**Stage 2 General Mathematics**

**Assessment Type 2: Mathematical Investigation**

**Topic 4: Financial Models – Preparing for retirement**

**The Task**

At 23, Charlie has come to you for financial advice. They have just finished university studies and started full time work, earning $XX,000 per annum. Charlie understands that superannuation will allow them to provide for their own retirement. Charlie has advised you that that they plan to retire at 65 and wants to be able to live for at least 20 years off the money that has built up in their superannuation account.

**Part 1: Superannuation**

Select a superannuation fund site to investigate and select an investment option into which Charlie’s money will be invested. Select a rate of return that you will use for your original calculations and provide brief reasons for your selection. Decide on the frequency of payments being made into the account by the employer. Include evidence of the investment information in your appendix.

Include evidence of the rate information in your appendix.

**Part 2: Account balance at retirement (how much Katarina will have at age 65 years)**

Calculate the account balance at retirement that Charlie would have in the superannuation fund if only the compulsory employer contributions were being made into the account until her retirement. Assume that the compulsory employer contributions are 11.5% of salary.

**Part 3: Living off the income in retirement**

Calculate how much money Charlie will have to live off if they roll over all of the account balance in the superannuation fund into an annuity to provide a regular income.

Include evidence of the rate information in your appendix.

**Part 4: Effect of inflation**

Calculate how much Charlie would receive per fortnight after taxation based on the salary you selected. Determine how much Charlie would need to receive from their annuity at 65 years of age to be receiving an equivalent amount, taking into account inflation over this period. Include evidence of the CPI rate chosen in your appendix.

Compare this to the regular income you found that Charlie would have in Part 3. Will Charlie be able to live comfortably in retirement?

**Part 5: Further investigations**

Undertake further investigations to provide Charlie with advice on what might affect the final account balance in her superannuation fund. For at least two of these further investigations, make predictions**\*** about the outcome of the change, and test it mathematically.

Your investigations may include:

* Making personal contributions into the superannuation fund
* Investing in different investment options over their career, e.g. a growth option in the beginning and a conservative option near retirement
* The effect of wage increases/decreases
* A change of retirement age
* The effect of taking time off work e.g. to travel or for a change of career
* A change to the CPI rate and if it will affect the amount that Charlie would need to receive in retirement.

These calculations should look at both how much her account balance will be at retirement age as well as how much they will be able to draw as a regular income over the 20 years throughout retirement.

**Key information about predictions\* RC5:**

Students are required to make and test at least two predictions on scenarios they are investigating.

In the process of forming and testing predictions, students will need to:

* State the prediction
* Test the prediction mathematically
* Discuss the outcome of testing the prediction.

To reach the A grade band for RC5, students need to form and test more than one appropriate prediction.

**The Report**

**Introduction**

Read the whole task and write an introduction that outlines the task in your own words.

**Mathematical Investigations**

Complete Parts 1 to 5.

**Discussion**

Give a background summary about superannuation so Charlie has a better understanding of what it is and the importance of it.

Discuss and compare the different scenarios that Charlie can choose from.

Make a recommendation to Charlie about which of the superannuation strategies you investigated that you feel would give them the best financial outcome in retirement.

Discuss any assumptions you have made in making this recommendation or any limitations to the information you could access that may affect the reasonableness of your recommendation.

**Conclusion**

Drawing on the information and mathematical calculation that you have investigated, recommend the most appropriate retirement strategy for Charlie.

**Appendix**

Include evidence such as:

* information collected on superannuation and using a lump sum as a regular income
* rate of return information.

**The investigation report should be a maximum of 12 single-sided A4 pages if written, or the equivalent in multimodal form.**

Performance Standards for Stage 2 General 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.  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 context.  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. |