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Key features of the “2022 HSC Comprehensive Revision Series”:

- ~13 hours of cherry picked HSC revision questions by topic
- Weighting toward more difficult examples
- Targeted at motivated students aiming for a Band 5 or 6 result
- **Attempt, carefully review and annotate** this revision set in Term 3
- This question set provides the foundation of a concise and high quality revision resource for the run into the HSC exam.

Our analysis on each topic, the common question types, past areas of difficulty and recent HSC trends all combine to create this revision set that ensures students cover a wide cross-section of the key areas.

IMPORTANT: Exposure to quality HSC questions multiple times is best practice revision and highly beneficial. Many top performing students attest to the benefits of doing quality questions 2-3 times before the HSC. The resulting confidence and *speed through the exam* creates a virtuous cycle for peak performance.

[HSC Final Study – STD2 Financial Maths](#) (estimated ~20% of exam)

Key Areas addressed by this worksheet

F1 Money Matters (Y11)

- *Simple Interest*: although an easier topic area, 2019’s question caused major problems and is reviewed;
- *Tax and Percentage Discounts*: tax tables are the most common question type (tested in each of the last 6 years) and must be given careful attention;
- GST caused problems in 2019. We revise this example which is novel in that students must know that GST doesn’t apply to fresh food;
- Insurance definitions are covered including harder Medicare examples. 2013 Q27b is reviewed, where many students were not clear that Medicare is deducted from "taxable income" and not "gross income". Stamp duty covered;
- *Earning money and budgeting*: Allocated marks in the last decade have ranged from 0 (in 2020-21) to 7 (in 2010);
- We highly recommend students take heed of *Marker’s Comments* in this topic area for minimising errors and set out their answers in small bite size pieces!

F4 Investments and Loans (Y12)

- *Compound Interest*: consistently causes problems, particularly with questions involving *Compounded Value of \$1* tables which were last examined in 2018. The use of the compound formula $FV = PV(1 + r)^n$ is regularly tested and reviewed accordingly;
- *Shares*: dividend yield has caused problems. We note it has been allocated a longer answer question in the past 3 new syllabus exams and this growing importance is reflected in its revision series allocation;
- *Depreciation*: tested 9 years of the last decade in questions worth anywhere from 1 mark to a very chunky 5-6 marks. A comparison of declining balance and straight-line depreciation is common and is featured in this revision;
- *Credit Cards*: asked 6 times in the last decade (absent 2021), with sub-50% mean marks resulting on each occasion except 2020. Calculating daily interest rates and applying the correct number of days has proven very challenging for the majority of students and is reviewed (note that some past HSC questions have been adjusted to reflect the new syllabus requirement of “daily compounding interest”);
- *Loans*: Exposure to different loan payment table styles, including “*Home Loan P+I-R Table*”, is very important and incorporated into this revision set. This question type has been absent since 2017 and deserves attention.

F5 Annuities (Y12)

- *Annuities* attracted huge 8-mark allocations in both 2020 and 2021 and leaps into the forefront of revision focus areas.
- *Future Value of an Annuity Table* has been the most regularly asked question type and is well covered (producing sub-50% mean marks a majority of the time);
- We include the very important 2021 Q40 and 2019 Q42 which require a deeper understanding of these tables than in previous years;
- Exposure to other types of annuity tables that have been poorly answered such as *Present Value Annuity Tables* (2021 and 2020), and the *Contribution per period for a future value of \$1 table* (2016).
- Recurrence relations within annuities had its first appearance and the 2020 exam, causing notable problems – this is a “must review” question.

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*– Peter Hargraves, James Sheahan
Catholic High School*

STANDARD 2:
2022 HSC Comprehensive Revision Series

- FINANCIAL MATHS

F1 Money Matters (Y11)

F4 Investments and Loans (Y12)

F5 Annuities (Y12)



Exam Equivalent Time: 120 minutes (based on HSC allocation of 1.5 minutes approx. per mark)

Questions

1. Financial Maths, STD2 F1 2014 HSC 13 MC

Jane sells jewellery. Her commission is based on a sliding scale of 6% on the first \$2000 of her sales, 3.5% on the next \$1000, and 2% thereafter.

What is Jane's commission when her total sales are \$5670?

- (A) \$188.40
- (B) \$208.40
- (C) \$321.85
- (D) \$652.05

2. Financial Maths, STD2 F4 2021 HSC 4 MC

Three years ago an appliance was valued at \$2467. Its value has depreciated by 15% each year, based on the declining-balance method.

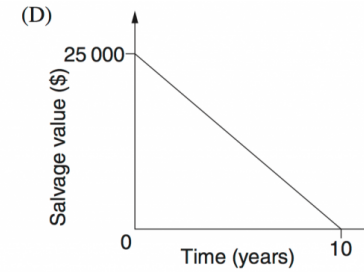
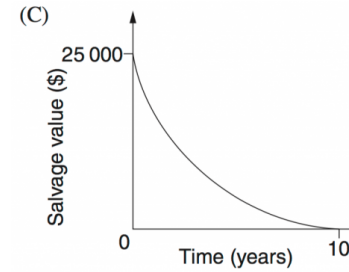
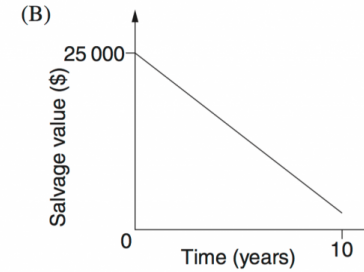
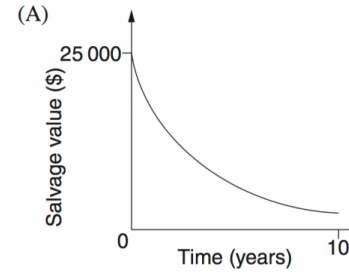
What is the salvage value today, to the nearest dollar?

- A. \$952
- B. \$1110
- C. \$1357
- D. \$1515

3. Financial Maths, STD2 F4 2012 HSC 16 MC

A machine was bought for \$25 000.

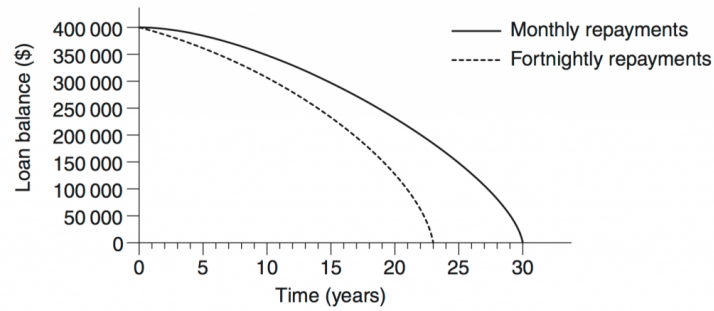
Which graph best represents the salvage value of the machine over 10 years using the declining balance method of depreciation?



