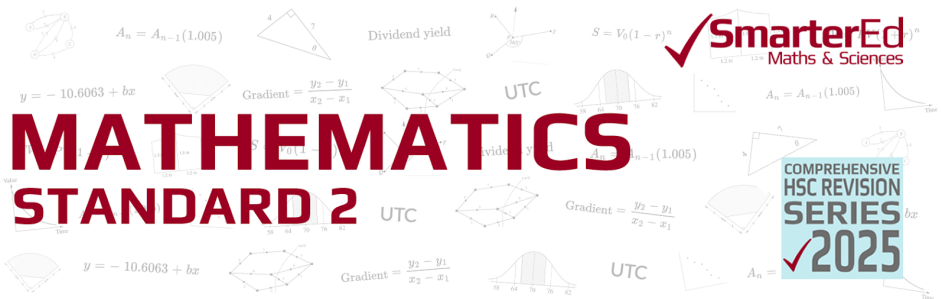


Thank you for subscribing to SmarterMaths Teacher Edition (Silver) in 2025.

Key features of the Standard 2 "2025 HSC Comprehensive Revision Series" include:

- ~15 hours of cherry picked HSC revision questions by topic
- Targeted at motivated students aiming for a Band 5 or 6 result
- Weighting toward more difficult examples
- Mark allocations given to each topic area reflect its historical (new syllabus) HSC exam allocation
- Std2/Adv common questions are key areas for high band results and this is reflected in question choices
- ***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: If students have been exposed to questions in these worksheets during the year, we say great. Many top performing students attest to the benefits of doing quality questions 2-3 times before the HSC. This type of revision set is aimed at creating confidence and *speed through the exam*, with cherry picked questions that cover all important elements of revision while avoiding low percentage rabbit hole excursions.

HSC Final Study – STD2 Financial Maths (2 of 2) (~22.9% of exam)

Key Areas addressed by this worksheet

F4 Investments and Loans (9.8%)

- *Compound Interest:* The use of the compound formula $FV = PV(1 + r)^n$ has been examined in 8 of the last 10 years (most recently in 2024) and is revised in multiple questions.
- Comparing compound interest vs simple interest investments is a common question type. *2021 Q26b* is a must review question in this area.
- Questions involving *Compounded Value of $1* tables have traditionally caused students problems and we note they were last examined in 2018.
- *Shares:* dividend yield attracted a dedicated questions each year between 2019-22 and its revision importance is reflected in the worksheet (notably absent in 2023-24 exams).
- *Depreciation:* tested 9 years of the last decade in questions worth anywhere from 1-6 marks. A comparison of declining balance and straight-line depreciation is common (examined in 2023 and 2022) and is featured in this revision.
- *2020 Std2 11 MC* caused problems with a 6-monthly depreciation period, producing a mean mark of 43% - revision attention required here.
- *Credit Cards:* asked in three new syllabus exams (most recently in 2023). Sub-50% mean marks are common, making this a key revision area.
- Calculating daily interest rates and applying the correct number of days has proven very challenging for the majority of students. Multiple revision questions address this.
- *Loans:* Exposure to different loan payment table styles is critical. Covered by numerous examples including the very challenging *2023 Q29*.
- *"Loan P+I-R Table"* style questions have appeared in the 2024 and 2022 exams, receiving significant mark allocations on each occasion. Interpreting these tables proved challenging and multiple questions cover this area.

F5 Annuities (6.8%)

- *Annuities* has attracted huge allocations of between 5-8 marks in the last 4 exams. It is an important area for Std2/Adv common questions and is treated as a major revision focus area.
- *Future Value of an Annuity Table* has been the most regularly asked question type and is well covered (note it has produced sub-50% mean marks in a majority of questions).
- 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 (2024, 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 problems – this is a "must review" question.

STANDARD 2 2025

HSC Revision Series

Financial Maths (2 of 2)

F4 Investments and Loans (Y12)

F5 Annuities (Y12)

Exam Equivalent Time: 120 minutes *(based on allocation of 1.5 minutes per mark)*

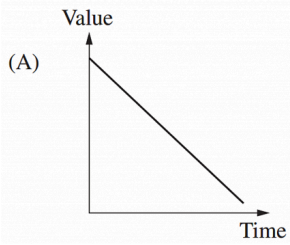
Questions

1. Financial Maths, STD2 F4 2007 HSC 12 MC

The value of a car is depreciated using the declining balance method.

