# Financial mathematics - practice test 2

16 questions | 43 marks | 60 minutes

All amounts are Australian dollars. Use the stated classroom models; exclude fees, tax and other transactions unless given. Round final currency to cents unless asked otherwise.

Equivalent correct methods earn the corresponding marks.

**1.** Write the factor for losing 12% of current value. [2 marks]

$1 - 0.12 = 0.88$.

**Answer:** 0.88

**2.** Find the total of 2500 dollars after 2 years at 4% simple interest. [2 marks]

$2500(1 + 0.04 \times 2) = 2700$.

**Answer:** 2700 dollars

**3.** Find the total of 2500 dollars after 2 years at 4% annual compound interest. [2 marks]

$2500(1.04)^2 = 2704$.

**Answer:** 2704 dollars

**4.** An annual-compounding model grows 1600 dollars to 1936 dollars in 2 years. Find its annual rate. [3 marks]

$(1 + r)^2 = 1936/1600 = 1.21$. Use positive factor 1.1.

**Answer:** 10%

**5.** A nominal rate is 10% annually, compounded every half-year for 3 years. State the period rate and exponent. [2 marks]

$0.10/2 = 0.05$ and $2 \times 3 = 6$.

**Answer:** 5% per half-year; exponent 6.

**6.** An initial 800 dollars grows at 1% per month for 4 months. Find the balance and interest to cents. [3 marks]

$800(1.01)^4 = 832.483208$. Subtract the original 800 dollars.

**Answer:** 832.48 dollars; interest 32.48 dollars.

**7.** A reducing-balance model is $V = 4500(0.9)^t$. Find its year-3 value and state the annual loss rate. [3 marks]

$4500(0.9)^3 = 3280.5$; the retained proportion is 90%.

**Answer:** 3280.50 dollars; 10%.

**8.** A straight-line asset model is $V = 2100 - 350t$. Give the largest whole year for a nonnegative model value. [2 marks]

$2100 - 350t \geq 0$ gives $t \leq 6$.

**Answer:** 6 years

**9.** A price rises by 25%, then falls by 20%. Find the combined percentage change. [2 marks]

$1.25 \times 0.8 = 1$.

**Answer:** 0%; no overall change.

**10.** What percentage increase restores an amount after a 20% loss? [2 marks]

The reverse multiplier is $1/0.8 = 1.25$.

**Answer:** 25%

**11.** Compare two deposit timings for an opening 600 dollars, a 50-dollar deposit and 2% period interest. [4 marks]

**(a)** Find the close if the deposit is made at the end. [2 marks]

$600(1.02) + 50 = 662$.

**Answer:** 662 dollars

**(b)** Find the close if the deposit is made before interest. [2 marks]

$(600 + 50)(1.02) = 663$.

**Answer:** 663 dollars

**12.** A loan rule is $L_{n+1} = 1.01L_n - 200$, beginning at $L_0 = 1000$. [6 marks]

**(a)** Find its first two closing balances. [3 marks]

$L_1 = 1010 - 200 = 810$; $L_2 = 810(1.01) - 200 = 618.1$.

**Answer:** 810 dollars; 618.10 dollars.

**(b)** A separate loan has an opening balance of 150 dollars and the same 1% monthly interest rate. What exact final payment clears it after that month’s interest? [3 marks]

The amount owed after interest is $150(1.01) = 151.5$; a full 200-dollar payment is unnecessary.

**Answer:** 151.50 dollars

**13.** A spreadsheet enters 4 in its decimal-rate column instead of 0.04. Explain the factor error. [2 marks]

$1 + 4 = 5$; the input represents 400%, not 4%.

**Answer:** It uses factor 5 instead of 1.04.

**14.** For an opening 750, rate 0.02 and end deposit 60, find the close and the next opening. [2 marks]

$750(1.02) + 60 = 825$. Carry this to the next row.

**Answer:** 825 dollars; next opening 825 dollars.

**15.** Compare 1000 dollars at 6% with a 20-dollar final fee against 1000 dollars at 5% without a fee, both for one year. Which model ends higher? [3 marks]

$1000(1.06) - 20 = 1040$, while $1000(1.05) = 1050$.

**Answer:** The 5% fee-free model: 1050 dollars versus 1040 dollars.

**16.** An advertisement says a 6% rate is always better than a 5% rate. Give two pieces of missing information needed for a fair mathematical comparison. [3 marks]

Also match initial amounts, payment timing, duration and extra transactions. The headline rate alone does not define a complete model.

**Answer:** For example: compounding convention and fees.