4. Financial Maths, STD2 F4 2012 HSC 24 MC

A \$400 000 loan can be repaid by making either monthly or fortnightly repayments.

The graph shows the loan balances over time using these two different methods of repayment.



The monthly repayment is \$2796.86 and the fortnightly repayment is \$1404.76.

What is the difference in the total interest paid using the two different methods of repayment, to the nearest dollar?

- (A) \$51 596
- (B) \$166 823
- (C) \$210 000
- (D) \$234 936

5. Financial Maths, STD2 F4 2005 HSC 10 MC

The table is used to calculate monthly loan repayments.

Monthly loan repayments (in dollars) per \$1000 borrowed

Interest rate % pa	5 years	10 years	15 years	20 years
5%	18.87	10.61	7.91	6.60
6%	19.33	11.10	8.44	7.16
7%	19.80	11.61	8.99	7.75
8%	20.28	12.13	9.56	8.36
9%	20.76	12.67	10.14	9.00

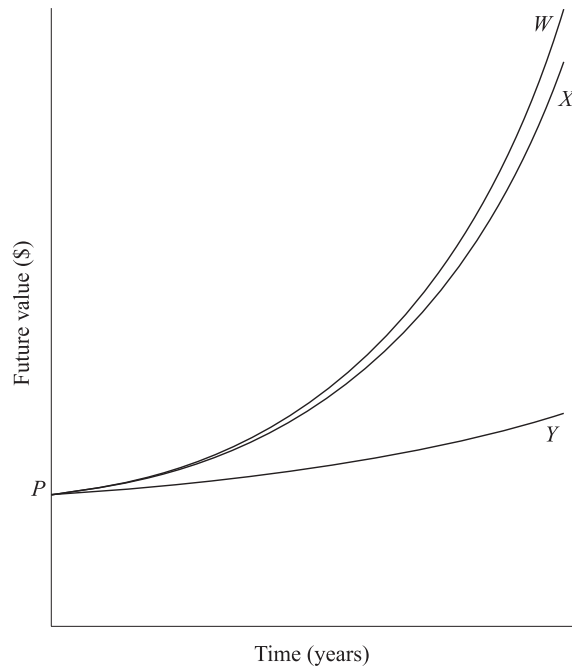
Samantha has borrowed \$70 000 at 8% per annum for 15 years.

What is her monthly loan repayment?

- (A) \$143.40
- (B) \$669.20
- (C) \$8030.40
- (D) \$10 038.00

6. Financial Maths, STD2 F4 2019 HSC 13 MC

The graph shows the future values over time of \$ P , invested at three different rates of compound interest.



Which of the following correctly identifies each graph?

- A.
- | | |
|-----|-------------------------------|
| W | 5% pa, compounding annually |
| X | 10% pa, compounding annually |
| Y | 10% pa, compounding quarterly |
- B.
- | | |
|-----|-------------------------------|
| W | 5% pa, compounding annually |
| X | 10% pa, compounding quarterly |
| Y | 10% pa, compounding annually |
- C.
- | | |
|-----|-------------------------------|
| W | 10% pa, compounding quarterly |
| X | 10% pa, compounding annually |
| Y | 5% pa, compounding annually |
- D.
- | | |
|-----|-------------------------------|
| W | 10% pa, compounding annually |
| X | 10% pa, compounding quarterly |
| Y | 5% pa, compounding annually |

7. Financial Maths, STD2 F2 2021 HSC 5 MC

Peter currently earns \$21.50 per hour. His hourly wage will increase by 2.1% compounded each year for the next four years.

What will his hourly wage be after four years?

- A. $21.50(1.21)^4$
 B. $21.50(1.021)^4$
 C. $21.50 + 21.50 \times 0.21 \times 4$
 D. $21.50 + 21.50 \times 0.021 \times 4$

8. Financial Maths, STD2 F1 2017 HSC 11 MC

A new car was bought for \$19 900 and one year later its value had depreciated to \$16 300.

What is the approximate depreciation, expressed as a percentage of the purchase price?

- A. 18%
 B. 22%
 C. 78%
 D. 82%

9. Financial Maths, STD2 F1 2009 HSC 20 MC

Lou bought a plasma TV which was priced at \$3499. He paid \$1000 deposit and got a loan for the balance that was paid off by 24 monthly instalments of \$135.36.

What simple interest rate per annum, to the nearest percent, was charged on his loan?

- (A) 11%
 (B) 15%
 (C) 30%
 (D) 46%

10. Financial Maths, STD2 F4 2005 HSC 13 MC

Last year, Helen bought 150 shares at \$2.00 per share. They are now worth \$2.50 per share. Helen receives a dividend of \$0.10 per share.

What is the dividend yield?

- (A) 4%
 - (B) 20%
 - (C) \$15
 - (D) \$75
-

11. Financial Maths, STD2 F1 2015 HSC 15 MC

A camera costs \$449, including 12% GST.

What is the price of the camera without GST, correct to the nearest dollar?

- (A) \$395
 - (B) \$401
 - (C) \$437
 - (D) \$503
-

12. Financial Maths, STD2 F4 2016 HSC 17 MC

Ariana is charged compound interest at the rate of 0.036% per day on outstanding credit card balances. She has \$780 outstanding for 24 days.

How much compound interest is she charged?

- (A) \$6.74
 - (B) \$6.77
 - (C) \$786.74
 - (D) \$786.77
-

13. Financial Maths, STD2 F1 2018 HSC 8 MC

A nanny charges \$15 per hour, or part thereof, for looking after a child.

What does the nanny charge for looking after a child from 8 am until 3.20 pm on a particular day?

- A. \$105
 - B. \$108
 - C. \$110
 - D. \$120
-

14. Financial Maths, STD2 F1 2018 HSC 14 MC

To determine the retail price of an item, a shop owner increases its cost price by 30%. In a sale, the retail price is reduced by 30% to give the sale price.

How does the sale price compare to the cost price?

- A. The sale price is less than the cost price.
 - B. The sale price is the same as the cost price.
 - C. The sale price is more than the cost price.
 - D. It is impossible to compare without knowing the cost price.
-

15. Financial Maths, STD2 F1 2018 HSC 15 MC

Sam is the driver at fault in a car accident.