Which graph best illustrates the value of the car over time?

(A)



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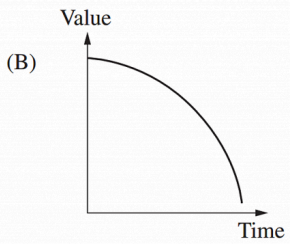
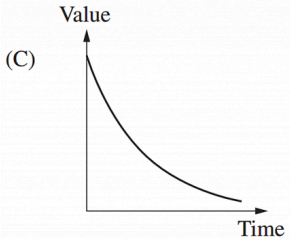
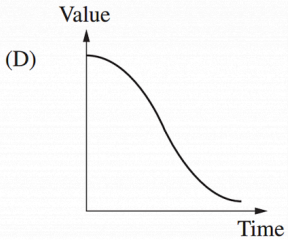


(C)



(D)



2. Financial Maths, STD2 F4 2008 HSC 15 MC

Ali is buying a speedboat at Betty's Boats.

Betty's Boats

Cash price
$16 000

OR

Terms
15% deposit plus
$320 per month for
5 years

What is the amount of interest Ali will have to pay if he chooses to buy the boat on terms?

A. $3200

B. $5600

C. $19 200

D. $21 600

3. Financial Maths, STD2 F4 2017 HSC 10 MC

A single amount of $10 000 is invested for 4 years, earning interest at the rate of 3% per annum, compounded monthly.

Which expression will give the future value of the investment?

A. $10\ 000 \times (1 + 0.03)^4$

B. $10\ 000 \times (1 + 0.03)^{48}$

C. $10\ 000 \times \left(1 + \frac{0.03}{12}\right)^4$

D. $10\ 000 \times \left(1 + \frac{0.03}{12}\right)^{48}$

4. Financial Maths, STD2 F4 2022 HSC 11 MC

In ten years, the future value of an investment will be \$150 000. The interest rate is 4% per annum, compounded half-yearly.

Which equation will give the present value (PV) of the investment?

A. $PV = \dfrac{150\ 000}{(1+0.04)^{10}}$

B. $PV = \dfrac{150\ 000}{(1+0.04)^{20}}$

C. $PV = \dfrac{150\ 000}{(1+0.02)^{10}}$

D. $PV = \dfrac{150\ 000}{(1+0.02)^{20}}$

---

5. Financial Maths, STD2 F4 2024 HSC 7 MC

Three years ago, the price of a uniform was \$180.

Due to inflation, the price increased annually by 2.5%.

What is the price of this uniform now?

A. \$180.14

B. \$ 181.35

C. \$ 193.50

D. \$ 193.84

---

6. Financial Maths, STD2 F5 2014 HSC 21 MC

A table of future value interest factors is shown.

Table of future value interest factors

Period	*Interest rate per period*				
	1%	*2%*	*3%*	*4%*	*5%*
1	1.0000	1.0000	1.0000	1.0000	1.0000
2	2.0100	2.0200	2.0300	2.0400	2.0500
3	3.0301	3.0604	3.0909	3.1216	3.1525
4	4.0604	4.1216	4.1836	4.2465	4.3101

A certain annuity involves making equal contributions of \$25 000 into an account every 6 months for 2 years at an interest rate of 4% per annum.

Based on the information provided, what is the future value of this annuity?

A. \$50 500

B. \$51 000

C. \$103 040

D. \$106 162

---

7. 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

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8. 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

---

9. 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 × 1.0816

B. 21 000 ÷ 1.0816

C. 21 000 × 1.0829

D. 21 000 ÷ 1.0829

---

10. 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

---

11. 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

---

12. Financial Maths, STD2 F5 2013 23 MC

Zina opened an account to save for a new car. Six months after opening the account, she made first deposit of $1200 and continued depositing $1200 at the end of each six month period. Interest was paid at 3% per annum, compounded half-yearly.

How much was in Zina's account two years after first opening it?

