# 1.4 Financial apps\_compound interest\_depreciation\_P\_1

**1a.** *[2 marks]*

*Give your answers to this question correct to two decimal places.*

Gen invests $2400 in a savings account that pays interest at a rate of 4% per year, compounded annually. She leaves the money in her account for 10 years, and she does not invest or withdraw any money during this time.

Calculate the value of her savings after 10 years.



**1b.** *[3 marks]*

The rate of inflation during this 10 year period is 1.5% per year.

Calculate the real value of her savings after 10 years.



**2a.** *[3 marks]*

Devra invested  US dollars (USD) in an account that pays a nominal annual interest rate of 3.1 %, **compounded monthly**. After 6 years she has 1100 USD in the account.

Calculate the value of . **Give your answer to 2 decimal places.**



**2b.** *[3 marks]*

Devra then bought a computer that cost 1100 USD and sold it 4 years later for 350 USD.

Find the rate at which the computer depreciated per year.



**3a.** *[3 marks]*

Nick has $150 000 in a trust fund. Each year he donates 8 % of the money remaining in his trust fund to charity.

Determine the maximum number of years Nick can donate to charity while keeping at least $50 000 in the trust fund.



**3b.** *[3 marks]*

Louise invests $200 000 in a bank account that pays a nominal interest rate of 5 %, **compounded quarterly**, for eight years.

Calculate the value of Louise’s investment at the end of this time.

Give your answer correct to the nearest cent.



**4a.** *[2 marks]*

Juan buys a bicycle in a sale. He gets a discount of 30% off the original price and pays 560 US dollars (USD).

Calculate the original price of the bicycle.



**4b.** *[4 marks]*

To buy the bicycle, Juan takes a loan of 560 USD for 6 months at a nominal annual interest rate of 75%, **compounded monthly**. Juan believes that the total amount he will pay will be less than the original price of the bicycle.

Calculate the difference between the original price of the bicycle and the total amount Juan will pay.



**5a.** *[3 marks]*

Arthur and Jacob dream of owning a speedboat that costs  euros (EUR).

Arthur invested  EUR in an account that pays a nominal annual interest rate of 3.6%, compounded **monthly**. After 18 years he will have  EUR in the account.

Calculate the value of Arthur’s initial investment, . Give your answer to two decimal places.



**5b.** *[3 marks]*

Jacob invested 9000 EUR for  years. The investment has a nominal annual interest rate of 3.2% and is compounded **quarterly**. After  years, the investment will be worth  EUR.

Find the value of .



**6a.** *[2 marks]*

Gabriella purchases a new car.

The car’s value in dollars, , is modelled by the function



where  is the number of years since the car was purchased and  is a constant.

Write down, and simplify, an expression for the car’s value when Gabriella purchased it.



**6b.** *[2 marks]*

After two years, the car’s value is $9143.20.

Find the value of .



**6c.** *[2 marks]*

This model is defined for . At  years the car’s value will be zero dollars.

Find the value of .



**7a.** *[3 marks]*

**In this question give all answers correct to two decimal places.**

Diogo deposited  Argentine pesos, , in a bank account which pays a nominal annual interest rate of , **compounded monthly**.

Find how much **interest** Diogo has earned after  years.



**7b.** *[3 marks]*

Carmen also deposited  in a bank account. Her account pays a nominal annual interest rate of , **compounded yearly**. After three years, the total amount in Carmen’s account is .

Find the amount that Carmen deposited in the bank account.



**8a.** *[3 marks]*

Pierre invests 5000 euros in a fixed deposit that pays a nominal annual interest rate of 4.5%, compounded **monthly**, for seven years.

Calculate the value of Pierre’s investment at the end of this time. Give your answer correct to two decimal places.



**8b.** *[3 marks]*

Carla has 7000 dollars to invest in a fixed deposit which is compounded **annually**.

She aims to double her money after 10 years.

Calculate the minimum annual interest rate needed for Carla to achieve her aim.



**9a.** *[3 marks]*

Minta deposits 1000 euros in a bank account. The bank pays a nominal annual interest rate of 5%, **compounded quarterly**.

Find the amount of money that Minta will have in the bank after 3 years. Give your answer correct to two decimal places.



**9b.** *[3 marks]*

Minta will withdraw the money from her bank account when the interest earned is 300 euros.

Find the time, in years, until Minta withdraws the money from her bank account.



**10a.** *[4 marks]*

Mandzur, a farmer, takes out a loan to buy a buffalo. He borrows 900 000 Cambodian riels (KHR) for 2 years. The nominal annual interest rate is 15%, compounded **monthly**.

Find the amount of the **interest** that Mandzur must pay. Give your answer correct to the nearest 100 KHR.



**10b.** *[2 marks]*

Write down your answer to part (a) in the form .



**11a.** *[1 mark]*

Ludmila takes a loan of 320 000 Brazilian Real (BRL) from a bank for two years at a nominal annual interest rate of 10%, **compounded half yearly**.

Write down the number of times interest is added to the loan in the two years.

**11b.** *[3 marks]*

Calculate the **exact** amount of money that Ludmila must repay at the end of the two years.

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