Which of the following is covered by Sam's compulsory third-party (CTP) insurance?

- A. Repairs to Sam's car
 - B. Injury to the other driver
 - C. Damage to the other driver's car
 - D. Cost of repairing a building damaged in the accident
-

16. Financial Maths, STD2 F4 2018 HSC 19 MC

The table shows the compounded values of \$1 at different interest rates over different periods.

Compounded values of \$1

Number of periods	Interest rate per period				
	1%	2%	3%	4%	5%
2	1.0201	1.0404	1.0609	1.0816	1.1025
4	1.0406	1.0824	1.1255	1.1699	1.2155
6	1.0615	1.1262	1.1941	1.2653	1.3401
8	1.0829	1.1717	1.2668	1.3686	1.4775
10	1.1046	1.2190	1.3439	1.4802	1.6289
12	1.1268	1.2682	1.4258	1.6010	1.7959

Amy hopes to have \$21 000 in 2 years to buy a car. She opens an account today which pays interest of 4% pa, compounded quarterly.

Using the table, which expression calculates the minimum single sum that Amy needs to invest today to ensure she reaches her savings goal?

- A. $21\,000 \times 1.0816$
 - B. $21\,000 \div 1.0816$
 - C. $21\,000 \times 1.0829$
 - D. $21\,000 \div 1.0829$
-

17. Financial Maths, STD2 F5 2020 HSC 14 MC

An annuity consists of ten payments, each equal to \$1000. Each payment is made on 30 June each year from 2021 through to 2030 inclusive.

The rate of compound interest is 5% per annum.

The present value of the annuity is calculated at 30 June 2020.

The future value of the annuity is calculated at 30 June 2030.

Without performing any calculations, which of the following statements is true?

- A. Present value of the annuity < \$10 000 < future value of the annuity
 - B. \$10 000 < present value of the annuity < future value of the annuity
 - C. Future value of the annuity < \$10 000 < present value of the annuity
 - D. \$10 000 < future value of the annuity < present value of the annuity
-

18. Financial Maths, STD2 F4 2020 HSC 11 MC

An asset is depreciated using the declining-balance method with a rate of depreciation of 8% per half year. The asset was bought for \$10 000.

What is the salvage value of the asset after 5 years?

- A. \$1749.01
 - B. \$4182.12
 - C. \$4343.88
 - D. \$6590.82
-

19. Financial Maths, STD2 F1 2006 HSC 22 MC

This income tax table is used to calculate Evelyn's tax payable.

<i>Taxable income</i>	<i>Tax payable</i>
\$0 – \$20 000	Nil
\$20 001 – \$45 000	Nil plus 10 cents for each \$1 over \$20 000
\$45 001 – \$70 000	\$2500 plus 35 cents for each \$1 over \$45 000
\$70 001 and above	\$11 250 plus 52 cents for each \$1 over \$70 000

Evelyn's taxable income increases from \$50 000 to \$80 000.

What percentage of her increase will she pay in additional tax?

- (A) 15.25%
 - (B) 40.7%
 - (C) 43.5%
 - (D) 52%
-

20. Financial Maths, STD2 F1 2019 HSC 9 MC

What is the interest earned, in dollars, if \$800 is invested for x months at a simple interest rate of 3% per annum?

- A. $2x$
 - B. $24x$
 - C. $200x$
 - D. $2400x$
-

21. Financial Maths, STD2 F4 2009 HSC 26c

Margaret borrowed \$300 000 to buy an apartment. The interest rate is 6% per annum, compounded monthly. The repayments were set by the bank at \$2200 per month for 20 years.

The loan balance sheet shows the interest charged and the balance owing for the first month.

<i>Month</i>	<i>Principal at the start of the month</i>	<i>Monthly interest</i>	<i>Monthly repayment</i>	<i>Balance at end of month</i>
1	\$300 000	\$1500	\$2200	\$299 300
2	\$299 300	A	\$2200	B

- i. What is the total amount that is to be paid for this loan over the 20 years? (1 mark)
 - ii. Find the values of *A* and *B*. (2 marks)
-

22. Financial Maths, STD2 F1 2012 HSC 27a

Tai earns a gross weekly wage of \$1024. Each week her deductions are:

- tax instalment of \$296.40
- health fund contribution of \$24.50
- union fees of \$15.80.

She also pays \$3640 over the year as her share of the household expenses.

What percentage of her net wage does Tai pay for household expenses? (3 marks)

23. Financial Maths, STD2 F1 2020 HSC 20

The table shows the income tax rates for the 2019 – 2020 financial year.

<i>Taxable income</i>	<i>Tax on this income</i>
0 – \$18 200	Nil
\$18 201 – \$37 000	19c for each \$1 over \$18 200
\$37 001 – \$90 000	\$3572 plus 32.5c for each \$1 over \$37 000
\$90 001 – \$180 000	\$20 797 plus 37c for each \$1 over \$90 000
\$180 001 and over	\$54 097 plus 45c for each \$1 over \$180 000

For the 2019 – 2020 financial year, Wally had a taxable income of \$122 680. During the year, he paid \$3000 per month in Pay As You Go (PAYG) tax.

Calculate Wally's tax refund, ignoring the Medicare levy. (3 marks)

24. Financial Maths, STD2 F4 2009 HSC 24e

Jay bought a computer for \$3600. His friend Julie said that all computers are worth nothing (i.e. the value is \$0) after 3 years.

- Find the amount that the computer would depreciate each year to be worth nothing after 3 years, if the straight line method of depreciation is used. (1 mark)
 - Explain why the computer would never be worth nothing if the declining balance method of depreciation is used, with 30% per annum rate of depreciation. Use suitable calculations to support your answer. (2 marks)
-

25. Financial Maths, STD2 F1 2004 HSC 27b

David is paid at these rates:

Weekday rate	\$18.00 per hour
Saturday rate	Time-and-a-half
Sunday rate	Double time

His time sheet for last week is:

	<i>Start</i>	<i>Finish</i>	<i>Unpaid break</i>
Friday	9.00 am	1.30 pm	30 minutes
Saturday	9.00 am	4.00 pm	1 hour
Sunday	8.00 am	2.00 pm	1 hour

- Calculate David's gross pay for last week. (3 marks)
 - David decides not to work on Saturdays. He wants to keep his weekly gross pay the same. How many extra hours at the weekday rate must he work? (1 mark)
-

26. Financial Maths, STD2 F4 2021 HSC 26

Nina plans to invest \$35 000 for 1 year. She is offered two different investment options.

