Financial Math: exam practice

10 questions · 38 marks · worked solutions and markschemes

Name _____ Date _____ Score / 38

- Answer every question before you look at the solutions. They start after the last question, with the marks for each line: M for method, A for accuracy, R for reasoning.
- Online, with more practice: ibmathrevision.com/hlaa/financial-math-exam-practice

1. **2 marks · Paper 1 style · no calculator**

An investment of P euros earns 6% per year, compounded annually. After 3 years it is worth €5955.08.

Find P. **[2]**

2. **3 marks · Paper 2 style · calculator**

Omar invests $\$2500$ at a nominal annual rate of 4.8%, compounded monthly.

Find the value of the investment after 5 years, to the nearest dollar. **[3]**

3. **3 marks · Paper 2 style · calculator**

A loan of $\$9000$ is repaid with simple interest. The total amount repaid after 4 years is $\$10\,980$.

Find the annual simple interest rate. **[3]**

4. **4 marks · Paper 2 style · calculator**

Find the least annual interest rate, compounded quarterly, at which €$10\,000$ grows to at least €$15\,000$ in 8 years. Give the rate as a percentage to 3 significant figures.

Find the rate. **[4]**

5. **4 marks · Paper 2 style · calculator**

At the start of each year Mia pays $\$1200$ into an account that pays 5% interest per year, compounded annually.

Find the value of the account at the end of the 10th year, to the nearest dollar. **[4]**

6. **4 marks · Paper 1 style · no calculator**

Kai saves $\$40$ in the first month, and each month he saves $\$6$ more than in the month before.

(a) Find how much he saves in the 24th month. **[2]**

(b) Find his total savings over 24 months. **[2]**

7. **5 marks · Paper 2 style · calculator**

Lena invests €4000 at 3.5% per year, compounded annually.

(a) Find the value of the investment after 8 years. **[2]**

(b) Find the number of complete years until the value first exceeds €6000. **[3]**

8. **4 marks · Paper 2 style · calculator**

The population of a town is $45\,000$ and increases by 2.4% each year.

(a) Find the population after 10 years, to the nearest hundred. **[2]**

(b) Find the number of complete years until the population first doubles. **[2]**

9. **5 marks · Paper 2 style · calculator**

A car bought for $\$32\,000$ loses 14% of its value each year.

(a) Find its value after 4 years. **[2]**

(b) Find how many complete years it takes for the value to fall below $\$8000$. **[3]**

10. **4 marks · Paper 2 style · calculator**

Two accounts each start with €3000. Account A pays 4% per year compounded annually. Account B pays 3.9% per year compounded monthly.

(a) Find the value of each account after 6 years. **[3]**

(b) State which account is worth more after 6 years. **[1]**

Answers and worked solutions

Question 1 — 2 marks

Answer: €5000

$P(1.06)^3 = 5955.08$ M1

$P = €5000$ A1

Question 2 — 3 marks

Answer: $3177

$2500\left(1 + \frac{0.048}{12}\right)^{60}$ $M1$A1

$3177 A1

Question 3 — 3 marks

Answer: 5.5%

interest $= 1980$ A1

$9000 \times \frac{r}{100} \times 4 = 1980$ M1

$r = 5.5\%$ A1

Question 4 — 4 marks

Answer: 5.10%

$10000\left(1 + \frac{r}{400}\right)^{32} = 15000$

$M1$A1

$1 + \frac{r}{400} = 1.5^{\frac{1}{32}}$ M1

$r = 5.10\%$ A1

Question 5 — 4 marks

Answer: $15\,848

$1200(1.05) + 1200(1.05)^2 + \cdots + 1200(1.05)^{10}$

M1

$= 1200 \times 1.05 \times \frac{1.05^{10} - 1}{0.05}$

$M1$A1

$15\,848 A1

Question 6 — 4 marks

Answer: (a) 178; (b) 2616

(a)

$40 + 23 \times 6$ M1

$178 A1

(b)

$\frac{24}{2}(40 + 178)$ M1

$2616 A1

Question 7 — 5 marks

Answer: (a) €5267.24; (b) 12

(a)

$4000(1.035)^8$ M1

€5267.24 A1

(b)

$4000(1.035)^n > 6000$ M1

$n > 11.8$ A1

12 years A1

Question 8 — 4 marks

Answer: (a) $57\,000$; (b) 30

(a)

$45000(1.024)^{10}$ M1

$57\,000 A1

(b)

$1.024^n > 2$ M1

$n = 30$ A1

Question 9 — 5 marks

Answer: (a) $17\,504; (b) 10

(a)

$32000(0.86)^4$ M1

$17\,504 A1

(b)

$32000(0.86)^n < 8000$ M1

$n > 9.19$ A1

10 years A1

Question 10 — 4 marks

Answer: (a) A: €3795.96, B: €3789.50; (b) Account A

(a)

A: $3000(1.04)^6 = €3795.96$ A1

B: $3000\left(1 + \frac{0.039}{12}\right)^{72}$ M1

$= €3789.50$ A1

(b)

Account A A1

Every solution is also on ibmathrevision.com/hlaa/financial-math-exam-practice
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