Investing and borrowing - Reasoning and model checks

Name: _____ Date: _____

10 questions | 59 marks | 70 minutes

An original mixed topic paper. Show calculations, label rates and periods, and explain conclusions using the supplied hypothetical financial rules. Round final monetary answers to cents unless a minimum deposit is requested.

A scientific calculator may be used.

1. A supplier raises a price by 20% and later discounts it 20%. The original price is AUD 350. [5 marks]

(a) Find the final price. [2 marks]

(b) A student says the changes cancel. Explain the different percentage bases. [3 marks]

2. Two one-year accounts pay simple interest. A pays 4% without fees. B pays 4.8% but charges AUD 32 annually. [6 marks]

(a) Find the break-even principal. [3 marks]

(b) Without recalculating final balances, explain which account wins for AUD 1500 and for AUD 8000. [3 marks]

3. Two balance models start at AUD 2000. Their values are listed. [6 marks]

Year	X (AUD)	Y (AUD)
0	2000	2000
1	2080	2080
2	2160	2163.20
3	2240	2249.728

(a) Identify which is simple and which is compound interest, and state each annual rate. [3 marks]

(b) Predict both balances at the end of Year 4. [3 marks]

4. A calculator entry for AUD 3000 at 6% nominal compounded monthly for 2 years is $3000(1.06)^{24}$. [6 marks]

(a) Explain both the correct and incorrect interpretations of this entry. [3 marks]

(b) Write the correct expression and evaluate it. [3 marks]

5. A deposit is required to reach AUD 9000 in 4 years at 3% annually. [6 marks]

(a) Find the unrounded present value to 4 decimal places. [3 marks]

(b) A calculator rounds the result down to a cent. Explain why that can fail and state the minimum cent deposit. [3 marks]

6. A student buys 50 shares at AUD 4 with AUD 12 brokerage. Later the price is AUD 4.30; selling incurs another AUD 12. There are no dividends. [6 marks]

(a) Find the net profit or loss. [3 marks]

(b) Explain how a price rise can coexist with a negative ROI, and find ROI to 2 decimal places. [3 marks]

7. A fund grows from AUD 5000 to AUD 6050 over 2 years with no other cash flows. [6 marks]

(a) Find the total and annualised percentage returns. [3 marks]

(b) Explain why dividing 21% by 2 does not give the exact annual compound rate. [3 marks]

8. An investment earns 8% after tax during a year in which prices rise 5%. [6 marks]

(a) Find the exact real return to 3 decimal places. [3 marks]

(b) Compare with the 3% subtraction estimate and explain the difference. [3 marks]

9. An AUD 8000 loan charges 0.75% monthly interest, with repayments at month end. [6 marks]

(a) Show that an AUD 50 repayment increases the balance and find the next balance. [3 marks]

(b) Find the minimum repayment that reduces the balance by exactly AUD 100 in that month. [3 marks]

10. An item costs AUD 3000 now. Borrowing requires 24 monthly payments of AUD 140 and an AUD 60 fee. Waiting one year is predicted to raise the cash price by 4%. [6 marks]

(a) Compare the total borrowing outlay with the predicted delayed cash price. [3 marks]

(b) Give two assumptions that must be considered before interpreting the cheaper option. [3 marks]