Option A: Interest is paid at 6% per annum compounded monthly.

Option B: Interest is paid at $r\%$ per annum simple interest.

- Calculate the future value of Nina's investment after 1 year if she chooses Option A. (2 marks)
 - Find the value of r in Option B that would give Nina the same future value after 1 year as for Option A. Give your answer correct to two decimal places. (2 marks)
-

27. Financial Maths, STD2 F5 2020 HSC 34

Tina inherits \$60 000 and invests it in an account earning interest at a rate of 0.5% per month. Each month, immediately after the interest has been paid, Tina withdraws \$800.

The amount in the account immediately after the n th withdrawal can be determined using the recurrence relation

$$A_n = A_{n-1}(1.005) - 800,$$

where $n = 1, 2, 3, \dots$ and $A_0 = 60\,000$

- Use the recurrence relation to find the amount of money in the account immediately after the third withdrawal. (2 marks)
- Calculate the amount of interest earned in the first three months. (2 marks)

28. Financial Maths, STD2 F4 2010 HSC 25b

William wants to buy a car. He takes out a loan for \$28 000 at 7% per annum interest for four years.

Monthly repayments for loans at different interest rates are shown in the spreadsheet.

	A	B	C	D	E
1		Monthly repayments			
2		Term of loan (in months)			48
3					
4	Amount	Interest rate p.a.			
5	borrowed	6%	7%	8%	9%
6	\$27 000	\$634.10	\$646.55	\$659.15	\$671.90
7	\$27 500	\$645.84	\$658.52	\$671.36	\$684.34
8	\$28 000	\$657.58	\$670.49	\$683.56	\$696.78
9	\$28 500	\$669.32	\$682.47	\$695.77	\$709.22
10	\$29 000	\$681.07	\$694.44	\$707.97	\$721.67
11	\$29 500	\$692.81	\$706.41	\$720.18	\$734.11
12	\$30 000	\$704.55	\$718.39	\$732.39	\$746.55

How much interest does William pay over the term of this loan? (2 marks)

29. Financial Maths, STD2 F4 2013 HSC 26e

Kimberley has invested \$3500.

Interest is compounded half-yearly at a rate of 2% per half-year.

Compounded values of \$1

Period	Interest rate per period					
	1%	2%	3%	4%	5%	6%
1	1.010	1.02	1.03	1.04	1.05	1.06
2	1.020	1.040	1.061	1.082	1.103	1.124
3	1.030	1.061	1.093	1.125	1.158	1.191
4	1.041	1.082	1.126	1.170	1.216	1.262
5	1.051	1.104	1.159	1.217	1.276	1.338
6	1.062	1.126	1.194	1.265	1.340	1.419
7	1.072	1.149	1.230	1.316	1.407	1.504
8	1.083	1.172	1.267	1.369	1.477	1.594

Use the table to calculate the value of her investment at the end of 4 years. (2 marks)

30. Financial Maths, STD2 F1 2013 HSC 27b

The table shows the tax payable to the Australian Taxation Office for different taxable incomes.

Taxable income	Tax on this income
\$0 – \$18 200	Nil
\$18 201 – \$37 000	19c for each \$1 over \$18 200
\$37 001 – \$80 000	\$3572 plus 32.5c for each \$1 over \$37 000
\$80 001 – \$180 000	\$17 547 plus 37c for each \$1 over \$80 000
\$180 001 and over	\$54 547 plus 45c for each \$1 over \$180 000

Acknowledgment: © Australian Taxation Office for the Commonwealth of Australia

Peta has a gross annual salary of \$84 000. She has tax deductions of \$1000 for work-related travel and \$500 for stationery. The Medicare levy that she pays is calculated at 1.5% of her taxable income.

Peta has already paid \$18 500 in tax.

Will Peta receive a tax refund or will she owe money to the Australian Taxation Office? Justify your answer by calculating the refund or amount owed. (4 marks)

31. Financial Maths, STD2 F5 2016 HSC 28d

The table gives the contribution per period for an annuity with a future value of \$1 at different interest rates and different periods of time.

Contribution per period for an annuity with a future value of \$1

Number of periods	Interest rate (% per period)					
	0.25%	0.5%	0.75%	1%	1.25%	1.5%
6	0.1656	0.1646	0.1636	0.1625	0.1615	0.1605
12	0.0822	0.0811	0.0800	0.0788	0.0778	0.0767
18	0.0544	0.0532	0.0521	0.0510	0.0499	0.0488
24	0.0405	0.0393	0.0382	0.0371	0.0360	0.0349
30	0.0321	0.0310	0.0298	0.0287	0.0277	0.0266
36	0.0266	0.0254	0.0243	0.0232	0.0222	0.0212

Margaret needs to save \$75 000 over 6 years for a deposit on a new apartment. She makes regular quarterly contributions into an investment account which pays interest at 3% pa.

How much will Margaret need to contribute each quarter to reach her savings goal? (2 marks)

32. Financial Maths, STD2 F4 2017 HSC 28c

Michelle borrows \$100 000. The interest rate charged is 12% per annum compounded monthly. The monthly payment is \$1029 and the first repayment is made after one month.

What is the amount outstanding immediately after the SECOND monthly repayment is made? (3 marks)

33. Financial Maths, STD2 F1 SM-Bank 1

Ralph buys a utility vehicle with a market value of \$63 500.

Stamp duty is calculated on the vehicle as follows:

- 3% of market value up to \$45 000
- 5% of market value over \$45 000

Calculate the amount of stamp duty payable by Ralph. (2 marks)

34. Financial Maths, STD2 F1 2019 HSC 29

Part of a supermarket receipt is shown.

SUPERMARKET RECEIPT	
Date: 22/09/2019	
Description	\$
*Chocolates 300 g	<input type="text" value="A"/>
Tomatoes 1 kg	5.00
Natural almonds 400 g	<input type="text" value="B"/>
Cheese slices 500 g	8.50
Milk 2 L	3.20
Bananas 570 g	2.85
Total for 6 items	36.25
GST included in total	0.70
*GST of 10% is included in the price of item.	

Determine the missing values, A and B, to complete the receipt. (2 marks)

35. Financial Maths, STD2 F4 2019 HSC 27

Ashley has a credit card with the following conditions:

- There is no interest-free period.
- Interest is charged at the end of each month at 18.25% per annum, compounding daily, from the purchase date (included) to the last day of the month (included).

