VETASSESS

Information sheet

Mathematician

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 Australian Government Department of Education.
- 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.

Job description

Mathematicians develop and apply mathematical principles and techniques to solve problems in all areas of the sciences, engineering, technology, social sciences, business, industry and commerce. The occupation of Mathematician criteria have been endorsed by the Australian Mathematical Sciences Institute.

Occupations considered suitable under this ANZSCO code:

- Operations Research Analyst

Closely related occupations in ANZSCO Unit Group 2241:

- Actuary
- Statistician

Mathematician is a VETASSESS Group A occupation

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

GROUP A	Criteria for a suitable Skills Assessment		
	Comparable Bachelor degree AQF level	With highly relevant major field of study	Relevant employment duration
1	 +	 +	
Pre-qualification methodology does not apply to Group A occupations			

The information below describes the available pathways for a Skills Assessment under**Group A**. Please note that in order to achieve a suitable Skills Assessment Outcome, a suitable assessment for both qualifications and employment is required.

Pathway 1

This pathway 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.

Bachelor degree or higher degree includes AQF Master Degree or AQF Doctoral Degree.

In addition, 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.

Qualification

Mathematics is the study of deductive systems, including algebra, number theory, geometry, analysis, differential equations, discrete mathematics, and its application in the sciences and social sciences.

Qualifications in certain fields (listed below) 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.

This includes:

- 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 required major field of study.

Highly relevant major fields of study include:

- Mathematics (Pure and/or Applied)
- Financial Mathematics
- Operations Research
- Mathematical Statistics

Employment

Highly relevant tasks 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 may include:

- developing mathematical theory underlying processes in the physical, biological and social sciences.
- may develop theoretical mathematical constructs and hypotheses.
- applying mathematical principles and techniques to solve problems in research, development, production, distribution and other functional areas.
- liaising with management and clients to determine the subject area to be examined.

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 of 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

Types of mathematicians

Applied Mathematicians

use theories and techniques, such as mathematical modelling, to solve practical problems. These mathematicians typically work with individuals in other occupations to solve these problems. For example, they may work with Chemists and Materials Scientists and Chemical Engineers to analyse the effectiveness of new drugs. Other Applied Mathematicians may work with Industrial Designers to study the aerodynamic characteristics of new automobiles.

Theoretical Mathematicians

do research to identify unexplained issues in mathematics and resolve them. They are primarily concerned with exploring new areas and relationships of mathematical theories to increase knowledge and understanding about the field. Although some may not consider the practical use of their findings, the knowledge they develop can be an important part of many scientific and engineering achievements. Despite the differences, these areas of mathematics frequently overlap. Many Mathematicians will use both applied and theoretical knowledge in their job duties.

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.

Highly relevant tasks include, but may not be limited to:

- Identifying and solving real-world problems in areas such as business, logistics, healthcare, or other fields.
- Collecting and organising information from a variety of sources, such as computer databases, sales histories, and customer feedback.
- Examining information to figure out what is relevant to a problem and what methods might be used to analyse it .
- Using optimisation, data mining, statistical analysis, simulations, predictive modelling, or other methods to analyse information and develop practical solutions to business problems.
- Advising 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.

Highly relevant tasks include, but may not be limited to:

- Undertaking numerical simulation of complex systems and natural phenomena that would be too expensive or dangerous to study by direct experimentation.
- Working 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 / Quantitative Analyst (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).

Highly relevant tasks include, but may not be limited to:

- Quantifying real world problems and scenarios using appropriate mathematical tools and in consultation with domain specialists.
- Working 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, advising researchers, managers and other decision makers of likely outcomes and impacts of various hypothetical scenarios.

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.

Highly relevant tasks include, but may not be limited to:

- Creating, setting up, and evaluating algorithms designed to solve number theory problems.
- In government and military sectors, protecting sensitive communication and data systems from foreign governments and hackers.
- Also providing decryption expertise for intelligence and counter-intelligence services.
- In the financial sector, ensuring that credit card, inter-bank, automatic teller machine, and other online transactions are secure.
- In the communications sector, developing technology to protect mobile phone and internet networks.

Employment not considered

Employment focused on data analysis, prediction / interpretation, survey design and statistical modelling is more relevant to the occupation of Statistician. Employment in the financial and commercial sector focused on business and data analysis and budgetary forecasting may be more suited to the occupation of Information and Organisational Professionals NEC (ANZSCO 224999).

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.