Financial mathematics - practice test 1

Name: _____ Date: _____

10 questions | 60 marks | 75 minutes

A balanced first paper covering investment growth, saving, income, loan balances and stated borrowing costs.

Use a graphics calculator or appropriate digital tool for labelled tasks.

1. A balance of AUD 4,500 earns 4.2% annually for 5 years, with no cash flows or fees. [6 marks]

(a) Find the final balance. [3 marks]

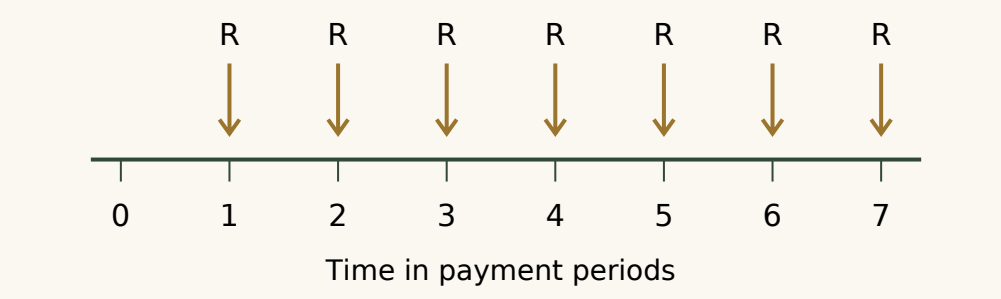
(b) Find the total interest and state one assumption of this model. [3 marks]

2. A savings account quotes a nominal annual rate of 6.4% with quarterly compounding. [6 marks]

(a) Find the quarterly rate. [3 marks]

(b) Find the effective annual rate. [3 marks]

3. An account starts at zero and receives AUD 1,200 at each year end for 7 years. Interest is 4% annually. [6 marks]



(a) Calculate the accumulated balance. [3 marks]

(b) Calculate the interest earned. [3 marks]

4. A target is AUD 18,000 in 6 years. Interest is 3.5% annually and the initial balance is zero. [6 marks]

(a) Find the required equal year-end deposit. [3 marks]

(b) Find the equal beginning-of-year deposit for the same target. [3 marks]

5. For this model, an annual gross contribution is 11% of an AUD 60,000 salary. A 15% deduction applies to contributions. The opening balance is AUD 25,000, the return is 5%, and a fixed AUD 120 fee is charged at year end. [6 marks]

(a) Find the net annual contribution. [3 marks]

(b) Find the balance after one year, adding the contribution and deducting the fee after the return. [3 marks]

6. An income account earns 4% annually and must pay AUD 8,000 at each year end for 10 years. [6 marks]

(a) Find the starting balance that exactly funds the payments. [3 marks]

(b) Find the balance immediately after the fourth withdrawal. [3 marks]

7. AUD 10,000 earns 6%. A stated tax takes 20% of interest; a fixed AUD 50 fee is then charged. Prices rise 3% over the year. [6 marks]

(a) Find the ending nominal balance. [3 marks]

(b) Find the purchasing-power return. [3 marks]

8. An interest-only loan of AUD 40,000 charges 5% annually. A separate sinking fund must repay the debt after 8 years and earns 3% annually. [6 marks]

(a) Find the annual loan-interest payment. [3 marks]

(b) Find the annual year-end sinking-fund deposit and combined annual outflow. [3 marks]

9. A loan begins at AUD 12,000, has 0.6% monthly interest, and is repaid by AUD 450 at each month end. [6 marks]

(a) Find the first two closing balances. [3 marks]

(b) Calculate the balance after 12 payments. [3 marks]

10. Both offers provide AUD 15,000 for 36 months. Offer A:36 repayments of AUD 460 plus a separate AUD 150 upfront fee. Offer B:36 repayments of AUD 455 plus an AUD 8 monthly fee. [6 marks]

(a) Calculate each total cash outflow. [3 marks]

(b) Choose the lower stated total and give one limitation of the comparison. [3 marks]