Ashley's credit card statement for April is shown, with some figures missing.

1 April to 30 April		
Date	Details	Amount (\$)
1 April	Opening balance	0
20 April	Furniture	3700
30 April	Interest charged	***
30 April	Closing balance	***

Minimum payment:

The minimum payment is calculated as 2% of the closing balance on 30 April.

Calculate the minimum payment. (3 marks)

36. Financial Maths, STD2 F4 2020 HSC 29

Jana owns a share portfolio. Details of her share portfolio at 30 June 2020 are given in the table.

Company name	Numbers of shares in Jana's portfolio	Dividend yield (per annum)	Market price per share
ABC	200	6.0 %	\$5.50
XYZ	?	4.0 %	\$6.00

Jana received a total annual dividend of \$149.52 from her share portfolio.

Calculate the number of shares Jana has in company XYZ on 30 June 2020. (3 marks)

37. Financial Maths, STD2 F5 2019 HSC 42

The table shows the future values of an annuity of \$1 for different interest rates for 4, 5 and 6 years. The contributions are made at the end of each year.

Years	Future value of an annuity of \$1			
	Interest rate per annum			
	1%	2%	3%	4%
4	4.060	4.122	4.184	4.246
5	5.101	5.204	5.309	5.416
6	6.152	6.308	6.468	6.633

An annuity account is opened and contributions of \$2000 are made at the end of each year for 7 years.

For the first 6 years, the interest rate is 4% per annum, compounding annually.

For the 7th year, the interest rate increases to 5% per annum, compounding annually.

Calculate the amount in the account immediately after the 7th contribution is made. (3 marks)

38. Financial Maths, STD2 F5 2021 HSC 31

Present value interest factors for an annuity of \$1 for various interest rates (r) and numbers of periods (N) are given in the table.

		Table of present value interest factors			
$N \backslash r$	Interest rate per period as a decimal				
	0.001	0.00125	0.0015	0.00175	
300	259.07072	250.03980	241.43789	233.24180	
330	280.95771	270.26900	260.13532	250.52386	
360	302.19816	289.75411	278.01062	266.92278	

A bank lends Martina \$500 000 to purchase a home, with interest charged at 1.5% per annum compounding monthly. She agrees to repay the loan by making equal monthly repayments over a 30-year period.

How much should the monthly payment be in order to pay off the loan in 30 years?

Give your answer correct to the nearest cent. (2 marks)

39. Financial Maths, STD2 F5 2021 HSC 40

A table of future value interest factors for an annuity of \$1 is shown.

Table of future value interest factors

Number of periods	Interest rate per period				
	0.25%	0.5%	0.75%	1%	1.25%
2	2.0025	2.0050	2.0075	2.0100	2.0125
4	4.0150	4.0301	4.0452	4.0604	4.0756
6	6.0376	6.0755	6.1136	6.1520	6.1907
8	8.0704	8.1414	8.2132	8.2857	8.3589
10	10.1133	10.2280	10.3443	10.4622	10.5817

Simone deposits \$1000 into a savings account at the end of each year for 8 years. The interest rate for these 8 years is 0.75% per annum, compounded annually.

After the 8th deposit, Simone stops making deposits but leaves the money in the savings account. The money in her savings account then earns interest at 1.25% per annum, compounded annually, for a further two years.

Find the amount of money in Simone's savings account at the end of ten years. (3 marks)

40. Financial Maths, STD2 F1 2016 HSC 27a

Alice intends to buy a car and insure it.

Briefly describe what each of these types of insurance covers:

- Compulsory third-party insurance (CTP)
- Non-compulsory third-party property insurance. (2 marks)

41. Financial Maths, STD2 F5 2020 HSC 37

Wilma deposited a lump sum into a new bank account which earns 2% per annum compound interest.

Present value interest factors for an annuity of \$1 for various interest rates (r) and numbers of periods (N) are given in the table.

Table of present value interest factors

$N \backslash r$	Interest rate per period as decimal			
	0.01	0.015	0.02	0.025
10	9.471	9.222	8.983	8.752
20	18.046	17.169	16.351	15.589
30	25.808	24.016	22.396	20.930

Wilma was able to make the following withdrawals from this account.

- \$1000 at the end of each year for twenty years (starting one year after the account is opened)
- \$3000 each year for ten years starting 21 years after the account is opened.

Calculate the minimum lump sum Wilma must have deposited when she opened the new account. (3 marks)

Worked Solutions

1. Financial Maths, STD2 F1 2014 HSC 13 MC

Commission

$$\begin{aligned} &= (2000 \times 6\%) + (1000 \times 3.5\%) + (5670 - 3000) \times 2\% \\ &= (2000 \times 0.06) + (1000 \times 0.035) + (2670 \times 0.02) \\ &= 120 + 35 + 53.40 \\ &= 208.40 \end{aligned}$$

$\Rightarrow B$

2. Financial Maths, STD2 F4 2021 HSC 4 MC

$$\begin{aligned} S &= V_0(1 - r)^n \\ &= 2467(1 - 0.15)^3 \\ &= 2467(0.85)^3 \\ &= \$1515 \end{aligned}$$

$\Rightarrow D$

3. Financial Maths, STD2 F4 2012 HSC 16 MC

By Elimination

B and D represent straight line depreciation.

C incorrectly has no salvage value after 10 years

$\Rightarrow A$

Worked Solutions

4. Financial Maths, STD2 F4 2012 HSC 24 MC

Monthly repayment = \$2796.86

$$\# \text{ Repayments} = 30 \times 12 = 360$$

$$\begin{aligned} \text{Total repaid} &= 360 \times 2796.86 \\ &= \$1\,006\,869.60 \end{aligned}$$

$$\begin{aligned} \text{Total interest} &= 1\,006\,869.60 - 400\,000 \\ &= \$606\,869.60 \end{aligned}$$

Fortnightly payment = \$1404.76

$$\# \text{ Repayments} = 23 \times 26 = 598$$

$$\begin{aligned} \text{Total repaid} &= 598 \times 1404.76 \\ &= \$840\,046.48 \end{aligned}$$

$$\begin{aligned} \text{Total interest} &= 840\,046.48 - 400\,000 \\ &= \$440\,046.48 \end{aligned}$$

$$\begin{aligned} \therefore \text{Difference in interest} &= 606\,869.60 - 440\,046.48 \\ &= \$166\,823 \quad (\text{nearest dollar}) \end{aligned}$$