A. $4909.08

B. $4982.72

C. $5018.16

D. $5094.55

---

13. Financial Maths, STD2 F4 2018 HSC 29e

Andrew borrowed $20 000 to be repaid in equal monthly repayments of $243 over 10 years. Having made this monthly repayment for 4 years, he increased his monthly repayment to $281. As a result, Andrew paid off the loan one year earlier.

How much less did he repay altogether by making this change? ***(2 marks)***

14. Financial Maths, STD2 F4 2019 HSC 21

A person owns 1526 shares with a market value of $8.75 per share. The total dividend received for these shares is $1068.20.

Calculate the percentage dividend yield. ***(2 marks)***

15. Financial Maths, STD2 F4 2023 HSC 28

A plumber leases equipment which is valued at $60 000.

The salvage value of the equipment at any time can be calculated using either of the two methods of depreciation shown in the table.

Method of depreciation	*Rate of depreciation*
Straight-line method	$3500 per annum
Declining balance method	12% per annum

Under which method of depreciation would the salvage value of the equipment be lower at the end of 3 years? Justify your answer with appropriate mathematical calculations. ***(3 marks)***

16. Financial Maths, STD2 F4 2024 HSC 21

William has a reducing balance loan on which he owes $5590. He makes monthly repayments of $110.

The loan company charges interest at 24% per annum, compounded monthly.

The spreadsheet shows some of the information for the next two months of the loan.

a. Complete the entries in the spreadsheet to show the balance owing on the loan at the end of two months. *(2 marks)*

	A	B	C	D	E
1	Month	Principal	Interest charged	Amount repaid	Balance owing
2	1	$5590.00	$111.80	$110.00	
3	2			$110.00	

b. Explain why the loan will never be repaid if William continues to make repayments of $110 per month. *(1 mark)*

17. Financial Maths, STD2 F4 2024 HSC 25

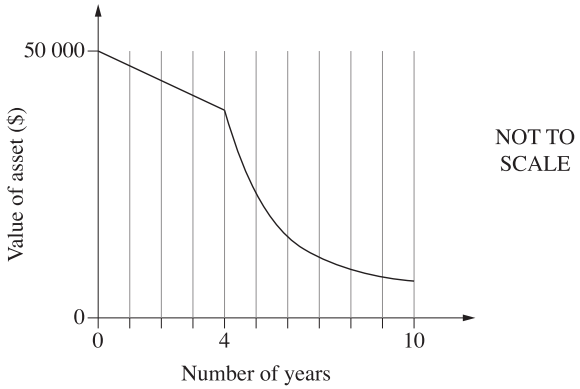
Alex and Jun each invest $1800 for 5 years.

- Alex's investment earns simple interest at a rate of 7.5% per annum.
- Jun's investment earns interest at a rate of 6.0% per annum, compounding quarterly.

By calculating the interest earned over the 5 years, determine who will have the greater amount. *(3 marks)*

18. Financial Maths, STD2 F4 2024 HSC 29

The graph shows the decreasing value of an asset.



NOT TO SCALE

For the first 4 years, the value of the asset depreciated by $1500 per year, using a straight-line method of depreciation.

After the end of the 4th year, the method of depreciation changed to the declining-balance method at the rate of 35% per annum.

What is the total depreciation at the end of 10 years? *(4 marks)*

19. Financial Maths, STD2 F4 2022 HSC 27

A company purchases a machine for $50 000. The two methods of depreciation being considered are the declining-balance method and the straight-line method.

a. For the declining-balance method, the salvage value of the machine after n years is given by the formula

$$S = V_0 \times (0.80)^n,$$

where S is the salvage value and V_0 is the initial value of the asset.

i. What is the annual rate of depreciation used in this formula? *(1 mark)*

ii. Calculate the salvage value of the machine after 3 years, based on the given formula. *(1 mark)*

b. For the straight-line method, the value of the machine is depreciated at a rate of 12.2% of the purchase price each year.

When will the value of the machine, using this method, be equal to the salvage value found in part (a) (ii)? *(2 marks)*

20. Financial Maths, STD2 F5 2005 HSC 26b

Rod is saving for a holiday. He deposits $3600 into an account at the end of every year for four years. The account pays 5% per annum interest, compounding annually.

