**Stage 2 Essential Mathematics**

**Assessment Type 2 Folio – Topic 5: Investments and Loans**

**Buying a car**

**The Task**

You are to investigate the cost of buying your first car. The car that you choose to buy should cost at least $10 000. You will investigate two different ways of paying for the car:

1. saving the entire amount in a savings account
2. taking out a loan to purchase the car.

Assume that you have just started your first full time job.

You need to make some decisions and find some information to proceed with the task:

* Choose a realistic starting wage = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Choose a realistic amount to pay for a car = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Choose a length of time for the investment and loan. You will use this length of time as a starting point in both the investment and loan investigations.

Investment/Loan term = \_\_\_\_\_\_\_\_\_\_\_\_\_ years

Part 1: Saving to buy the car

You are to investigate saving to buy your car. You should consider several different investment types, and work out how much you have had to invest to reach the full cost of the car. You could consider:

* Making a deposit of a sum into a term deposit
* Making regular payments into a savings account
* Making regular payments into an account into which you were able to make a significant initial deposit (e.g. 20% of the value of the car).

Part 2: Taking out a loan to buy the car

i) Investigate unsecured loans and select one for your loan investigations. State its interest rate and calculate:

* your minimum periodic payment
* how much the loan will cost you in total, and how much interest you have paid.

ii) Now investigate mathematically some strategies to minimise the interest you pay. You could consider investigating:

* making more frequent payments
* paying extra per period
* other (perhaps a combination of two strategies).

For each strategy you investigate calculate how much the loan will cost you in total, and how much interest you have paid.

Part 3: Discussion and conclusion

Discuss your results, and in particular consider what is good and what is bad about each method you have investigated. You should include discussion of any assumptions you had to make in carrying out your investigations, and also discuss how reasonable you think they are as a method of buying a car.

**The Response**

Carry out the mathematical investigations described in parts 1 and 2 and then prepare a response which, excluding bibliography and appendices if used, must be a maximum of 10 single-sided A4 pages if written, or the equivalent in multimodal form.

The folio task response may take a variety of forms, but should include the following:

* an outline of the problem to be explored
* the method used to find a solution
* the application of the mathematics, including, for example:
* generation or collection of relevant data and/or information, with a summary of the process of collection
* mathematical calculations and results, using appropriate representations
* discussion and interpretation of results, including consideration of the reasonableness and limitations of the results
* the results and conclusions in the context of the problem.

Performance Standards for Stage 2 Essential Mathematics

| - | **Concepts and Techniques** | **Reasoning and Communication** |
| --- | --- | --- |
| **A** | Comprehensive knowledge and understanding of concepts and relationships.  Highly effective selection and application of mathematical techniques and algorithms to find efficient and accurate solutions to routine and complex problems in a variety of contexts.  Successful development and application of mathematical models to find concise and accurate solutions.  Appropriate and effective use of electronic technology to find accurate solutions to routine and complex problems. | Comprehensive interpretation of mathematical results in the context of the problem.  Drawing logical conclusions from mathematical results, with a comprehensive understanding of their reasonableness and limitations.  Proficient and accurate use of appropriate mathematical notation, representations, and terminology.  Highly effective communication of mathematical ideas and reasoning to develop logical and concise arguments.  Formation and testing of appropriate predictions, using sound mathematical evidence. |
| **B** | Some depth of knowledge and understanding of concepts and relationships.  Mostly effective selection and application of mathematical techniques and algorithms to find mostly accurate solutions to routine and some complex problems in a variety of contexts.  Attempted development and successful application of mathematical models to find mostly accurate solutions.  Mostly appropriate and effective use of electronic technology to find mostly accurate solutions to routine and some complex problems. | Mostly appropriate interpretation of mathematical results in the context of the problem.  Drawing mostly logical conclusions from mathematical results, with some depth of understanding of their reasonableness and limitations.  Mostly accurate use of appropriate mathematical notation, representations, and terminology.  Mostly effective communication of mathematical ideas and reasoning to develop mostly logical arguments.  Formation and testing of mostly appropriate predictions, using some mathematical evidence. |
| **C** | Generally competent knowledge and understanding of concepts and relationships.  Generally effective selection and application of mathematical techniques and algorithms to find mostly accurate solutions to routine problems in different contexts.  Successful application of mathematical models to find generally accurate solutions.  Generally appropriate and effective use of electronic technology to find mostly accurate solutions to routine problems. | Generally appropriate interpretation of mathematical results in the context of the problem.  Drawing some logical conclusions from mathematical results, with some understanding of their reasonableness and limitations.  Generally appropriate use of mathematical notation, representations, and terminology, with reasonable accuracy.  Generally effective communication of mathematical ideas and reasoning to develop some logical arguments.  Formation of an appropriate prediction and some attempt to test it using mathematical evidence. |
| **D** | Basic knowledge and some understanding of concepts and relationships.  Some selection and application of mathematical techniques and algorithms to find some accurate solutions to routine problems in some contexts.  Some application of mathematical models to find some accurate or partially accurate solutions.  Some appropriate use of electronic technology to find some accurate solutions to routine problems. | Some interpretation of mathematical results.  Drawing some conclusions from mathematical results, with some awareness of their reasonableness.  Some appropriate use of mathematical notation, representations, and terminology, with some accuracy.  Some communication of mathematical ideas, with attempted reasoning and/or arguments.  Attempted formation of a prediction with limited attempt to test it using mathematical evidence. |
| **E** | Limited knowledge or understanding of concepts and relationships.  Attempted selection and limited application of mathematical techniques or algorithms, with limited accuracy in solving routine problems.  Attempted application of mathematical models, with limited accuracy.  Attempted use of electronic technology, with limited accuracy in solving routine problems. | Limited interpretation of mathematical results.  Limited understanding of the meaning of mathematical results, their reasonableness or limitations.  Limited use of appropriate mathematical notation, representations, or terminology, with limited accuracy.  Attempted communication of mathematical ideas, with limited reasoning.  Limited attempt to form or test a prediction. |