$\Rightarrow B$

5. Financial Maths, STD2 F4 2005 HSC 10 MC

Monthly repayment of \$1000 at 8% for 15 years

$$= \$9.56$$

\therefore Monthly repayment of \$70 000

$$= 70 \times \$9.56$$

$$= \$669.20$$

$\Rightarrow B$

6. Financial Maths, STD2 F4 2019 HSC 13 MC

Values increase quicker

- higher compounding interest rate
- same rate but more frequent compounding period

$\therefore W = 10\%$ quarterly

$X = 10\%$ annually

$Y = 5\%$ annually

$\Rightarrow C$

7. Financial Maths, STD2 F2 2021 HSC 5 MC

Wage after 1 year = 21.50×1.021

Wage after 2 years = $21.50 \times 1.021 \times 1.021 = 21.50(1.021)^2$

\vdots

Wage after 4 years = $21.50(1.021)^4$

$\Rightarrow B$

8. Financial Maths, STD2 F1 2017 HSC 11 MC

Net Depreciation = $19\,900 - 16\,300$
= $\$3600$

$\therefore \% \text{ Depreciation} = \frac{3600}{19\,900} \times 100$
= $18.09\dots\%$

$\Rightarrow A$

9. Financial Maths, STD2 F1 2009 HSC 20 MC

Loan = Price – deposit
= $3499 - 1000$
= $\$2499$

Total repaid = 24×135.36
= $\$3248.64$

\therefore Interest paid = $3248.64 - 2499$
= $\$749.64$

Simple Interest = Prn
 $749.64 = 2499 \times r \times 2$
 $\therefore r = \frac{749.64}{2 \times 2499}$
= $0.1499\dots$
 $\approx 15\%$

$\Rightarrow B$

10. Financial Maths, STD2 F4 2005 HSC 13 MC

Dividend yield = $\frac{\text{Dividend}}{\text{Share Value}}$
= $\frac{0.10}{2.50}$
= 0.04
= 4%

$\Rightarrow A$

♦♦ Mean mark 34%

COMMENT: A multi-step question targeting higher bands that can be a time-trap for many students.

11. Financial Maths, STD2 F1 2015 HSC 15 MC

Let C = cost of camera ex-GST

$$C + 12\%C = \$449$$

◆ Mean mark 36%.

$$1.12C = 449$$

$$\therefore C = \frac{449}{1.12}$$

$$= \$400.89\dots$$

⇒ B

12. Financial Maths, STD2 F4 2016 HSC 17 MC

Total owing

$$= P(1 + r)^n$$

$$= 780\left(1 + \frac{0.036}{100}\right)^{24}$$

$$= 786.77$$

◆ Mean mark 38%.

COMMENT: Credit card problems consistently produce sub-50% mean marks. Important review area.

∴ Interest charged

$$= 786.77 - 780$$

$$= \$6.77$$

⇒ B

13. Financial Maths, STD2 F1 2018 HSC 8 MC

8 am - 3:20 pm = 7 hrs 20 mins

Since part of an hour is charged as a full hour,

$$\therefore \text{Charge} = 8 \times 15$$

$$= \$120$$

⇒ D

14. Financial Maths, STD2 F1 2018 HSC 14 MC

Take an item that costs \$100 (for example):

$$\Rightarrow \text{Original price} = 100 \times 1.3 = \$130$$

◆ Mean mark 50%.

$$\Rightarrow \text{Sale Price} = 130 \times 0.7 = \$91$$

∴ Sale price < cost price

⇒ A

15. Financial Maths, STD2 F1 2018 HSC 15 MC

CTP insurance covers liability for death or injury

to other people, but does not cover property damage.

◆◆ Mean mark 34%.

⇒ B

16. Financial Maths, STD2 F4 2018 HSC 19 MC

4% annual

$$\Rightarrow \frac{4\%}{4} = 1\% \text{ compounded quarterly}$$

◆◆ Mean mark 33%.

$$\Rightarrow n = 8$$

$$\Rightarrow \text{Factor} = 1.0829$$

$$\therefore \text{Minimum sum} = 21\,000 \div 1.0829$$

⇒ D

17. Financial Maths, STD2 F5 2020 HSC 14 MC

Mean mark 53%.

 PV (30 June 2020) < \$10 000 (each payment discounted to 30-Jun-20 value) FV (30 June 2030) \Rightarrow annuity has received $10 \times \$1000$

payments plus interest

 $\therefore FV$ (30 June 2030) > \$10 000 $\Rightarrow A$ **18. Financial Maths, STD2 F4 2020 HSC 11 MC** $V_0 = 10\,000$, $r = 0.08$, $n = 10$

$$S = V_0(1 - r)^n$$

$$= 10\,000(1 - 0.08)^{10}$$

$$= 10\,000(0.92)^{10}$$

$$= \$4343.88$$

 $\Rightarrow C$

♦ Mean mark 43%.

COMMENT: 8% depreciation is applicable every 6 months here ($n=10$). Read carefully!**19. Financial Maths, STD2 F1 2006 HSC 22 MC**

$$\text{Tax on } \$50\,000 = 2500 + 0.35 \times (50\,000 - 45\,000)$$

$$= 2500 + 1750$$

$$= \$4250$$

$$\text{Tax on } \$80\,000 = 11\,250 + 0.52 \times (80\,000 - 70\,000)$$

$$= 11\,250 + 5200$$

$$= \$16\,450$$

$$\therefore \text{Extra tax} = 16\,450 - 4250$$

$$= \$12\,200$$

 \therefore % Increase paid in tax

$$= \frac{12\,200}{30\,000} \times 100$$

$$= 40.66\dots\%$$

 $\Rightarrow B$ **20. Financial Maths, STD2 F1 2019 HSC 9 MC**

$$\text{Interest} = 800 \times \frac{x}{12} \times \frac{3}{100}$$

$$= 2x$$

 $\Rightarrow A$

♦♦♦ Mean mark 20%!

21. Financial Maths, STD2 F4 2009 HSC 26c

i. Monthly repayment = \$2200

$$\begin{aligned}\therefore \text{Total paid} &= 2200 \times 240 \\ &= \$528\,000\end{aligned}$$

$$\# \text{ Repayments} = 20 \times 12 = 240$$

ii. Interest rate monthly = $\frac{6\%}{12}$
= 0.5%

$$\begin{aligned}A &= \text{Principal at start of month} \times \frac{0.5}{100} \\ &= 299\,300 \times \frac{0.5}{100} \\ &= \$1496.50\end{aligned}$$

$$\begin{aligned}B &= \text{Principal} + \text{interest} - \text{repayment} \\ &= 299\,300 + 1496.50 - 2200 \\ &= \$298\,596.50\end{aligned}$$

♦ Mean mark 39%

MARKER'S COMMENT: Many students didn't realise the simplicity of this question. The 1 mark allocation should flag that the answer should not be too involved or difficult.