The table shows future values of an annuity of $1.

Future values of an annuity of $1

End of year	*Interest rate*				
	1%	2%	3%	4%	5%
1	1.0000	1.0000	1.0000	1.0000	1.0000
2	2.0100	2.0200	2.0300	2.0400	2.0500
3	3.0301	3.0604	3.0909	3.1216	3.1525
4	4.0604	4.1216	4.1836	4.2465	4.3101
5	5.1010	5.2040	5.3091	5.4163	5.5256
6	6.1520	6.3081	6.4684	6.6330	6.8019
7	7.2135	7.4343	7.6625	7.8983	8.1420
8	8.2857	8.5830	8.8923	9.2142	9.5491

i. Use the table to find the value of Rod's investment at the end of four years. *(2 marks)*

ii. How much interest does Rod earn on his investment over the four years? *(2 marks)*

21. 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.

a. Calculate the future value of Nina's investment after 1 year if she chooses Option *A*. *(2 marks)*

b. 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)*

22. 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 nth withdrawal can be determined using the recurrence relation

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

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

a. Use the recurrence relation to find the amount of money in the account immediately after the third withdrawal. *(2 marks)*

b. Calculate the amount of interest earned in the first three months. *(2 marks)*

23. 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)*

24. 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)*

25. Financial Maths, STD2 F4 2021 HSC 30

Ariana owns 1500 shares in a company. The market price for each share is $27. Ariana's total dividend from these shares is $810.

Calculate the dividend yield for her shares. *(2 marks)*

26. Financial Maths, STD2 F4 2023 HSC 32

Ali has a credit card which has no interest-free period. Interest is charged at 13.5% per annum, compounding daily, on the amount owing.

During the month, Ali made only one purchase of $450 using the credit card. The full amount owing was repaid 21 days later.

a. Calculate the amount of interest charged on the purchase, assuming that interest is charged for the 21 days. *(2 marks)*

b. What percentage of the full amount repaid is the interest? Give the answer to two decimal places. *(2 marks)*

27. 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.

Future value of an annuity of $1

Years	*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)***

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28. 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

r / N	*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)***

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29. 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)***

30. Financial Maths, STD2 F5 2024 HSC 41

Twenty-five years ago, Phoenix deposited a single sum of money into a new bank account, earning 2.4% interest per annum compounding monthly.

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

Rate (r) / *Period (n)*	*0.001*	*0.002*	*0.003*	*0.004*
60	58.207	56.487	54.835	53.249
120	113.026	106.592	100.649	95.156
180	164.655	151.036	138.927	128.137
240	213.278	190.460	170.908	154.093
300	259.071	225.430	197.627	174.521

Phoenix made the following withdrawals from this account.

- $2000 at the end of each month for the first 15 years, starting at the end of the first month.
- $1200 at the end of each month for the next 10 years, starting at the end of the 181st month after the account was opened.

Calculate the minimum sum that Phoenix could have deposited in order to make these withdrawals. ***(4 marks)***

31. Financial Maths, STD2 F4 2022 HSC 36

Frankie borrows $200 000 from a bank. The loan is to be repaid over 23 years at a rate of 7.2% per annum, compounded monthly. The repayments have been set at $1485 per month.

The interest charged and the balance owing for the first three months of the loan are shown in the spreadsheet below.

Month	*Principal (at start of month)*	*Interest charged*	*Monthly repayment*	*Balance (at end of month)*
1	$200 000	$1200	$1485	$199 715
2	$199 715	***A***	$1485	$199 428.29
3	$199 428.29	$1196.57	$1485	***B***

a. What are the values of A and B? ***(2 marks)***

b. After 50 months of repaying the loan, Frankie decides to make a lump sum payment of $ 40 000 and to continue making the monthly repayments of $1485. The loan will then be fully repaid after a further 146 monthly repayments.

How much less will Frankie pay overall by making the lump sum payment? ***(3 marks)***

32. Financial Maths, STD2 F4 2023 HSC 29

The table shows monthly repayments for each $1000 borrowed.

