Self-directed Clarifying Activity – Assessment Type 2: Folio – Savings and Borrowing

Purpose: The purpose of this activity is to support teachers to interpret and apply performance standards consistently to students' work in Stage 1 Mathematical Applications.

1. **Please use the following Stage 1 Mathematical Applications performance standards to determine a grade for the student work sample on pages 6 and 7.**

   Please note: grades are determined by considering whether evidence of learning demonstrates the specific features predominantly within a particular grade e.g. a B grade level work sample should demonstrate assessment design criteria specific features predominantly at the B grade band.

2. **Record your assessment decision by holding the 'Ctrl' key and clicking here.**

   Please note: recording an assessment decision will prompt your computer to download an annotated version of the student response.

3. **Use the annotated performance standards and student work sample to compare your interpretation of the performance standards and recalibrate your assessment decision (if necessary).**

Performance Standards for Stage 1 Mathematics

	Mathematical Knowledge and Skills and Their Application	Mathematical Modelling and Problem-solving	Communication of Mathematical Information
A	Comprehensive knowledge of content and understanding of concepts and relationships. Appropriate selection and use of mathematical algorithms and techniques (implemented electronically where appropriate) to find efficient solutions to complex questions. Highly effective and accurate application of knowledge and skills to answer questions set in applied and theoretical contexts.	Development and effective application of mathematical models. Complete, concise, and accurate solutions to mathematical problems set in applied and theoretical contexts. Concise interpretation of the mathematical results in the context of the problem. In-depth understanding of the reasonableness and possible limitations of the interpreted results, and recognition of assumptions made.	Highly effective communication of mathematical ideas and reasoning to develop logical arguments. Proficient and accurate use of appropriate notation, representations, and terminology.
B	Some depth of knowledge of content and understanding of concepts and relationships. Use of mathematical algorithms and techniques (implemented electronically where appropriate) to find some correct solutions to complex questions. Accurate application of knowledge and skills to answer questions set in applied and theoretical contexts.	Attempted development and appropriate application of mathematical models. Mostly accurate and complete solutions to mathematical problems set in applied and theoretical contexts. Complete interpretation of the mathematical results in the context of the problem. Some depth of understanding of the reasonableness and possible limitations of the interpreted results, and recognition of assumptions made.	Effective communication of mathematical ideas and reasoning to develop mostly logical arguments. Mostly accurate use of appropriate notation, representations, and terminology.
C	Generally competent knowledge of content and understanding of concepts and relationships. Use of mathematical algorithms and techniques (implemented electronically where appropriate) to find mostly correct solutions to routine questions. Generally accurate application of knowledge and skills to answer questions set in applied and theoretical contexts.	Appropriate application of mathematical models. Some accurate and generally complete solutions to mathematical problems set in applied and theoretical contexts. Generally appropriate interpretation of the mathematical results in the context of the problem. Some understanding of the reasonableness and possible limitations of the interpreted results, and some recognition of assumptions made.	Appropriate communication of mathematical ideas and reasoning to develop some logical arguments. Use of generally appropriate notation, representations, and terminology, with some inaccuracies.
D	Basic knowledge of content and some understanding of concepts and relationships. Some use of mathematical algorithms and techniques (implemented electronically where appropriate) to find some correct solutions to routine questions. Sometimes accurate application of knowledge and skills to answer questions set in applied or theoretical contexts.	Application of a mathematical model, with partial effectiveness. Partly accurate and generally incomplete solutions to mathematical problems set in applied or theoretical contexts. Attempted interpretation of the mathematical results in the context of the problem. Some awareness of the reasonableness and possible limitations of the interpreted results.	Some appropriate communication of mathematical ideas and reasoning. Some attempt to use appropriate notation, representations, and terminology, with occasional accuracy.
E	Limited knowledge of content. Attempted use of mathematical algorithms and techniques (implemented electronically where appropriate) to find limited correct solutions to routine questions. Attempted application of knowledge and skills to answer questions set in applied or theoretical contexts, with limited effectiveness.	Attempted application of a basic mathematical model. Limited accuracy in solutions to one or more mathematical problems set in applied or theoretical contexts. Limited attempt at interpretation of the mathematical results in the context of the problem. Limited awareness of the reasonableness and possible limitations of the results.	Attempted communication of emerging mathematical ideas and reasoning. Limited attempt to use appropriate notation, representations, or terminology, and with limited accuracy.

STAGE 1 MATHEMATICAL APPLICATIONS (Unit A) **School No** ___

Folio Task 1 **SACE No** ___

Topic:- Savings and Borrowing **Name** ___

This assessment provides an opportunity to demonstrate skills in understanding and appropriate use of the mathematical concepts related to the topic of Savings and Borrowing and to apply them to the scenario of buying a house and repaying a mortgage.

Clear and logical solutions and correct use of notation and terminology are required in this assessment to effectively and appropriately communicate relevant information.

Sub topics 5.1 Financial Institutions
5.3 Costs of Borrowing

The final report requires an individual presentation of a full mathematical and written analysis of results, including an interpretation of the results and consideration of the effect of errors on the reasonableness of these results. Electronic technology should be used where appropriate.

