Compound-interest revision

6 questions | 18 marks

Equivalent correct methods earn the corresponding marks.

1. Find the balance of AUD 3,400 after 5 years at 3.5% compounded annually. [3 marks]

Use $i = 0.035$ and $n = 5$.

$3400(1.035)^5 =$ AUD 4,038.13.

Answer: AUD 4,038.13

2. AUD 900 grows to AUD 1,050. What interest has been earned? [3 marks]

$\text{Interest} = \text{final balance} - \text{principal}.$

$1050 - 900 = 150.$

Answer: AUD 150.00

3. An account reaches AUD 8,000 after 6 years at 5% compounded annually. Find its original principal. [3 marks]

Rearrange $P = \frac{B}{(1+i)^n}$.

$P = \frac{8000}{(1.05)^6} =$ AUD 5,969.72.

Answer: AUD 5,969.72

4. AUD 2,000 earns a nominal annual rate of 6%, compounded monthly, for 2 years. Find the balance. [3 marks]

The monthly rate is $\frac{0.06}{12} = 0.005$ and there are 24 months.

$2000(1.005)^{24}$ = AUD 2,254.32.

Answer: AUD 2,254.32

5. A model uses $B = 6000(1.02)^{8}$. State the periodic rate and the number of periods. [3 marks]

The multiplier 1.02 equals $1 + i$, so $i = 0.02$.

The exponent counts 8 periods. The formula alone does not identify whether the periods are months or years.

Answer: 2% per period; 8 periods.

6. Compare AUD 5,000 invested for 4 years at 4% simple interest and at 4% annual compound interest. [3 marks]

Simple balance $= 5000(1 + 0.04 \times 4) = 5800$.

Compound balance $= 5000(1.04)^{4}$ = AUD 5,849.29.

Subtract the simple balance from the compound balance.

Answer: Simple: AUD 5,800.00; compound: AUD 5,849.29; compound is AUD 49.29 higher.