Monthly repayment table

Principal and Interest per $1000 borrowed

Interest rate (per annum)	*Term of loan* (years)					
	5	10	15	20	25	30
6.5%	19.57	11.35	8.71	7.46	6.75	6.32
7.0%	19.80	11.61	8.99	7.75	7.07	6.65
7.5%	20.04	11.87	9.27	8.06	7.39	6.99
8.0%	20.28	12.13	9.56	8.36	7.72	7.34

a. A couple borrows $520 000 to buy a house at 8% per annum over 25 years.

How much does the couple repay in total for this loan? ***(3 marks)***

b. Chris borrows some money at 7% per annum. Chris will repay the loan over 15 years, paying $3596 per month.

How much money does Chris borrow? ***(1 mark)***

33. 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 \ 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)***

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Worked Solutions

1. Financial Maths, STD2 F4 2007 HSC 12 MC

Declining balance depreciates quicker in absolute terms in the early stages, and slower as time goes on and the balance owing decreases.

$\Rightarrow C$

2. Financial Maths, STD2 F4 2008 HSC 15 MC

$$\begin{aligned}\text{Deposit} &= 15\% \times 16\ 000 \\ &= 2400\end{aligned}$$

$$\begin{aligned}\text{Payments} &= 320 \times 5 \times 12 \\ &= 19\ 200\end{aligned}$$

$$\begin{aligned}\text{Total paid} &= 2400 + 19\ 200 \\ &= 21\ 600\end{aligned}$$

$$\begin{aligned}\therefore\ \text{Interest} &= 21\ 600 – 16\ 000 \\ &= 5600\end{aligned}$$

$\Rightarrow B$

3. Financial Maths, STD2 F4 2017 HSC 10 MC

$$\text{Compounding rate } = \frac{3}{100} \div 12 = \frac{0.03}{12}$$

$$\text{Compounding periods} = 4 \times 12 = 48$$

$$\therefore\ \text{FV} = 10\ 000 \times \left(1 + \frac{0.03}{12}\right)^{48}$$

$\Rightarrow D$

Worked Solutions

4. Financial Maths, STD2 F4 2022 HSC 11 MC

$$\text{Compounding periods } = 10 \times 2 = 20$$

$$\text{Compounding rate } = \frac{4\%}{2} = 2\% = 0.02$$

$$PV = \frac{150\ 000}{(1+0.02)^{20}}$$

$$\Rightarrow D$$

---

5. Financial Maths, STD2 F4 2024 HSC 7 MC

$$r = 2.5\% = \frac{2.5}{100} = 0.025$$

$$\begin{aligned} FV &= PV(1+r)^n \\ &= 180(1.025)^3 \\ &= 193.84 \end{aligned}$$

$$\Rightarrow D$$

---

6. Financial Maths, STD2 F5 2014 HSC 21 MC

4 contributions of \$25 000 made.

Annuity period = 6 months

Rate (per annuity period) $= \frac{4\%}{2} = 2\%$

Periods = 4 (4 x 6 months = 2 years)

Table value = 4.1216

$$\therefore \text{ Annuity Value} = 4.1216 \times 25\ 000 = \$103\ 040$$

$$\Rightarrow C$$

♦ *Mean mark 43%*

---

7. Financial Maths, STD2 F4 2005 HSC 13 MC

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

$$\Rightarrow A$$

---

8. Financial Maths, STD2 F4 2016 HSC 17 MC

Total owing

$$\begin{aligned} &= P(1+r)^n \\ &= 780\left(1+\frac{0.036}{100}\right)^{24} \\ &= 786.77 \end{aligned}$$

$$\therefore \text{ Interest charged}$$

$$\begin{aligned} &= 786.77 - 780 \\ &= \$6.77 \end{aligned}$$

$$\Rightarrow B$$

♦ *Mean mark 38%.*
COMMENT: Credit card problems consistently produce sub-50% mean marks. Important review area.

---

9. Financial Maths, STD2 F4 2018 HSC 19 MC

4% annual

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

$$\Rightarrow n = 8$$

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

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

$$\Rightarrow \text{ D}$$

♦♦ *Mean mark 33%.*

---

10. Financial Maths, STD2 F5 2020 HSC 14 MC

Mean mark 53%.

