

# General Mathematics 2019 v1.2

## Unit 1 Topic 1 sample assessment instrument

September 2018

### Problem-solving and modelling task

This sample has been compiled by the QCAA to assist and support teachers in planning and developing assessment instruments for individual school settings.

Schools develop internal assessments for each senior subject, based on the learning described in Units 1 and 2 of the subject syllabus. Each unit objective must be assessed at least once.

### Assessment objectives

This assessment instrument is used to determine student achievement in the following objectives:

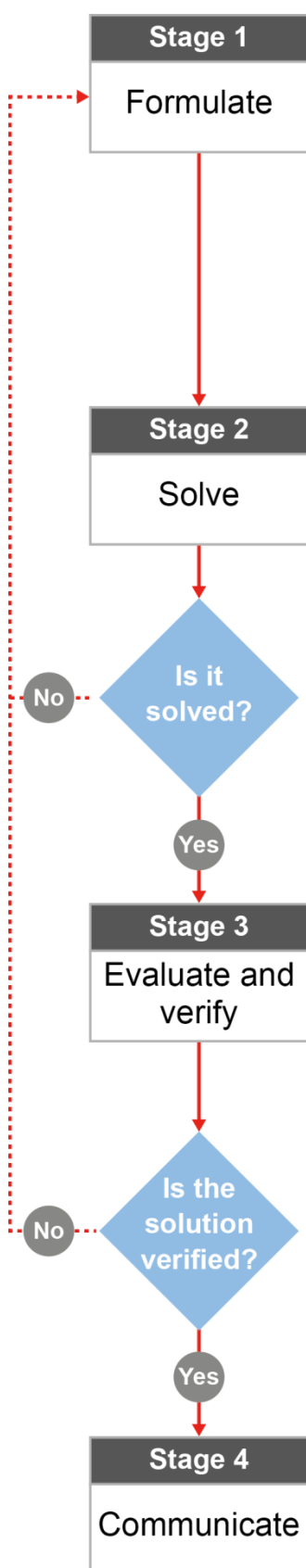
1. select, recall and use facts, rules, definitions and procedures drawn from Unit 1 Topic 1
2. comprehend mathematical concepts and techniques drawn from Unit 1 Topic 1
3. communicate using mathematical, statistical and everyday language and conventions
4. evaluate the reasonableness of solutions
5. justify procedures and decisions by explaining mathematical reasoning
6. solve problems by applying mathematical concepts and techniques drawn from Unit 1 Topic 1.

<b>Subject</b>	General Mathematics
<b>Technique</b>	Problem-solving and modelling task
<b>Unit</b>	1: Money, measurement and relations
<b>Topic</b>	1: Consumer arithmetic

<b>Conditions</b>			
<b>Duration</b>	4 weeks, including 3 hours of class time		
<b>Mode</b>	Written report	<b>Length</b>	<ul style="list-style-type: none"> <li>- up to 10 pages (including tables, figures and diagrams)</li> <li>- maximum of 2000 words</li> <li>- appendixes can include raw data, repeated calculations, evidence of authentication and student notes (appendixes are not to be marked).</li> </ul>
<b>Individual/group</b>	Individual	<b>Other</b>	—
<b>Resources available</b>	<p>The use of technology is required, e.g.</p> <ul style="list-style-type: none"> <li>• computer/internet</li> <li>• spreadsheet program</li> <li>• online financial tool</li> <li>• calculator (scientific or graphic)</li> <li>• other software/technology.</li> </ul>		
<b>Context</b>			
<p>In 2020, Tokyo will host the sixteenth Summer Paralympic Games. A significant number of people will travel to the games to support their country's athletes. These people need to understand the financial requirements of such a trip, including fixed and discretionary spending, in order to develop a personal budget based on their income.</p>			
<b>Task</b>			
<p>Investigate the financial requirements of a person aiming to travel from Australia to the Tokyo Paralympic Games in 2020 to support the Australian team. Produce a personal budget based on the results of your mathematical research, then refine the model to ensure they can afford to attend. You are to assume that the supporter:</p> <ul style="list-style-type: none"> <li>• has a part-time job</li> <li>• is entitled to government disability support</li> <li>• will attend at least four different Olympic events.</li> </ul> <p>You must use:</p> <ul style="list-style-type: none"> <li>• the approach to problem-solving and mathematical modelling provided</li> <li>• different data to other students in your class and school.</li> </ul> <p>You will have four weeks to complete the assessment, including three hours of class time.</p>			

<b>To complete this task, you must:</b>
<ul style="list-style-type: none"> <li>• use your knowledge of consumer arithmetic to investigate the problem and create a budget</li> <li>• use an approach that is a combination of dependent, guided and independent to prepare you for an entirely independent investigation in Unit 3 (as outlined in the General Mathematics syllabus, in the section 'Approaches to problem-solving and mathematical modelling in the classroom')</li> <li>• develop a unique response.</li> </ul>
<b>Stimulus</b>
—
<b>Checkpoints</b>
<input type="checkbox"/> One week after issue date: Students email evidence of 'formulation' of the task to their teacher.
<input type="checkbox"/> Two weeks after issue date: Students develop a draft for feedback. A summary of written feedback and advice will be given to the whole class.
<input type="checkbox"/> Three weeks after issue date: Students email evidence of their progress to their teacher.
<input type="checkbox"/> Four weeks after issue date: Students submit their final response.
<b>Feedback</b>
<b>Authentication strategies</b>
• Students will provide documentation of their progress at indicated checkpoints.
• Students will use plagiarism-detection software at submission of the response.
• Students must acknowledge all sources.
• Students must submit a declaration of authenticity.
<b>Scaffolding</b>
The approach to problem-solving and modelling must be used (see page 4).

## Approach to problem-solving and modelling



In this task, you will investigate the financial requirements of a person aiming to travel from Australia to the Tokyo Paralympic Games in 2020 to support the Australian team. Your report should consider:

- the supporter's income, including a part-time job and any government allowances they are entitled to
- costs for the trip (including potential increases due to inflation)
- exchange rates for foreign currency while at the Games.

Design a detailed plan, identifying the mathematical procedures required to solve this problem. Remember to state any necessary assumptions, variables and observations. You must also explain how you will make use of technology.

Develop a budget to explain how the person could afford the trip. Consider any necessary assumptions, variables and observations in your calculations. You will make further refinements in Stage 3, as necessary.

The budget should include:

- income from the appropriate government allowances
- income from a part-time job
- weekly/fortnightly living expenses
- weekly/fortnightly savings.

How will the person finance the trip? You will need to show the cost of airfares, accommodation, food and entertainment, including potential increases due to inflation, and the use of exchange rates to buy and sell foreign currency while at the Games and on their return.

You must use technology efficiently and show detailed calculations demonstrating the procedures used to plan and budget for the trip.

Evaluate the reasonableness of your original solution.

Based on your budget, consider whether the person can afford to attend the Games. Look at the strengths and limitations of your plan and make any necessary changes, e.g. extra costs associated with travelling overseas not initially considered; changes to spending in the budget to assist in saving more money.

Justify all decisions you have made.

Considering the original task, how valid is your solution?

Once you have completed all necessary calculations, you should consider how you have communicated all aspects of your report. Communicate using appropriate language that refers to the calculations and tables included in previous sections. Your response should be coherently and concisely organised.

Ensure you have:

- used mathematical, statistical and everyday language
- considered the strengths and limitations of your solution
- drawn conclusions by discussing your results
- included recommendations.