22. Financial Maths, STD2 F1 2012 HSC 27a

$$\text{Gross wage} = \$1024 \text{ per week}$$

$$\begin{aligned}\text{Weekly Deductions} &= 296.40 + 24.50 + 15.80 \\ &= \$336.70\end{aligned}$$

$$\text{Net Weekly Wage} = 1024 - 336.70 = \$687.30$$

$$\text{Annual Net Wage} = 52 \times 687.30 = \$35\,739.60$$

$$\begin{aligned}\therefore \text{Household expenses} &= \frac{3640}{35\,739.60} \\ &= 10.18478\dots \\ &= 10.18\% \text{ (to 2 d.p.)}\end{aligned}$$

MARKER'S COMMENT: The best answers used clear steps in calculating deductions and net wages, and kept wages in their weekly form until the last step.

23. Financial Maths, STD2 F1 2020 HSC 20

$$\begin{aligned}\text{Tax paid} &= 12 \times 3000 \\ &= \$36\,000\end{aligned}$$

$$\begin{aligned}\text{Tax payable on } \$122\,680 &= 20\,797 + 0.37(122\,680 - 90\,000) \\ &= 20\,797 + 0.37(32\,680) \\ &= \$32\,888.60\end{aligned}$$

$$\begin{aligned}\therefore \text{Tax refund} &= 36\,000 - 32\,888.60 \\ &= \$3111.40\end{aligned}$$

24. Financial Maths, STD2 F4 2009 HSC 24e

i. $S = V_0 - Dn$

$$0 = 3600 - D \times 3$$

$$3D = 3600$$

$$D = \frac{3600}{3}$$

$$= 1200$$

\therefore Annual depreciation = \$1200

ii Using $S = V_0(1 - r)^n$

where $r = 30\%$ and $V_0 = 3600$

◆ Mean mark 45%

$$S = 3600 \left(1 - \frac{30}{100}\right)^n$$

$$= 3600(0.7)^n$$

$(0.7)^n > 0$ for all n

\therefore Salvage value is always > 0

25. Financial Maths, STD2 F1 2004 HSC 27b

i. Pay (Fri) = 4 hours \times 18.00

$$= \$72.00$$

Pay (Sat) = 6 hours \times 1.5 \times 18.00

$$= \$162.00$$

Pay (Sun) = 5 hours \times 2 \times 18.00

$$= \$180.00$$

$$\therefore \text{Gross pay} = 72 + 162 + 180$$

$$= \$414.00$$

ii. Pay on Sat = \$162.00

Weekly equivalent hours

$$= \frac{162}{18}$$

$$= 9 \text{ hours}$$

\therefore He will have to work 9 extra hours on

a weekday for the same gross pay

26. Financial Maths, STD2 F4 2021 HSC 26

a. $r = \frac{6\%}{12} = 0.5\% = 0.005$ per month
 $n = 12$

$$\begin{aligned}FV &= PV(1 + r)^n \\ &= 35\,000(1 + 0.005)^{12} \\ &= \$37\,158.72\end{aligned}$$

b. $I = Prn$

$$2158.72 = 35\,000 \times r \times 1$$

$$r = \frac{2158.72}{35\,000}$$

$$= 0.06167\dots$$

$$= 6.17\% \text{ (to 2 d.p.)}$$

♦♦ Mean mark part (b) 36%.

27. Financial Maths, STD2 F5 2020 HSC 34

a. $A_1 = 60\,000(1.005) - 800 = \$59\,500$

$$A_2 = 59\,500(1.005) - 800 = \$58\,997.50$$

$$A_3 = 58\,997.50(1.005) - 800 = \$58\,492.49$$

♦ Mean mark part (a) 41%.

b. Amount (not interest)

$$= 60\,000 - (3 \times 800)$$

$$= \$57\,600$$

♦♦ Mean mark part (b) 33%.

∴ Interest earned in 3 months

$$= A_3 - 57\,600$$

$$= 58\,492.49 - 57\,600$$

$$= \$892.49$$

28. Financial Maths, STD2 F4 2010 HSC 25b

$$\text{Loan} = \$28\,000, \quad r = 7\% \text{ p.a.}$$

$$\text{Monthly repayment} = \$670.49$$

$$\# \text{ Repayments} = 4 \times 12 = 48$$

$$\text{Total repaid} = 48 \times 670.49$$

$$= \$32\,183.52$$

$$\therefore \text{Interest paid} = 32\,183.52 - 28\,000$$

$$= \$4183.52$$

♦ Mean mark 42%

MARKER'S COMMENT: An incorrect table value used correctly in the following calculations received half-marks here. Show your working!

29. Financial Maths, STD2 F4 2013 HSC 26e

$$r = 2\% \text{ per half-year}$$

$$n = 8 \quad (8 \text{ half-years in 4 years})$$

$$\Rightarrow \text{Table Factor} = 1.172$$

$$\text{Investment} = 3500 \times 1.172$$

$$= \$4102$$

$$\therefore \text{After 4 years, investment value is } \$4102$$

♦ Mean mark 44%

COMMENT: Structure your answer: 1-Find the interest rate per compounding period (same in this case). 2-Find the number of compounding periods.

30. Financial Maths, STD2 F1 2013 HSC 27b

$$\begin{aligned}\text{Total Deductions} &= 1000 + 500 \\ &= \$1500\end{aligned}$$

$$\begin{aligned}\text{Taxable Income} &= \text{Gross Income} - \text{Total Deductions} \\ &= 84\,000 - 1500 \\ &= \$82\,500\end{aligned}$$

Using the tax table:

$$\begin{aligned}\text{Tax} &= 17\,547 + 0.37 \times (82\,500 - 80\,000) \\ &= 17\,547 + 925 \\ &= \$18\,472\end{aligned}$$

♦ Mean mark 44%

IMPORTANT: Note that 'Tax' and the 'Medicare Levy' are calculated *separately* using the 'Taxable Income' figure and added together to find the amount owed to the ATO.

$$\begin{aligned}\text{Medicare owing} &= 1.5\% \times 82\,500 \\ &= \$1237.50\end{aligned}$$

$$\begin{aligned}\text{Owed to ATO} &= 18\,472 + 1237.50 \\ &= \$19\,709.50\end{aligned}$$

$$\text{Tax paid} = \$18\,500$$

$$\begin{aligned}\text{Difference owing} &= 19\,709.50 - 18\,500 \\ &= \$1209.50\end{aligned}$$

∴ Peta owes the tax office \$1209.50.