$PV\ (30\ \text{June}\ 2020)\ <\ \$10\ 000\ \ (\text{each payment discounted to 30-Jun-20 value})$

$FV\ (30\ \text{June}\ 2030)\ \Rightarrow \text{annuity has received}\ \ 10 \times \$1000$

payments plus interest

$\therefore\ FV\ (30\ \text{June}\ 2030)\ >\ \$10\ 000$

$\Rightarrow\ A$

---

11. 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!

---

12. Financial Maths, STD2 F5 2013 23 MC

Interest: 3% p.a $\Rightarrow 1.5\%$ per 6 months

After 2 years,

Value of 1st deposit $= 1200(1.015)^3 = 1254.81$

Value of 2nd deposit $= 1200(1.015)^2 = 1236.27$

Value of 3rd deposit $= 1200(1.015) = 1218$

Value of 4th deposit $= 1200$

$\therefore$ Amount in account after 2 years

$= 1254.81 + 1236.27 + 1218 + 1200$

$= \$4909.08$

$\Rightarrow A$

♦ *Mean mark 41%.*

---

13. Financial Maths, STD2 F4 2018 HSC 29e

Total original repayments $= 10 \times 12 \times 243$

$= \$29\ 160$

Actual repayments $= 4 \times 12 \times 243\ +\ 5 \times 12 \times 281$

$= \$28\ 524$

$\therefore$ Savings $= 29\ 160 - 28\ 524$

$= \$636$

---

14. Financial Maths, STD2 F4 2019 HSC 21

$$\begin{aligned}\text{Value of shares} &= 1526 \times 8.75 \\ &= \$13\ 352.50\end{aligned}$$

$$\begin{aligned}\therefore\ \text{Dividend yield} &= \frac{1068.20}{13\ 352.50} \\ &= 0.08 \\ &= 8\%\end{aligned}$$

15. Financial Maths, STD2 F4 2023 HSC 28

Straight-line method:

$$\begin{aligned}S &= V_0 - Dn \\ &= 60\ 000 - 3500 \times 3 \\ &= \$49\ 500\end{aligned}$$

Declining-balance method:

$$\begin{aligned}S &= V_0(1-r)^n \\ &= 60\ 000(1-0.12)^3 \\ &= 60\ 000(0.88)^3 \\ &= \$40\ 888.32\end{aligned}$$

Salvage value is lower for the declining-balance method.

16. Financial Maths, STD2 F4 2024 HSC 21

a.

	A	B	C	D	E
1	Month	Principal	Interest charged	Amount repaid	Balance owing
2	1	$5590.00	$111.80	$110.00	$5591.80
3	2	$5591.80	$111.84	$110.00	$5593.64

Calculations:

Cell E2 $= 5590 + 111.80 - 110 = \$5591.80$

Cell B3 = Cell E2

Cell C3 $= 5591.80 \times 0.02 = \$111.84$ (monthly r/i $= 2\%$)

Cell E3 $= 5591.80 + 111.84 - 110 = \$5593.64$

b. The interest charged exceeds the amount that is repaid.

Interest charges will gradually increase with the monthly repayment staying the same $\Rightarrow$ loan will

17. Financial Maths, STD2 F4 2024 HSC 25

Alex's investment:

Interest $= Prn = 1800 \times 0.075 \times 5 = \$675$

Jun's investment:

$r = \dfrac{6.0\%}{4} = 1.5\%$ per quarter

Compounding periods $= 5 \times 4 = 20$

$FV = PV(1+r)^n = 1800(1+0.015)^{20} = \$2424.34$

Total interest $= FV - PV = 2424.34 - 1800 = \$624.34$

Alex's interest $>$ Jun's interest.

$\Rightarrow$ Alex will have a greater amount (since original investment the same)

18. Financial Maths, STD2 F4 2024 HSC 29

Depreciation after 4 years $= 4 \times 1500 = \$6000$

Value after 4 years $= 50\,000 - 6000 = 44\,000$

Declining balance used for the next 6 years:

$V_0 = \$44\,000, r = 0.35, n = 6$

$$\begin{aligned} S &= V_0(1-r)^n \\ &= 44\,000(1-0.35)^6 \\ &= \$3318.43 \end{aligned}$$

$\therefore$ Total depreciation $= 50\,000 - 3318.43 = \$46\,681.57$

---

19. Financial Maths, STD2 F4 2022 HSC 27

a.i. Depreciation rate $= 1 - 0.8 = 0.2 = 20\%$

♦♦ Mean mark (a.i.) 24%.
COMMENT: A poor State result in part (a.i.) that warrants attention.

