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

**1a.** *[3 marks]*

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

Bryan decides to purchase a new car with a price of €14 000, but cannot afford the full amount. The car dealership offers two options to finance a loan.

**Finance option A:**

A 6 year loan at a nominal annual interest rate of 14 % **compounded quarterly**. No deposit required and repayments are made each quarter.

Find the repayment made each quarter.



**1b.** *[2 marks]*

Find the total amount paid for the car.



**1c.** *[2 marks]*

Find the interest paid on the loan.



**1d.** *[2 marks]*

**Finance option B:**

A 6 year loan at a nominal annual interest rate of  % **compounded monthly**. Terms of the loan require a 10 % deposit and monthly repayments of €250.

Find the amount to be borrowed for this option.



**1e.** *[3 marks]*

Find the annual interest rate, .



**1f.** *[2 marks]*

State which option Bryan should choose. Justify your answer.



**1g.** *[3 marks]*

Bryan’s car depreciates at an annual rate of 25 % per year.

Find the value of Bryan’s car six years after it is purchased.



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

Find the repayment made each quarter.



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

Find the total amount paid for the car.



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

Find the interest paid on the loan.



**2d.** *[2 marks]*

Find the amount to be borrowed for this option.



**2e.** *[3 marks]*

Find the annual interest rate, .



**2f.** *[2 marks]*

State which option Bryan should choose. Justify your answer.



**2g.** *[4 marks]*

Bryan chooses option B. The car dealership invests the money Bryan pays as soon as they receive it.

If they invest it in an account paying 0.4 % interest per month and inflation is 0.1 % per month, calculate the real amount of money the car dealership has received by the end of the 6 year period.



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

Tommaso plans to compete in a regional bicycle race after he graduates, however he needs to buy a racing bicycle. He finds a bicycle that costs 1100 euro (EUR). Tommaso has 950 EUR and invests this money in an account that pays 5 % interest per year, **compounded monthly**.

Determine the amount that he will have in his account after 3 years. Give your answer correct to two decimal places.



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

The cost of the bicycle, , can be modelled by , where  is the number of years since Tommaso invested his money.

Find the difference between the cost of the bicycle and the amount of money in Tommaso’s account after 3 years. Give your answer correct to two decimal places.



**3c.** *[5 marks]*

After  complete **months** Tommaso will, for the first time, have enough money in his account to buy the bicycle.

Find the value of .



**4a.** *[3 marks]*

**Give your answers to parts (b), (c) and (d) to the nearest whole number.**

Harinder has 14 000 US Dollars (USD) to invest for a period of five years. He has two options of how to invest the money.

**Option A:** Invest the full amount, in USD, in a fixed deposit account in an American bank.

The account pays a nominal annual interest rate of *r*% , **compounded yearly**, for the five years. The bank manager says that this will give Harinder a return of 17500 USD.

Calculate the value of *r*.



**4b.** *[2 marks]*

**Option B:** Invest the full amount, in Indian Rupees (INR), in a fixed deposit account in an Indian bank. The money must be converted from USD to INR before it is invested.

The exchange rate is 1 USD = 66.91 INR.

Calculate 14 000 USD in INR.



**4c.** *[3 marks]*

The account in the Indian bank pays a nominal annual interest rate of 5.2 % **compounded monthly**.

Calculate the amount of this investment, in INR, in this account after five years.



**4d.** *[3 marks]*

Harinder chose option B. At the end of five years, Harinder converted this investment back to USD. The exchange rate, at that time, was 1 USD = 67.16 INR.

Calculate how much **more** money, in USD, Harinder earned by choosing option B instead of option A.



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