

WA8MNAF1

Financial mathematics

Core + Challenge

Interest, Fees and Penalties

I can calculate interest on unpaid credit card balances, late and missed-payment fees, and compare the total cost of borrowing.

Name: _____ Date: _____ Score: _____ / 58

Key idea

Interest is the cost of borrowing money. Monthly interest = balance $\times$ monthly rate. \$800 at 1.5% per month $\rightarrow 800 \times 0.015 = \$12$.

An annual rate (p.a.) $\div 12$ gives a monthly rate: 18% p.a. = 1.5% per month. Credit card interest is charged on the **unpaid balance** after the due date.

Fees and penalties: late-payment fees, BNPL missed-payment fees, annual card fees, set-up (establishment) fees and monthly account fees.

Total cost of borrowing = total repaid – amount borrowed. Borrow \$500, repay $6 \times \$90 = \$540 \rightarrow$ cost **\$40**.

A Fluency *practise the skill*

/ 16 marks

Find each amount or rate. Interest in Q16 is simple interest. 1 mark each.

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|--|--|
| 1. 1.5% of \$800 _____ | 9. \$360 as a % of \$2000 _____ |
| 2. Interest: 2% per month on \$350 _____ | 10. 3 missed payments $\times$ \$10 fee _____ |
| 3. 18% p.a. as a monthly rate _____ | 11. Balance \$640, pays \$200: unpaid _____ |
| 4. 21% p.a. as a monthly rate _____ | 12. 2% per month on \$440 _____ |
| 5. 1.75% per month on \$1200 _____ | 13. Minimum payment: 3% of \$1500 _____ |
| 6. Late fee \$25 + interest \$6.40 _____ | 14. \$15 interest on \$1000 in a month: rate _____ |
| 7. Borrow \$600, repay $12 \times \$55$: cost _____ | 15. \$99 annual fee: cost per month _____ |
| 8. Borrow \$2000, repay \$2360: cost _____ | 16. Interest: 5% p.a. on \$400, 3 years _____ |

B**Core** *apply the skill to problems*

/ 22 marks

- 1 Use the credit card statement. [3 marks]
- (a) Find the minimum payment.
- (b) Sophie pays only the minimum by the due date. Find the unpaid balance and the interest charged on it next month, to the nearest cent.

Credit card statement	
Closing balance	\$1850.00
Minimum payment	2% of balance (at least \$25)
Interest on unpaid balance	1.6% per month

- 2 Jack pays his \$86 phone bill late. The company adds a \$15 late fee plus interest of 2% of the bill. How much must he pay now? [2 marks]

Answer: _____

- 3 Zoe buys \$360 headphones with BNPL: 4 payments of \$90. She misses her second payment and is charged a \$10 late fee. It is still unpaid a week later, so a further \$7 fee is added. Find the total she pays, and the extra as a percentage of the price (1 decimal place). [2 marks]

Answer: _____

- 4 An \$1800 phone can be paid off on either plan. Find the total cost of each plan and how much extra each costs compared with paying \$1800 upfront. Which plan is cheaper, and by how much? [3 marks]

Phone plan	Repayments	Extra fee
Plan A	\$80 per month for 24 months	none
Plan B	\$158 per month for 12 months	\$30 set-up

Answer: _____

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- 5 A small loan of \$400 has an establishment fee of 20% of the loan and a monthly fee of 4% of the loan. It is repaid after 3 months. Find the total fees and the total repaid. [2 marks]

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Answer:

- 6 Ben owes \$2000 on his credit card and makes no payments or purchases. Interest of 1.5% per month is added to the balance at the end of each month. What does he owe after 2 months? [2 marks]

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Answer:

- 7 A car loan of \$12 000 is charged simple interest of 7% p.a. for 4 years. It is repaid in equal monthly payments. Find the total interest and the monthly payment. [2 marks]

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Answer:

- 8 A sofa costs \$1800 on an 'interest-free for 12 months' store card, which charges a \$4.95 monthly account fee. Mai pays it off in 12 months. What is her total cost? [2 marks]

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Answer:

- 9 Leo owes \$1000 on a credit card charging 1.5% interest per month. After one month's interest is added, he pays \$30. What is his new balance, and by how much did his debt actually go down? [2 marks]

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Answer:

- 10 Card X has no annual fee and charges 20.99% p.a. Card Y has a \$59 annual fee and charges 12.99% p.a. Kai expects an average unpaid balance of \$500 for a year (use interest = balance $\times$ annual rate). Which card is cheaper, and by how much? [2 marks]

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Answer:

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C**Reasoning** *explain, justify and check*

/ 9 marks

- 1 Explain why paying only the minimum repayment on a credit card is a poor way to pay off a debt. [2 marks]

- 2 True or false? 'A card with 55 interest-free days is always free to use.' Explain. [2 marks]

- 3 A card charges 18% p.a. Lucy calculates one month's interest on \$600 as $600 \times 0.18 = \$108$. Explain her mistake and find the correct monthly interest. [2 marks]

- 4 Buy now, pay later companies advertise 'no interest'. Explain two ways they still make money. [3 marks]

D**Challenge** *multi-step and problem-solving*

/ 11 marks

- 1 Aisha's card starts at \$0. In month 1 she spends \$900 and pays \$300 by the due date. Interest of 1.5% is charged on the unpaid balance (to the nearest cent) and added to it. In month 2 she pays \$400 and interest is charged the same way. How much must she pay in month 3 to clear the card (no new purchases), and how much interest has she paid in total? [3 marks]

Answer: _____

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- 2 Leo (Core Q9) keeps paying \$30 each month. Each month 1.5% interest is added (to the nearest cent), then he pays \$30. Find his balance after 3 months. How much of the \$90 he paid actually reduced his debt? [3 marks]

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Answer: _____

- 3 A \$15 late fee is charged on a \$120 BNPL instalment that is paid one week late. Write the fee as a percentage of the instalment, and then as a yearly rate (assume 52 weeks in a year). [2 marks]

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Answer: _____

- 4 Nat borrows \$3000 for a holiday. [3 marks]
- Option A: a credit card charging 1.5% per month. Each month interest is added (to the nearest cent), then she pays \$500, until the card is cleared.
- Option B: a personal loan with a \$150 fee and simple interest of 9% p.a. for 1 year.
- Find the total interest and fees for each option. Which is cheaper, and by how much?

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Answer: _____

How did I go?

Fluency ____ / 16 Core ____ / 22 Reasoning ____ / 9 Challenge ____ / 11 **Total ____ / 58**

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