31. Financial Maths, STD2 F5 2016 HSC 28d

$$\text{Periods} = 6 \times 4 = 24$$

$$\text{Interest rate} = \frac{1}{4} \times 3 = 0.75\%$$

♦ Mean mark 40%.

$$\Rightarrow \text{Table factor} = 0.0382$$

(i.e. 3.82 cents contributed per quarter = \$1 after 6 years)

∴ Quarterly contribution

$$\begin{aligned}&= 75\,000 \times 0.0382 \\ &= \$2865\end{aligned}$$

32. Financial Maths, STD2 F4 2017 HSC 28c

$$\text{Interest per month} = \frac{12\%}{12} = 1\%$$

Let A = amount owing

♦ Mean mark 41%.

After 1st repayment:

$$\begin{aligned}A_1 &= (100\,000 + 1\% \times 100\,000) - 1029 \\ &= \$99\,971\end{aligned}$$

After 2nd repayment:

$$\begin{aligned}A_2 &= (99\,971 + 1\% \times 99\,971) - 1029 \\ &= \$99\,941.71\end{aligned}$$

33. Financial Maths, STD2 F1 SM-Bank 1

$$\begin{aligned}\text{Stamp Duty} &= 3\% \times 45\,000 + 5\% \times (63\,500 - 45\,000) \\ &= 3\% \times 45\,000 + 5\% \times 18\,500 \\ &= \$2275\end{aligned}$$

34. Financial Maths, STD2 F1 2019 HSC 29

Chocolate is the only item where GST applies.

$$\text{GST on chocolate} = 0.70$$

♦♦ Mean mark 25%.

$$\Rightarrow \text{Cost of chocolate} = \$7.00$$

$$\therefore A = 7.00 + 0.70 = \$7.70$$

$$\begin{aligned} \therefore B &= 36.25 - (7.70 + 5.00 + 8.50 + 3.20 + 2.85) \\ &= \$9.00 \end{aligned}$$

35. Financial Maths, STD2 F4 2019 HSC 27

$$\begin{aligned} \text{Daily interest} &= \frac{18.25}{100 \times 365} \\ &= 0.0005 \end{aligned}$$

$$\begin{aligned} \text{Closing balance} &= 3700(1.0005)^{11} \\ &= 3720.40 \end{aligned}$$

♦ Mean mark 39%.

$$\begin{aligned} \therefore \text{Minimum payment} &= 3720.40 \times 0.02 \\ &= \$74.408\dots \\ &= \$74.41 \text{ (nearest cent)} \end{aligned}$$

36. Financial Maths, STD2 F4 2020 HSC 29

$$\begin{aligned} \text{ABC Dividend} &= \text{Value of shares} \times \text{dividend yield} \\ &= (200 \times 5.5) \times 0.06 \\ &= \$66.00 \end{aligned}$$

$$\begin{aligned} \text{XYZ Dividend} &= 149.52 - 66.00 \\ &= \$83.52 \end{aligned}$$

♦ Mean mark 43%.

Let x = number of XYZ shares

$$83.52 = \text{Value of XYZ shares} \times \text{dividend yield}$$

$$83.52 = (x \times 6.0) \times 0.04$$

$$6x = \frac{83.52}{0.04}$$

$$\therefore x = \frac{2088}{6}$$

$$= 348$$

37. Financial Maths, STD2 F5 2019 HSC 42

$$\text{Annuity compounding factor (4\% for 6 years)} = 6.633$$

$$\begin{aligned} \therefore \text{Value after 6 years} &= 2000 \times 6.633 \\ &= \$13\,266.00 \end{aligned}$$

♦♦ Mean mark 27%.

At the end of 7th year:

$$\begin{aligned} \text{Value} &= 13\,266 \times 1.05 + 2000 \\ &= 13\,929.30 + 2000 \\ &= \$15\,929.30 \end{aligned}$$

38. Financial Maths, STD2 F5 2021 HSC 31

$$\text{Monthly interest rate } (r) = \frac{1.5}{12} = 0.125\% = 0.00125$$

$$N = 30 \times 12 = 360$$

◆ Mean mark 43%.

$$\Rightarrow \text{PV annuity factor} = 289.75411$$

$$\begin{aligned} \therefore \text{Monthly payment} &= \frac{500\,000}{289.75411} \\ &= \$1725.60 \end{aligned}$$

39. Financial Maths, STD2 F5 2021 HSC 40

In 1st 8 years:

$$\text{Future value factor} = 8.2132$$

◆ Mean mark 35%.

$$\begin{aligned} \text{Value of annuity} &= 8.2132 \times 1000 \\ &= \$8213.20 \end{aligned}$$

After 10 years:

$$\begin{aligned} \text{Value of investment} &= 8213.2 \times (1.0125)^2 \\ &= \$8419.81 \end{aligned}$$

40. Financial Maths, STD2 F1 2016 HSC 27a

CTP Insurance:

This insures a driver against liability if their car injures or kills a person in an accident.

◆◆ Mean mark 13%.

MARKER'S COMMENT: Again, car insurance causes major issues for students.

Non-compulsory TP Insurance:

This insurance covers damage to other people's property in an accident, but does not cover the driver's own vehicle.

41. Financial Maths, STD2 F5 2020 HSC 37

Annuity 1: *PV* of \$1000 annuity for 20 years at $r = 0.02$

$$\text{PV factor} = 16.351$$

◆◆ Mean mark 23%.

$$\begin{aligned} \therefore \text{PV Annuity 1} &= 16.351 \times 1000 \\ &= \$16\,351 \end{aligned}$$

Annuity 2: *PV* of \$3000 annuity for years 21-30 at $r = 0.02$

$$\begin{aligned} \text{PV Annuity 2} &= \text{PV}(30 \text{ years}) - \text{PV}(20 \text{ years}) \\ &= 3000 \times 22.396 - 3000 \times 16.351 \\ &= \$18\,135 \end{aligned}$$

$$\begin{aligned} \therefore \text{Lump sum required} &= 16\,351 + 18\,135 \\ &= \$34\,486 \end{aligned}$$