Investing and borrowing - Extended applications

Name: _____ Date: _____

10 questions | 60 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 quoted price of AUD 165 includes a supplied 10% sales tax. The seller’s tax-exclusive cost was AUD 120. [6 marks]

(a) Recover the tax-exclusive selling price and tax amount. [3 marks]

(b) Find the seller’s profit percentage on the tax-exclusive cost. [3 marks]

2. Compare two accounts over 2 months with AUD 4000 initially. A grows 0.3% each month, then charges AUD 2. B grows 0.25% each month with no fee. [6 marks]

(a) Calculate each final balance. [3 marks]

(b) Explain why reporting only rounded balances can hide which unrounded model is larger. [3 marks]

3. A single AUD 5000 investment becomes AUD 5618 in 2 years, with monthly compounding and no fees. [6 marks]

(a) Find the monthly rate to 4 decimal places as a percentage. [3 marks]

(b) Find the corresponding effective annual rate to 3 decimal places. [3 marks]

4. An investor has AUD 6000 available. Option A deducts a AUD 60 fee immediately, then earns 5% annually for 3 years. Option B invests all 6000 at 4.8%, subtracting an AUD 15 fee at each year end. [6 marks]

(a) Find Option A's final value. [3 marks]

(b) Calculate Option B using a recurrence and compare. [3 marks]

5. A shareholder owns 200 shares. A dividend of AUD 0.45 per share is paid. The holder uses it to buy whole shares at AUD 8 each, with no reinvestment fee. [6 marks]

(a) Find the dividend, number of new shares and cash left over. [3 marks]

(b) A later dividend is AUD 0.40 per share on all 211 shares. Find this dividend and total cash held if the AUD 2 remains. [3 marks]

6. A purchase costs AUD 10000 today. Its price is predicted to rise 3% annually for 3 years. Savings earn 6% annually, with 25% of each year's interest deducted as tax. [6 marks]

(a) Find the annual after-tax savings factor and future price. [3 marks]

(b) Find the minimum initial savings deposit to meet the future price. [3 marks]

7. An AUD 1000 loan charges 1% monthly. Payments of AUD 300 are made at month end until a smaller final payment clears it. [6 marks]

(a) Find the balance immediately after the third 300 payment. [3 marks]

(b) Find the final payment one month later and total paid, assuming final cent settlement. [3 marks]

8. A cash-price AUD 3600 purchase has two credit options. X takes a AUD 600 deposit plus 24 payments of AUD 145. Y takes 36 payments of AUD 112 and an AUD 40 fee. [6 marks]

(a) Find total outlay and extra cost for each. [3 marks]

(b) Explain why the AUD 8 total difference does not show whether the repayment schedules are equally affordable. [3 marks]

9. A hypothetical club policy requires all money to be available after exactly one year. A pays 4.5% for one year. B pays 6% simple interest for 18 months but cannot be withdrawn early without a fee that is not supplied. [6 marks]

(a) Find A’s final balance from AUD 8000. [3 marks]

(b) Can B be declared the better option for this club from the stated information? Explain. [3 marks]

10. A learner models a AUD 5000 deposit at 4.8% nominal annual interest, compounded monthly, for 18 months. Their formula is $5000(1.048)^{1.5}$, followed by subtraction of 18 monthly fees of AUD 1. [6 marks]

(a) Correct the growth expression. Find the net balance if fees are all charged only at the end. [3 marks]

(b) If fees are actually deducted each month, state the correct recurrence and explain the direction of the difference. [3 marks]