

HSC Standard Mathematics Exam Booklet: Financial Maths



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- 1. 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
- Tom earns a weekly wage of \$1025. He also receives an additional allowance of \$87.50 per day when handling toxic substances.
 What is Tom's income in a fortnight in which he handling toxic substances on 5 separate days?
 - A. \$1112.50
 - B. \$1462.50
 - C. \$2225.00
 - D. \$2487.50
- A single amount of \$10000 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. $10000 \times (1 + 0.03)^4$
- B. $10000 \times (1 + 0.03)^{48}$
- C. $10000 \times (1 + \frac{0.03}{12})^4$

$$D = 10000 \times (1 + \frac{0.03}{3})^{48}$$

D.
$$10000 \times (1 + \frac{0.03}{12})^{45}$$



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4. A company manufactures phones. The company's income equation and cost equation are drawn on the same graph.



Number of phones

Which region of the graph is the profit zone?

- A. *W*
- B. *X*
- C. *Y*
- D. *Z*
- 5. Ariana is charged compound interest at the rate of 0.036% per day on outstanding credit card balance. 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
- Isabella works a 35-hour week and is paid at an hourly rate of \$18. Any overtime hours worked are paid at time-and-a-half. In a particular week, she earned \$1008.

How many hours in total did Isabella work in this week to earn this amount?

- A. 37.3
- B. 42
- C. 49
- D. 56



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7. The table shows the future value of an investment of \$1000, compounding yearly, at varying interest rate for different periods of time.

Number	Interest rate per annum				
of years	1%	2%	3%	4%	5%
1	1010.00	1020.00	1030.00	1040.00	1050.00
2	1020.10	1040.40	1060.90	1081.60	1102.50
3	1030.30	1061.21	1092.73	1124.86	1157.63
4	1040.60	1082.43	1125.51	1169.86	1215.51
5	1051.01	1104.08	1159.27	1216.65	1276.28

Future values of an investment of \$1000

Based on the information provide, what is the future value of an investment of \$2500 over 3 years at 4% pa?

- A. \$1124.86
- B. \$2812.15
- C. \$3624.86
- D. \$5312.15
- 8. A piece of machinery, initially worth \$56000, depreciates at 8% per annum. Which graph best shows the salvage value of this piece of machinery over time?





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9. A new car was bought for \$19900 and one year later its value had depreciated to \$16300.

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

- A. 18%
- B. 22%
- C. 78%
- D. 82%
- 10. 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
- 11. Ari borrowed \$3340 for a period of 11 months. In total he repaid \$4022. The simple interest rate per annum is:
 - A. $\frac{4022-3340}{3340\times11} \times 100\%$ B. $\frac{3340}{4022\times11} \times 100\%$ C. $\frac{12\times(4022-3340)}{3340\times11} \times 100\%$ D. $\frac{12\times3340}{4022\times11} \times 100\%$
- 12. David earns a gross income of \$890 per week, 25% of this income is deducted in taxation. David budgets to save 20% of his net income.How much does he budget to save each week?
 - A. \$44.50
 - B. \$133.50
 - C. \$489.50
 - D. \$534.00



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

Number	Interest rate per period				
of periods	1%	2%	3%	4%	5%
2	1.0201	1.040	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

Compounded values of \$1

Amy hopes to have \$21000 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 calculate the minimum single sum that Amy needs to invest today to ensure she reaches her saving goal?

- A. 21000 × 1.0816
- B. 21000 ÷ 1.0816
- C. 21000 × 1.0829
- D. 21000 ÷ 1.0829
- 14. Jenny earns a yearly salary of \$63752. Her annual loading is $17\frac{1}{2}$ % of four weeks pay. Calculate her total pay for her four weeks of annual leave.



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15. Sam purchased 500 company share at \$3.20 per share. Brokerage fees were 1.5% of the purchase price. Sam is paid a dividend of 26 cents per share, then immediately sells the share for \$4.80 each. If he pays no further brokerage fees, what is Sam's total profit?

