

## Information sheet

# Mathematician

The occupation criteria for Mathematician have been endorsed by the Australian Mathematical Sciences Institute.

ANZSCO: 224112

Group A

### About this document

- › The following Information Sheet is for your reference only and should be used as a guide to assist with your Skills Assessment application to VETASSESS. This information is subject to change.
- › Please note that a Skills Assessment of the qualification involves assessment of both the qualification level and content. Qualifications are assessed according to the guidelines published by the Department of Education, Skills and Employment.
- › The employment assessment involves determining the skill level and relevance of the tasks undertaken.
- › Integrity checks may be conducted to verify the qualification and employment claims made in an application.

### General assessment criteria

This occupation requires a qualification assessed as comparable to the education level of an Australian Qualifications Framework (AQF) Bachelor Degree or higher degree and in a field highly relevant to the nominated occupation.

In addition to the above, it is essential for applicants to meet the following employment criteria:

- › at least one year of post-qualification employment at an appropriate skill level,
- › undertaken in the last five years,
- › working 20 hours or more per week, and
- › highly relevant to the nominated occupation.

Please note in order to achieve a successful Skills Assessment Outcome, a positive assessment for both qualifications and employment is required.

### Occupation Description

A MATHEMATICIAN develops and applies mathematical principles and techniques to solve problems in all areas of the sciences, engineering, technology, social sciences, business, industry and commerce.

### Specialisation

Operations Research Analyst

### Closely related Occupations in ANZSCO Unit Group 2241:

- › Actuary
- › Statistician
- › Data Analyst
- › Data Scientist

### Qualification

AQF Bachelor Degree or equivalent as minimum required level.

Highly relevant fields of study include:

- › Pure Mathematics
- › Applied Mathematics
- › Mathematical Physics
- › Financial Mathematics
- › Operations Research
- › Mathematical Statistics

Mathematics is the study of deductive systems, including algebra, number theory, geometry, analysis, differential equations, discrete mathematics, and their application in the sciences, business, finance, and other fields.

Qualifications in certain fields (as listed below in dot point) may be accepted on a case by case basis if the program consists of sufficient subjects in Mathematics, Algebra, Calculus, Predictive Modelling, Numerical Analysis, Optimisation, Linear Algebra, Machine Learning, Discrete Mathematics, Mathematical Modelling, Geometry, Combinatorics, Topology, Logic, Number Theory, Dynamic Systems, Differential Equations, and Financial Mathematics.

- › Actuarial Science
- › Quantitative Finance
- › Statistics
- › Computer Science
- › Data Science
- › Electronic/Computer Engineering
- › Physics
- › Machine Learning

Final year subjects and research projects undertaken are analysed and weighted higher in our analysis of the major.

## Employment

One year of (post qualification) highly relevant employment completed in the last five years at an appropriate skill level to the nominated occupation.

## Employment tasks

Required ANZSCO tasks for this occupation include:

- › Formulating mathematical models to simulate processes
- › Applying models to experimental observations, and adjusting and recasting the models
- › Using numerical analysis methods to develop algorithms and perform computations

Additional tasks:

- › Develops mathematical theory underlying processes in the physical, biological and social sciences
  - › May develop theoretical mathematical constructs and hypotheses
  - › Applies mathematical principles and techniques to the solution of problems in research, development, production, distribution and other functional areas
  - › Liaising with management and clients to determine the subject area to be examined
  - › Applying mathematical and statistical methods to financial and risk management problems
- \* An applicant should be undertaking the majority of these tasks as their core duties in an employment role. Although it is not mandatory that they perform all tasks listed, an applicant is required to demonstrate that their daily tasks and skillset matches the nominated occupation.

## Employment context

In Australia, there are currently no legal requirements for licensing or registration for the occupation Mathematician.

Mathematicians typically do the following:

- › Expand knowledge in mathematical areas, such as algebra or geometry, by developing new rules, theories, and concepts
- › Use mathematical formulas and models to prove or disprove hypotheses and conjectures
- › Apply mathematical theories and techniques to solve practical problems in business, engineering, the sciences, or other fields

## Operations Research Analyst (ANZSCO specialisation)

An Operations Research Analyst applies scientific method to problems concerning the management of systems of people, machines, materials and money in industry, business government and defence.

- › Identify and solve real-world problems in areas such as business, logistics, healthcare, or other fields
- › Collect and organise information from a variety of sources, such as computer databases, sales histories, and customer feedback
- › Examine information to figure out what is relevant to a problem and what methods might be used to analyse it
- › Use optimisation, data mining, statistical analysis, simulations, predictive modelling, or other methods to analyse information and develop practical solutions to business problems
- › Advise managers and other decision makers on the impacts of various courses of action to take in order to address a problem

## Computational Scientist (specialisation)

A computational scientist seeks to gain understanding of scientific and engineering problems principally through the implementation, use and analysis of mathematical models on high performance computers.

- › Undertake numerical simulation of complex systems and natural phenomena that would be too expensive or dangerous to study by direct experimentation
- › Work with specialist scientists and engineers to deliver computer-based mathematical models in areas such as climate modelling, oceanography, mining, nuclear engineering and medical imaging

## Mathematical Modeller (specialisation)

Mathematical modellers are applied mathematicians who construct mathematical representations of real-world situations or hypothetical scenarios in order to predict outcomes and consequences or to create visualisations. Applications can range from manufacturing, environmental modelling through to computer/video games and computer-generated imagery (CGI).

- › Quantify real world problems and scenarios using appropriate mathematical tools and in consultation with domain specialists
- › Work with software engineers and computational scientists to implement mathematical models as computer algorithms with suitable user interfaces and visualisation tools
- › In scientific and commercial environments, advise researchers, managers and other decision makers of likely outcomes and impacts of various hypothetical scenarios

## Quantitative Analyst (specialisation)

A quantitative analyst applies mathematical, statistical, data analysis and machine learning techniques to financial and risk management problems. They are employed by banks, quantitative trading firms, investment companies, hedge funds and other financial institutions.

- › Implementing complex models to make financial and business decisions about investments and the risk and value of assets
- › Developing computer code to evaluate financial data and create trading strategies
- › Researching and analysing financial data to create efficient and accurate modelling tools

## Cryptographer (specialisation)

Cryptographers/cryptanalysts use the mathematical theories of cryptology and computer coding to create and decipher digital codes. They are employed by companies, institutions, government agencies, police and the armed forces to maintain security and privacy of sensitive commercial and government transactions and communications.

- › Create, set-up, and evaluate algorithms designed to solve number theory problems
- › In government and military sectors protect sensitive communication and data systems from foreign governments and hackers. Also provide decryption expertise for intelligence and counter-intelligence services

- › In the financial sector ensure that credit card, inter-bank, automatic teller machine, and other online transactions are secure
- › In the communications sector develop technology to protect mobile phone and internet networks

## Employment not considered

Employment focused on prediction/interpretation, survey design and statistical modelling is more relevant to the occupation of Statistician. An individual needs to show that the major responsibility of the role is to develop and apply mathematical principles and techniques to meet the occupation of Mathematician.

Employment in the financial and commercial sector focused on business and budgetary forecasting may be more suited to the occupation of Information and Organisational Professionals NEC (ANZSCO 224999).

The Australian Computer Society assesses Data Scientists and Data Analysts working exclusively in ICT occupations.



## Contact us

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