♦ Mean mark part (b) 38%.

a.ii. Find S when $n = 3$:

$$\begin{aligned} S &= V_0 \times (0.80)^n \\ &= 50\,000 \times (0.80)^3 \\ &= \$25\,600 \end{aligned}$$

b. Using the SL method

$$\begin{aligned} S_n &= 50\,000 - (0.122 \times 50\,000) \times n \\ &= 50\,000 - 6100n \end{aligned}$$

Find n when $S_n = \$25\,600$

$$\begin{aligned} 25\,600 &= 50\,000 - 6100n \\ 6100n &= 24\,400 \\ n &= \frac{24\,400}{6100} \\ &= 4 \text{ years} \end{aligned}$$

---

20. Financial Maths, STD2 F5 2005 HSC 26b

i. Using the table, $r = 5\%$ and $n = 4$

Annuity factor $= 4.3101$

$\therefore$ Value of investment

$$\begin{aligned} &= 3600 \times 4.3101 \\ &= \$15\,516.36 \end{aligned}$$

ii. Interest $=$ Value $-$ Contributions

$$\begin{aligned} &= 15\,516.36 - (4 \times 3600) \\ &= \$1116.36 \end{aligned}$$

---

21. Financial Maths, STD2 F4 2021 HSC 26

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

$n = 12$

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

b.

$$\begin{aligned} I &= Prn \\ 2158.72 &= 35\,000 \times r \times 1 \\ r &= \frac{2158.72}{35\,000} \\ &= 0.06167\ldots \\ &= 6.17\% \text{ (to 2 d.p.)} \end{aligned}$$

♦♦ *Mean mark part (b) 36%.*

---

22. 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%.*

$\therefore$ Interest earned in 3 months

$= A_3 - 57\ 600$

$= 58\ 492.49 - 57\ 600$

$= \$892.49$

---

23. Financial Maths, STD2 F5 2016 HSC 28d

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

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

♦ *Mean mark 40%.*

$\Rightarrow$ Table factor $= 0.0382$

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

$\therefore$ Quarterly contribution

$= 75\ 000 \times 0.0382$

$= \$2865$

---

24. Financial Maths, STD2 F4 2019 HSC 27

$$\text{Daily interest} = \frac{18.25}{100 \times 365}$$
$$= 0.0005$$

$$\text{Closing balance} = 3700(1.0005)^{11}$$
$$= 3720.40$$

♦ *Mean mark 39%.*

$\therefore$ Minimum payment $= 3720.40 \times 0.02$

$= \$74.408\ldots$

$= \$74.41$ (nearest cent)

---

25. Financial Maths, STD2 F4 2021 HSC 30

$$\text{Dividend yield} = \frac{\text{Dividend}}{\text{Value of shares}}$$
$$= \frac{810}{1500 \times 27}$$
$$= 0.02$$
$$= 2\% \text{ yield}$$

♦ *Mean mark 47%.*

---

26. Financial Maths, STD2 F4 2023 HSC 32

a. Daily interest rate $(r) = \dfrac{13.5}{365}\,\% = \dfrac{0.135}{365}$

♦ Mean mark (a) 45%.

$n = $ 21 days

$$\begin{aligned} FV &= PV(1+r)^n \\ &= 450\left(1+\frac{0.135}{365}\right)^{21} \\ &= \$453.51 \end{aligned}$$

$\therefore$ Interest charged $= 453.51 - 450 = \$3.51$

b. Interest as % total repaid $= \dfrac{3.51}{453.51} \times 100$

♦ Mean mark (b) 49%.

$$\begin{aligned} &= 0.007739\ldots \\ &= 0.77\,\% \text{ (to 2 d.p.)} \end{aligned}$$

---

27. Financial Maths, STD2 F5 2019 HSC 42

Annuity compounding factor (4% for 6 years) $= 6.633$

$\therefore$ Value after 6 years $= 2000 \times 6.633$

♦♦ Mean mark 27%.

$$= \$13\ 266.00$$

At the end of 7th year:

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

---

28. Financial Maths, STD2 F5 2021 HSC 31

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

$N = 30 \times 12 = 360$

♦ Mean mark 43%.

