VCE School Assessed Coursework: SAC

Students Name:

Sacred Heart College Yarrawonga

VCE Study:	Further Mathematics
Unit:	3
Outcomes:	1, 2 and 3
Assessment Task	Core SAC – Recursion and Financial Maths, Part 2
Date:	Thursday 18th May, 2022
Time:	5 mins reading 55 mins writing
Instructions:	Students to complete all tasks on this paper.
Conditions:	Silent, individual work
Permitted Materials:	Pens, Pencils, Ruler, Eraser, TIInspire CAS calculator, Bound Notes
Marks allocated:	/28

Students are NOT permitted to bring mobile phones and/or any other unauthorised electronic devices into the room.

I understand I must not intentionally or unintentionally disclose any details on this SAC or imply what is or is not included, or in any way gain an unfair advantage for myself over other students. If I do, I understand that disciplinary action will occur and my result will be downgraded. In fairness to fellow students it is my responsibility to inform the VCE office if I am aware that information about the SAC is being passed on, or that a student has gained unfair advantage.

Student Signature: Date:

The Einstein family…….

The Einstein family is looking at setting up a math lab at a university campus. They are investigating different plans offered by the banks for a loan. After looking at the loan plans, they will be investigating different models to analyse the depreciation cost associated with the math lab equipment. The Einstein family are also interested in setting up a scholarship plan with the university to acknowledge the efforts of students in the math areas.

Question 1
Setting up the loan…

To set up the math lab The Einstein family will require a loan of $1.2 million **($1 200 000)** and they are investigating the following options-

Option 1: Reducing balance loan for **25 years** at **3.81%** per annum, **compounded monthly.**

Option 2: Reducing balance loan for **25 years** at **3.9%** per annum, **compounded fortnightly.**

Option 3: Interest only loan of the balance for **25 years** at **3.3%** per annum, **compounded monthly.**

a) Use finance solver to calculate the payments on each of these options.
Option 1: Reducing balance loan for **25 years** at **3.81%** per annum, **compounded monthly.**

N	I(%)	PV	Pmt	FV	PpY	CpY

Option 2: Reducing balance loan for **25 years** at **3.9%** per annum, **compounded fortnightly.**

N	I(%)	PV	Pmt	FV	PpY	CpY

Option 3: Interest only loan of the balance for **25 years** at **3.3%** per annum, **compounded monthly.**

N	I(%)	PV	Pmt	FV	PpY	CpY

(2 marks each – 6 marks)

b) Using this information, give a **recurrence relation** to model each option. (Use a variable of your choice to model the situation)

Option 1: Reducing balance loan for **25 years** at **3.81%** per annum, **compounded monthly.**

Option 2: Reducing balance loan for **25 years** at **3.9%** per annum, **compounded fortnightly.**

Option 3: Interest only loan of the balance for **25 years** at **3.3%** per annum, **compounded monthly.**

(2 marks each – 6 marks)

c) For each option, use finance solver to calculate the amount owing after every **5 years.**

Option 1: Reducing balance loan for **25 years** at **3.81%** per annum, **compounded monthly.**

N	I(%)	PV	Pmt	FV	PpY	CpY

Option 2: Reducing balance loan for **25 years** at **3.9%** per annum, **compounded fortnightly.**

N	I(%)	PV	Pmt	FV	PpY	CpY

Option 3: Interest only loan of the balance for **25 years** at **3.3%** per annum, **compounded monthly.**

N	I(%)	PV	Pmt	FV	PpY	CpY

(2 marks each – 6 marks)

a) Use available tools to calculate the **total cost** of each loan and the total **interest payable.** Show all setting out.

Option 1: Reducing balance loan for **25 years** at **3.81%** per annum, **compounded monthly.**

Option 2: Reducing balance loan for **25 years** at **3.9%** per annum, **compounded fortnightly.**

Option 3: Interest only loan of the balance for **25 years** at **3.3%** per annum, **compounded monthly.**

Compare the different loan options and identify the best option for The Einstein family.

(3 marks)

Question 2

The Einstein family are thinking of another strategy to pay off their loan-
Interest-only for the first five years at an annual interest rate of **3.3% per annum**, compounded **monthly.**
After five years, they plan to make a lump-sum payment of $68 000 and change the terms of the remaining loan to **reducing-balance option 1.**
They still plan to pay off the loan in **25 years**.

Calculate the total cost of the loan using this strategy. (Show any steps/calculations you use)

(4 marks)

Compare this strategy with the other options available to identify the better option.

(3 marks)