Warm up questions

Question 1.

Find the future value of €4,000 at 3% (AER) per annum, compounded annually for 4 years. Find the interest earned over the period.

Question 2.

An investment offers a return of 12% if invested for 5 years. Calculate the AER for the investment correct to 1 decimal place

Question 3.

Find the present value of a payment of €2,500 due in 7 years time if the available annual rate of interest is 3%.

Compound Interest

Question 4.

Sonya deposits €300 at the end of each quarter into her savings account. If the money earns 5.75% (AER), how much will this investment be worth at the end of four years?

Question 5.

Company A is offering €12,700 in 5 years in return for an investment of €9,950. What is the AER to 2 decimal places?
Hint: The unknown (i) is inside the indexed bracket. So, this involves getting the 5th root on your calculator (fractional power).

Question 6.

Company B wants to offer €13,000 in return for an investment of €10,000 using a CAR of 5%. When (to the nearest month) should they return the money?
Hint: The unknown (t) is the exponent. So, this involves using logs. Natural logs are easiest on the calculator.

Question 7. P1 2015 Q6

Donagh is arranging a loan and is examining two different repayment options.

(i) Bank A will charge him a monthly interest rate of 0·35%. Find, correct to three significant figures, the annual percentage rate (APR) that is equivalent to a monthly interest rate of 0·35%.

(ii) Bank B will charge him a rate that is equivalent to an APR of 4·5%. Find, correct to three significant figures, the monthly interest rate that is equivalent to an APR of 4·5%.

(iii) Donagh borrowed €80 000 at a monthly interest rate of 0·35%, fixed for the term of the loan, from Bank A. The loan is to be repaid in equal monthly repayments over ten years. The first repayment is due one month after the loan is issued. Calculate, correct to the nearest euro, the amount of each monthly repayment.

Question 8. 2013 P1 Q4

Niamh has saved to buy a car. She saved an equal amount at the beginning of each month in an account that earned an annual equivalent rate (AER) of 4%.

(i) Show that the rate of interest, compounded monthly, which is equivalent to an AER of 4% is 0·327%, correct to 3 decimal places.

(ii) Niamh has €15 000 in the account at the end of 36 months. How much has she saved each month, correct to the nearest euro?

(iii) Conall borrowed to buy a car. He borrowed €15 000 at a monthly interest rate of 0·866%. He made 36 equal monthly payments to repay the entire loan. How much, to the nearest euro, was each of his monthly payments?

Depreciation

Question 9. A new car is purchased for €20,000. The car depreciates in value by 15% in the first 2 years and by 10% each year after that. Find the value of the car after

   i. 2 years

   ii. 5 years

Present Value

Question 10. John is is presented with a short term investment project as shown in the table below:

Year	0	1	2	3
Project X Cashflow	-5000	-2000	2000	5000
Project Y Cashflow	-3000	-1000	2000	3000

Using present values, advise Catherine on which project is profitable using a 5% discount rate.

Amortisation Questions

Question 11. 2017 P1 Q8 Part B *(50 marks)*

Alex has a credit card debt of €5,000. One method of clearing this debt is to make a fixed repayment at the end of each month. The amount of this repayment is 2.5% of the original debt.

(i) *(10 marks)*

What is the fixed monthly repayment, €A ,required to pay the debt of €5,000?

(ii) *(10 marks)*

The annual percentage rate (APR) charged on debt by the credit card company is 21.75%, fixed for the term of the debt. Find as a percentage, correct to 3 significant figures, the monthly interest rate that is equivalent to an APR of 21.75%.

(iii) *(10 marks)*

Assume Alex pays the fixed monthly repayment, €A ,each month and does not have any further transactions on that card.

Complete the table below to show how the balance of the debt of €5000 is reducing each month for the first three months, assuming an APR of 21·75%, charged and compounded monthly.

Payment number	Fixed monthly payment, €A	€A		New balance of debt (€)
		Interest	Previous balance reduced by (€)	
0				5000
1			42·50	4957·50
2				
3				

(iv) *(5 marks)*

Using the formula you derived on the previous page, or otherwise, find how long it would take to pay off a credit card debt of €5000, using the repayment method outlined at the beginning of **part (i)** above.

Give your answer in months, correct to the nearest month.

(v) *(10 marks)*

Alex decides to borrow €5000 from the local Credit Union to pay off this credit card debt of €5000. The APR charge for the Credit Union loan is 8·5% fixed for the term of the loan. The loan is to be repaid in equal weekly repayments, at the end of each week, for 156 weeks. Find the amount of each weekly repayment.

(vi) *(5 marks)*

How much will Alex save by paying off the credit card debt using the loan from the Credit Union instead of paying the fixed repayment from **part (iii)** each month to the credit card company?

Question 12.

A graduate is setting up his own company. He borrows the €5000 for set-up costs for 6 months at a flat rate of 1% per month (compounded monthly). He wants to arrange to pay this off in six equal monthly instalments at the end of each month.

(i)   Calculate the monthly repayment amount.
(ii)   Make a schedule showing the monthly payment, the monthly interest on the outstanding balance, the portion of the payment contributing towards reducing the debt, and the outstanding balance.

Question 13.

Tom , age 45, earns €60,000 per year. He expects his salary will increase at 4% every year. Tom wants to retire at age 65.

(i) If Tom saves 15% of his salary at the end of each year to fund his pension and his savings grow at 3% per annum, how much will Tom's savings be worth at the end of 20 years?

(ii) If Tom wants to buy an annuity at age 65 with his savings from part (i) ,which will pay him €10,000 at the start of each year and will increase at 5% each year, how long will the annuity be payable for ? You can assume that the annuity is calculated based on an interest rate of 3% pa

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