$\Rightarrow$ PV annuity factor $= 289.75411$

$$\therefore \text{ Monthly payment} = \frac{500\ 000}{289.75411}$$

$$= \$1725.60$$

---

29. Financial Maths, STD2 F5 2021 HSC 40

In 1st 8 years:

Future value factor $= 8.2132$

♦ Mean mark 35%.

$$\text{Value of annuity} = 8.2132 \times 1000$$

$$= \$8213.20$$

After 10 years:

$$\text{Value of investment} = 8213.2 \times (1.0125)^2$$

$$= \$8419.81$$

---

30. Financial Maths, STD2 F5 2024 HSC 41

♦♦ Mean mark 39%.

1st Annuity

Find PVA for \$2000 paid monthly for 1st 15 years:

$r = \dfrac{2.4}{12} = 0.2\% = 0.002$

Total payments (to Phoenix) $= 15 \times 12 = 180$

PVA factor (from table) $= 151.036$

PVA (1st annuity) $= 2000 \times 151.036 = \$302\,072$

2nd Annuity

Find PVA for \$1200 paid monthly from year 16 to 25:

PVA (2nd annuity) = PVA (25 years) − PVA (15 years)

$r = \dfrac{2.4}{12} = 0.2\% = 0.002$

Total payments (25 years) $= 25 \times 12 = 300$

PVA factors (from table): 225.430 (25 years), 151.036 (15 years)

$$\begin{aligned}\text{PVA (2nd annuity)} &= (1200 \times 225.430) - (1200 \times 151.036) \\ &= \$89\,272.80\end{aligned}$$

$\therefore$ Minimum deposit $= 302\,072 + 89\,272.80 = \$391\,344.80$

---

31. Financial Maths, STD2 F4 2022 HSC 36

a. Monthly interest rate $= \dfrac{7.2}{12} = 0.6\%$

$$\begin{aligned}A &= 199\ 715 \times \frac{0.6}{100} \\ &= \$1198.29\end{aligned}$$

$$\begin{aligned}B &= P + I - R \\ &= 199\ 428.29 + 1196.57 - 1485 \\ &= \$199\ 139.86\end{aligned}$$

b. Total payments if lump sum not paid

♦♦♦ Mean mark (b) 17%.

$$\begin{aligned}&= (23 \times 12) \times 1485 \\ &= \$409\ 860\end{aligned}$$

Total payments if lump sum paid

$$\begin{aligned}&= 40\ 000 + (50 + 146) \times 1485 \\ &= \$331\ 060\end{aligned}$$

Savings by paying the lump sum

$$\begin{aligned}&= 409\ 860 - 331\ 060 \\ &= \$78\ 800\end{aligned}$$

---

32. Financial Maths, STD2 F4 2023 HSC 29

♦ Mean mark (a) 50%.

a. 8.0% interest over a 25 year loan

Monthly repayments to borrow $\$1000 = \$7.72$

$\text{Total months } = 25 \times 12 = 300$

$$\begin{aligned}\text{Monthly repayments} &= 520 \times 7.72 \\ &= \$4014.40\end{aligned}$$

$$\begin{aligned}\therefore\ \text{Total repayments} &= 4014.40 \times 300 \\ &= \$1\ 204\ 320\end{aligned}$$

♦♦♦ Mean mark (b) 11%.

b. 7.0% interest over a 15 year loan

Monthly repayments to borrow $\$1000 = \$8.99$

$$\begin{aligned}\therefore\ \text{Amount borrowed} &= \frac{3596}{8.99} \times \$1000 \\ &= 400\ 000\end{aligned}$$

---

33. Financial Maths, STD2 F5 2020 HSC 37

♦♦♦ *Mean mark 23%.*

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

PV factor $= 16.351$

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

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

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

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