	Table of future value interest factors						
Periods		Intere	est rate per p	eriod			
	1%	1% 2% 3% 4% 5%					
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		

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

An annuity involves contributions of \$12000 per annum for 5 years. The interest rate is 4% per annum, compounded of this annuity.

(i) Calculate the future value of this annuity.



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(ii) Calculate the interest earned on this annuity.

17. Rachel bought a motorcycle advertised for \$4990. She paid a \$500 deposit and took out a flat-rate loan to repay the balance. Simple interest was changed at a rate of 7% per annum on the amount borrowed. She repaid the loan over 2 years, making equal weekly repayment. Calculate the weekly repayment.



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- 18. Constantine borrows \$8000 to buy a car. The flat interest rate is 8.6% p.a. and he repays the loan in equal momthly instalments over five years.
 - (i) Find the amount of interest charged.

(ii) Find the total amount to be repaid.

(iii) Find the monthly repayment.



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19. Calculate the divided on 3500 shares with a market price of \$1.00 per share if the dividend yield is 4.6%.

20. The table below shoes the monthly repayments per \$1000 on a bank home loan.

Term of	6.00%	6.25%	5.50%	6.75%	7.00%	7.25%	7.50%
loan							
(years)							
5	\$19.33	\$19.45	\$19.57	\$19.68	\$19.80	\$19.92	\$20.04
10	\$11.10	\$11.23	\$11.35	\$11.48	\$11.61	\$11.74	\$11.87
15	\$8.44	\$8.57	\$8.71	\$8.85	\$8.99	\$9.13	\$9.27
20	\$7.16	\$7.31	\$7.46	\$7.60	\$7.75	\$7.90	\$8.06
25	\$6.44	\$6.60	\$6.75	\$6.91	\$7.07	\$7.23	\$7.39

Determine the monthly repayment for a loan of \$120000 at 6.8% p.a. interest rate over 20 years.

- A. \$7.46
- B. \$89.52
- C. \$895.20
- D. \$7460



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21. A family currently pays \$320 for some groceries. Assuming a constant annual inflation rate of 2.9%, calculate how much would be paid for the same groceries in 5 years' time.

22. The table gives the present value interest factors for an annuity of \$1 per period, for various interest rate (r) and numbers of periods (N).

Table of present value interest factors							
r	Interest rate per period (as a decimal)						
N	0.0075	0.0075 0.0080 0.0085 0.0090 0.0095					
70	5430462	53.43960	53.43960	51.76724	50.95891		
71	54.89293	54.00754	54.00754	52.29657	51.46995		
72	55.47685	54.57097	54.57097	52.82118	51.97618		
73	56.05643	55.12993	55.12993	53.34111	52.47764		
74	56.63169	55.68446	55.68446	53.85641	52.97438		

(i) Oscar plans to invest \$200 each month for 74 months. His investment will earn interest at the rate of \$0.0080 (as a decimal) per month. Use the information in the table to calculate the preset value of this annuity.





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 Lucy is using the same table to calculate the loan repayment for the car loan. Her loan is \$21500 and will be repaid in equal monthly repayments over 6 years. The interest rate on her loan is 10.8% per annum. Calculate the amount of each monthly repayment, correct to the nearest dollar.

23. Yanika open a new credit account, with interest and fees as shown.

Intere	est
٠	Flat rate of 12.3% per annum
٠	No interest-free period
Fees	-
٠	\$0 for online repayments
٠	\$3 for repayments in cash
(free a	added to balance immediately after repayment)

Yanika makes a single purchase of \$849 with the credit card.

(i) Show that the balance owing on the credit card 24 days after making the purchase is \$855.87.





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(ii) Yanika makes her first repayment 24 days after making the ourchase. She makes a cash repayment of \$450. What is the balance on the credit card immediately after her repayment is made and the repayment fee has been charged?