Learning Requirements	*Assessment Design Criteria*	*Capabilities*
1. Understand fundamental mathematical concepts and relationships, making use of electronic technology where appropriate to aid and enhance understanding 2. Identify, collect, and organise mathematical information relevant to investigating and finding solutions to questions/problems taken from social, scientific, economic, or historical contexts. 3. Recognise and apply the mathematical techniques needed when analysing and finding a solution to a question/problem in context. 4. Interpret results, draw conclusions, and reflect on the reasonableness of these in the context of the question/problem. 5. Communicate mathematical ideas and reasoning using appropriate language and representations. 6. Work both independently and cooperatively in planning, organising, and carrying out mathematical activities.	**Mathematical Knowledge and Skills and Their Application** The specific features are as follows: ▪ MKSA1 Knowledge of content and understanding of mathematical concepts and relationships. ▪ MKSA2 Use of mathematical algorithms and techniques (implemented electronically where appropriate) to find solutions to routine and complex questions. ▪ MKSA3 Application of knowledge and skills to answer questions in applied contexts. **Mathematical Modelling and Problem-solving** The specific features are as follows: ▪ MMP1 Application of mathematical models. ▪ MMP2 Development of mathematical results for problems set in applied contexts. ▪ MMP3 Interpretation of the mathematical results in the context of the problem. ▪ MMP4 Understanding of the reasonableness and possible limitations of the interpreted results and recognition of assumptions made. **Communication of Mathematical Information** The specific features are as follows: ▪ CMI1 Communication of mathematical ideas and reasoning to develop logical arguments. ▪ CMI2 Use of appropriate mathematical notation, representations, and terminology.	Communication Citizenship Personal Development Work Learning

Stage 1 Mathematical Applications – Directed Investigation

Home Loans – Hill

Crescent, Hill, SA 5158 $340,000-$365,000

House 3 1 3

quiet and peaceful family friendly location

First Open Inspection This Sunday 22nd July From 1-1.30pm.Call today for viewing times. A lovely larger family...

Floorplan

Inspect **Save** **Details**

You are looking to buy the property advertised above, at an agreed value of $355,000 and have two banks to choose from.

Bank A: Home Loans are offered at 90% of the valuation of the property and they will charge$650 bank fees. The loan terms are 5.7%pa compounded monthly for 25 years with monthly repayments to be made.

Bank B: Home Loans are offered at 85% of the valuation of the property and they will charge$600 bank fees. The loan terms are 5.9%pa compounded quarterly for 25 years with quarterly repayments to be made.

Both banks value the property at $330,000 and you have found a broker that will charge $350 in fees.

1. For **each** bank
   a. Calculate the initial cost of buying the house.
   b. For the home loan use the value of the mortgage to calculate the;
      i. Repayments per period (round up to the nearest 10c)
      ii. Total repayments
      iii. Interest charged
   c. Calculate the final cost of the house.

2. Comment on the advantages and disadvantages of each option.

3. **For Bank A only.** You get a $120 pay rise per month and decide to use it to make extra repayments on your loan. Calculate the effects this has on;
   a. The number of repayments (round up to the nearest month)
   b. Total repayments
   c. Interest charged
   d. How much money is saved compared to 1(c)
   e. Discuss the benefits of making extra repayments with regard to the amount of time and money saved. What external factors may prevent you from using the entire pay rise for extra repayments?

Student Work Sample

1a

Bank A Price

Home ~~Value~~ = $355,000

Home Value = $330,000

Deposit 10% of 355,000

= $35500

Home loan = ~~355,000 - 35500~~ 355,000 − 35500

= $319500

+ bank fees = $650 ✓

+ broker fees = $350 ✓

Stamp duty mortgage = 10 + 313500/100 × 0.30

($6000)

= 10 + 940.50 ✓

= 950.50

Stamp Duty ($300'00) Transfer = $11330

~~= 5000 = 355000~~

11330 + 55000/100 × 5 = 14080 ✓

~~11330~~ + 14080 ✓

= ~~$25410~~

LTO = 1944 + 300000/10000 × 60 (305000)

= $1994

Total = $29004.50 ✗

b n = 25 × 12 (300) ✓

I = 5.7 ✓

PV = 355000

PMT = ? 2222.60

FV = 0

P\Y = 12 ✓

C\Y = 12 ✓

c 355000 + 29004.50 + 2222.60

= $386227.10 ✗

+350 = $386577.10

Bank B

Home value = $330,000

Deposit ~~10~~ 15% of $330600

= $66000 ✗

Home loan = 355000 − 66000

= $289000

+ bank fees = $600 ✓

+ broker fees = $350 ✓

Stamp duty mortgage = 10 + 289000/100 × 0.30

= 10 + 849

= 859 ✓

Stamp Duty Transfer = $11330.

11330 + 55000/100 × 5 = 14080

= 11330 + 14080

= $25410

LTO = 194 + 300000/10000 × 60

= 1994 ✗

Total = $~~38413~~ $29213

b n = 25 × 4 (100) ✓

I = 5.9 ✓

PV = 355000

PMT = ? 4502.50

FV = 0

P\Y = 12 4

C\Y = 12 4

c 355000 + 29213 + 4502.50

= $388715.50

2 Bank A is cheaper than Bank B. Bank B has lower fees than Bank A, but overall, A is a better option and will cost less ✗

in the long run. There are a few similarities amongst the two options like the LIO and the Stamp Duty on Transfer. With B instead of paying every month you only be paying every four but at a bigger price.

3a $1000 at 5.7% over 25 yrs

359×6.2911

$= 2233.34$

2222 + 120

b $2233.34 \times 12 \times 25$

$= 2233.34 \times 300$

$= \$670002.15$

$\$2342 \times 12 \times 25$

c $670002.15 - 355000$

$= \$315002.15$

$315002.15 - 3000$

$= \$312002.15$

d $74574.95 is saved if this ~~extra~~ to is the way it would happen.

e Making these extra repayments would save $74574.95 and a lot of time as well. Around 6 or 7 years will be saved in making these repayments. Some external factors would be; buying your own things, water bills, electricity bills and telephone bills.