying mathematics</b>	<p>This is a skill required in all branches of engineering and physical science.</p> <p><b>Aeronautical Engineer</b> - Aeronautical engineers apply their engineering skills to their work with highly sophisticated products such as aircraft, missiles and space vehicles. They usually specialise in research, design, manufacture or maintenance. Some aeronautical engineers specialise in new designs or improving existing ones. This work is largely mathematical and involves testing ideas using computers. In design work, the engineer's aim may be to improve safety, or reduce fuel consumption or air and noise pollution. Other engineers are specialists in flight testing. Based on test results, they may advise changes to improve safety, reliability and efficiency. The usual requirement for this career is a relevant <u>degree</u> or <u>HND</u>, such as aerospace or aeronautical engineering.</p> <p><b>Broadcast Engineer</b> - Broadcast engineers develop, maintain and support the equipment used to make television and radio broadcasts. They install and modify the different broadcasting systems, developing and supporting the latest technologies. For example, they develop and support digital television and online internet services. Broadcast engineers who work in television are responsible for the audio and video equipment used for studio recordings, and for network and outside broadcasts. In a large television company, studio engineers are likely to provide support to different departments, including news, broadcast and production. Some broadcast engineers are responsible for the quality of signals fed to, and received from, a number of networks. Other broadcast engineers work on location for outside broadcasts, or are based at transmitting stations, which can be in remote areas. Most entrants have a relevant <u>degree</u> or <u>HND</u>. There is very strong competition for entry.</p>
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Teaching	<p><b>Maths Teacher</b> - In secondary schools, pupils learn about topics such as fractions, decimals, ratios, powers, roots, algebra, probability and statistics. Teaching methods include group and project work, using audio-visual materials, calculators, interactive whiteboard work and online games. Maths teachers also have to plan lessons, mark work, write reports, go to meetings and give feedback. To enter, you'll need a degree that leads to Qualified Teacher Status (QTS), or to follow a relevant degree with postgraduate training leading to QTS.</p>
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