Reducing-balance loans

6 questions | 17 marks

Equivalent correct methods earn the corresponding marks.

1. On AUD 6,000 at 0.5% monthly interest, what is the first month’s interest? [3 marks]

Interest is calculated on the opening debt.

$6000 \times 0.005 = 30$.

Answer: AUD 30.00

2. AUD 9,600 is repaid in 24 equal month-end payments at zero interest. Find the payment. [3 marks]

At zero interest, $P = nR$.

$R = \frac{9600}{24} = 400$.

Answer: AUD 400.00

3. A balance is AUD 5,000 at 1% monthly interest. Explain what happens if each month’s repayment is AUD 40. [3 marks]

First interest is $5000 \times 0.01 = 50$.

The AUD 40 payment is less than interest, so $5000 + 50 - 40 = 5010$.

Future interest grows as the balance grows.

Answer: The balance grows; first closing balance is AUD 5,010.

4. Find the monthly repayment for AUD 12,000 over 36 months at 6% nominal annually, compounded monthly. [3 marks]

Use $i = \frac{0.06}{12} = 0.005,\ n = 36.$

$R = \frac{12000 \times 0.005}{1 - 1.005^{-36}}.$

Answer: AUD 365.06

5. A debt of AUD 8,000 has a monthly interest rate of 0.75%. What repayment leaves the balance unchanged after that month? [3 marks]

A payment equal to interest leaves principal unchanged.

$8000 \times 0.0075 = 60.$

Answer: AUD 60.00

6. For a loan balance B and periodic rate i, explain why a fixed repayment can reduce the debt faster in later periods. [2 marks]

Separate each payment into interest and principal reduction.

Principal reduction is $R - Bi$; this increases as B decreases.

Answer: As B falls, the interest Bi falls, so more of the same repayment reduces principal.