24. Andrew borrowed \$20000 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?



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- 25. Last year, Luke's taxable income was \$87000 and the tax payable on this incom was \$19822. This year, Luke's taxable income has increased by \$16800.
 - (i) Use the table to calculate the tax payable by Luke this year.

Taxable income (\$)	Tax payable
\$0 - \$18200	Nil
\$18201 - \$37000	19c for each \$1 over \$18200
\$37001 - \$87000	\$3572 plus 32.5c for each \$1 over \$37000
\$87001 - \$180000	\$19822 plus 37c for each \$1 over \$87000
\$180001 and over	\$54232 plus 45c for each \$1 over \$180000

(ii) How much extra money will Luke have this year, after paying tax, as a result of the increase in his taxable income? Ignore the Medicare levy.



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26. Sabrina's taxable income is \$86725 in a particular year.The table below is used to calculate her tax payable. In addition, she pays the Medicare levy, which is 2% of her taxable income.

Taxable income (\$)	Tax payable
\$0 - \$18200	Nil
\$18201	19c for each \$1 over \$18200
- \$37000	
\$37001	\$3572 plus 32.5c for each \$1 over
- \$87000	\$37000
\$87001	\$19822 plus 37c for each \$1 over
- \$180000	\$87000
\$180001 and	\$54232 plus 45c for each \$1 over
over	\$180000

Calculate Sabrina's net income in that year.



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- 27. Theo is completing his tax return. He has a gross salary of \$82521 and income from a rental property totalling \$10920. He is claiming \$13420 in allowable deductions.
 - (i) Determine Theo's taxable income.

Taxable income (\$)	Tax payable
0 - 18200	Nil
\$18201	19c for each \$1 over
- \$37000	\$18200
\$37001	\$3572 plus 32.5c for each
- \$87000	\$1 over \$37000
\$87001	\$19822 plus 37c for each
- \$180000	\$1 over \$87000
\$180001	\$54232 plus 45c for each
and over	\$1 over \$180000

(ii) Using the tax table below, calculate Theo's payable.



(iii) In addition to the above tax, Theo must also pay a Medicare levy of \$1600.42.
Theo has already paid \$20525 as Pay As You Go (PAYG) tax.
Should Theo receive a tax refund or will he owe more tax? Justify your answer with calculations.

28. (a) On 20 August, tickets were purchased for \$425 using a credit card. No other purchases were made using this card in August. Simple interest was charged at a rate of 18.4% per annum. There was no interest-free period. The period for which interest was charged included the date of purchase and the date of payment. What amount was paid when the account was paid in full on 31 August?



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(b) Jamal borrowed \$350000 to be repaid over 30 over 30 years, with monthly repayments of \$1880. However, after 10 years he made a lump sum payment of \$80000. The monthly repayment remained unchanged. The graph shows the balances owing over the period of the loan.



Over the period of the loan, how much less did Jamal pay by making the lump sum payment?



29. Marge borrowed \$19000 to buy a used car. Interest on the loan was changed at 4.8% pa at the end of each month. She made a repayment of \$436 at the end of every month. The table below se\$ts out her monthly repayment schedule for the first four months of the loan.

Month	Amount owing at start of	Interest charged	Repayment	Amount owing at end of
	month			month
1	A	\$76.00	\$436.00	\$18640.00
2	\$18640.00	X	\$436.00	\$18278.56
3	\$18278.56	\$73.11	\$436.00	\$17915.67
4	\$17915.67	\$71.66	\$436.00	В

(i) Some values in the table are missing. Write the values for *A* and *B*.

(ii) Calculate the value of *X*.



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(iii) Marge repaid this loan over four years. What is the total amount that Marge repaid?

30. (a) Michelle borrows \$100000. 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?

(b) Make *y* the subject of the equation $x = \sqrt{yp - 1}$.



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

Number of	Interest rate (%per period)					
periods	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	0.778	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

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

Margaret needs to save \$75000 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 Margarent need to contribute each quarter to reach her savings goals?