Savings annuities

6 questions | 18 marks

Equivalent correct methods earn the corresponding marks.

1. Deposit AUD 80 at each month end for 12 months. Interest is 0.4% monthly. Find the final balance. [3 marks]

Use $i = 0.004$ and $n = 12$.

Balance is $80((1.004)^{12} - 1)/0.004$.

Answer: AUD 981.40

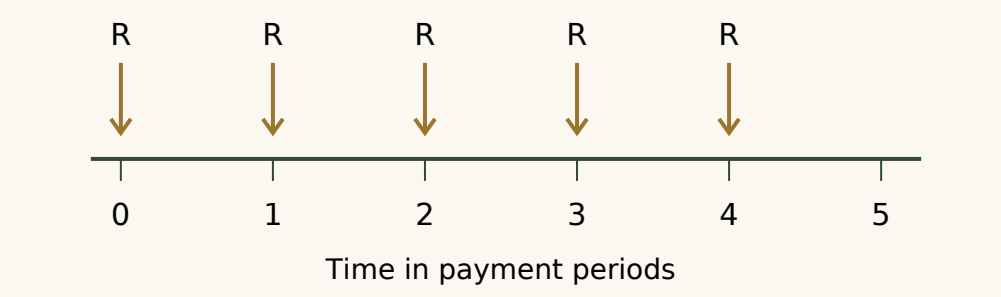
2. Deposit AUD 250 at each year end for 6 years in an account paying no interest. Find the final balance. [3 marks]

At zero interest the balance is the sum of six deposits.

$6 \times 250 = 1500$.

Answer: AUD 1,500.00

3. Deposit AUD 300 at each year beginning for 5 years at 3%. Measure the balance at time 5. Find it. [3 marks]



An ordinary annuity gives the end-deposit balance.

Multiply by 1.03 because each beginning deposit earns one extra year.

Answer: AUD 1,640.52

4. An ordinary annuity ends with AUD 6,200 after 10 deposits of AUD 500. How much interest has been earned? [3 marks]

Total deposited is $10 \times 500 = 5000$.

Interest is $6200 - 5000 = 1200$.

Answer: AUD 1,200.00

5. At 5% annually, compare three end-of-year deposits of AUD 1,000 with one AUD 3,000 deposit at time 0, both measured at time 3. [3 marks]

Annuity is $1000(1.05^2 + 1.05 + 1)$.

Lump $sum = 3000(1.05)^3$.

The lump sum grows more because all money is invested earlier.

Answer: Annuity: AUD 3,152.50; lump sum: AUD 3,472.88.

6. An account has AUD 2,000 now. With 4% annual interest and AUD 400 deposits at each year end, write and calculate its balance after 2 years. [3 marks]

Year 1: $2000 \times 1.04 + 400 = 2480$.

Year 2: $2480 \times 1.04 + 400 = 2979.20$.

The recurrence agrees with initial balance plus annuity formula.

Answer: AUD 2,979.20