Financial mathematics - practice test 3

Name: _____ Date: _____

10 questions | 60 marks | 75 minutes

Payment timing, numerical rate solving and the effect of borrowing fees.

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

1. AUD 6,000 earns 0.4% per month for 18 months with no other cash flows. [6 marks]

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

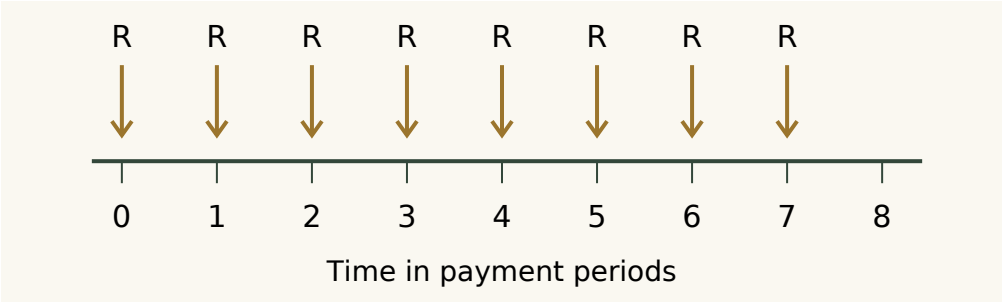
(b) Find the nominal annual quotation and effective annual rate. [3 marks]

2. Account A quotes 5.8% nominal compounded monthly. Account B quotes 5.9% nominal compounded quarterly. Both are fee-free. [6 marks]

(a) Find both effective annual rates. [3 marks]

(b) Compare their one-year interest on AUD 30,000. [3 marks]

3. Eight annual deposits of AUD 700 earn 4%. [6 marks]



(a) Find the balance at time 8 if deposits occur at times 0 through 7. [3 marks]

(b) Find how much more this is than deposits at times 1 through 8. [3 marks]

4. Six end-of-year deposits of AUD 1,000 accumulate to AUD 6,800. Assume a constant rate between 0% and 10%. [6 marks]

(a) Find the annual rate numerically. [3 marks]

(b) Check the result and calculate total interest. [3 marks]

5. Two funds start with AUD 40,000, earn 5% before fixed year-end fees, and receive net AUD 3,000 year-end contributions for 10 years. Their annual fees are AUD 100 and AUD 180. [6 marks]

(a) Find both final balances. [3 marks]

(b) Find the accumulated impact of the fee difference. [3 marks]

6. An annuity must pay AUD 4,000 annually for 7 years at 6%. [6 marks]

(a) Find its present value if payments are at year ends. [3 marks]

(b) Find its present value if the first payment is immediate and six more follow annually. [3 marks]

7. An investment earns 8% in a year. Tax takes 25% of the interest. A fee of 1% of the post-tax balance follows. Inflation is 3%. [6 marks]

(a) Find its net nominal growth factor. [3 marks]

(b) Find the real annual return. [3 marks]

8. Compare repaying AUD 25,000 over 5 years. Model A:5% annual interest-only, plus a year-end sinking fund earning 3%. Model B:5% reducing-balance with five equal annual end repayments. Ignore fees. [6 marks]

(a) Find A’s annual combined outflow. [3 marks]

(b) Find B’s annual repayment and compare the total five-year cash outflows. [3 marks]

9. AUD 8,000 is owed at 0.6% monthly. Compare month-end repayments AUD 400 and AUD 500; use exact balances and reduce the last payment. [6 marks]

(a) Find the payment count for each. [3 marks]

(b) Find the interest saved by choosing AUD 500. [3 marks]

10. For an educational cost-rate model, a borrower receives AUD 4,900 after a fee and pays AUD 450 at each month end for 12 months. [6 marks]

(a) Write the equation for the monthly cash-flow cost rate i. [3 marks]

(b) Solve for i and give the effective annual cost rate. [3 marks]