



MATHEMATICS

FINANCIAL MATH

QUESTION 1

- 7.1 A survey conducted in December 2015 determined that 5,7 million South Africans were living with HIV. The researchers used a model of exponential growth $A = P(1+i)^n$ to predict that there will be 6 million people living with HIV in December 2022. Calculate, as a percentage, the annual rate of increase that the researchers used for the 7 years. (3)
- 7.2 Shimmy invests R4 000 000 into an account earning interest of 6% per annum, compounded monthly. She withdraws R30 000 per month. Her first withdrawal is exactly one month after she deposited the R4 000 000.
- 7.2.1 How many withdrawals of R30 000 will Shimmy be able to make? (5)
- 7.2.2 How many withdrawals will Shimmy be able to make if she changes the amount withdrawn per month to R20 000? Substantiate your answer. (3)
- 7.3 Estrid opened a savings account with a single deposit of R1 000 on 1 April 2022. She then makes 18 monthly deposits of R700 at the end of every month. Her first payment is made on 30 April 2022 and her last payment on 30 September 2023. The account earns interest at 15% per annum, compounded monthly. Determine the amount that should be in her savings account immediately after her last deposit is made (on 30 September 2023). (4)
- [15]

QUESTION 2

- 6.1 Lester invests R8 000 at 13% per annum, compounded quarterly. At the end of the investment period he receives R22 350.
- For how long did he invest the money? (4)
- 6.2 Brian deposits R700 at the end of each month into a saving account for 15 years. Exactly 5 years after the first payment, R5 200 was paid in the account as an additional payment. The interest rate on the savings account is 12% per annum, compounded monthly.
- Determine the accumulated amount at the end of the investment period. (5)
- 6.3 Mr Faku was granted a loan of R900 000, over a period of 20 years. The loan is repaid in equal monthly instalments at the end of each month. The interest rate is 11,5% per annum compounded monthly. The first instalment is paid 4 months after the loan was granted.
- 6.3.1 Determine Mr Faku's monthly payments. (4)
- 6.3.2 The balance immediately after 16 years is R379 811,29. Determine how much interest he paid till the end of 16 years. (3)

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QUESTION 3

- 6.1 How long must R50 000 be invested to double at an interest rate of 8.5% p.a. on the straight-line method? (Give your answer in years and months). (3)
- 6.2 On 1 June 2024, a bank granted Thabiso a loan of R250 000 at an interest rate of 15% p.a. compounded monthly to buy a car. Thabiso agreed to repay the loan in monthly instalments commencing on 1 July 2024 and ending four (4) years later on 1 June 2028. However, Thabiso was unable to make the first two instalments and only commenced with monthly instalments on 1 September 2024.
- 6.2.1 Calculate the amount Thabiso owed the bank on 1 August 2024, a month before he paid his first monthly instalment. (2)
- 6.2.2 Having paid his first monthly instalment on 1 September 2024, Thabiso will still pay his last monthly instalment on 1 June 2028. Calculate his monthly instalment. (4)
- 6.3 R x (x Rands) is invested into a new account at an interest rate of 12% p.a. compounded monthly. Three years later, R $2x$ is deposited into the same account. After seven years, there is R276 558,75 in the account. Determine how much money was invested at the beginning. (That is the value of x .) (6)
- [15]

QUESTION 4

- 6.1 Johnson deposited an amount of R10 000 into a savings account that pays interest at 7,15% p.a., compounded quarterly.
- 6.1.1 Calculate the effective interest rate. (2)
- 6.1.2 How long will it take for this investment to grow to R17 628,78? (4)
- 6.2 Mr Simbine took out a home loan of R1 000 000 at an interest rate of 11,25% p.a., compounded monthly over 20 years. The loan is repaid via monthly instalments of R10 492,56.
- 6.2.1 Determine the outstanding balance after the 125th payment. (4)
- 6.2.2 Mr Simbine had financial difficulties and was unable to make the 126th, 127th, 128th, 129th and 130th payments. The bank agreed to restructure the loan so that it is paid off in the same amount of time. Determine the new monthly instalment. (5)

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QUESTION 5

Mathew's dad died and he inherited the farm. His dad planned to install solar panels and already paid a deposit of R202 500 which is 15% of the cost of the solar panels.

- 6.1 Determine the cost of the solar panels. (2)
- 6.2 The bank grants Mathew a loan at an interest rate of 9,8% per annum, compounded monthly, to pay off the balance of the cost of the panels. Mathew agreed to pay monthly instalments of R20 000. How many monthly instalments are required to pay off the loan? (6)
- 6.3 After 2 years Mathew decided to pay off the loan. Determine the balance of the loan after 2 years. (3)
- 6.4 Calculate the total amount paid for the panels. (3)
- [14]

QUESTION 6

- 6.1 Thabo deposits R3 550 into a savings account which pays interest at a rate of 8% p.a., compounded half-yearly.

Calculate the:

- 6.1.1 Effective interest rate he receives on his savings (3)
- 6.1.2 Final amount in his account after a period of 5 years (2)
- 6.2 A vehicle was bought for R185 000. Over a period of n years the value of the vehicle depreciated, according to a reducing-balance method, at a rate of 19% p.a., to a value of R48 896. Calculate n . (3)
- 6.3 Thembi was granted a loan of R35 000 at an interest rate of 18% p.a., compounded monthly. He agreed to repay the loan over 4 years.
- 6.3.1 Calculate the monthly instalment to repay the loan. (3)
- 6.3.2 Thembi was unable to pay the 21st and 22nd instalments. If he resumes payment at the end of the 23rd month, what will the outstanding balance be? (5)
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QUESTION 7

- 7.1 Morne purchases a gaming computer for R85 000. The computer depreciates at 8,5% per annum, on the reduced balance method. Calculate the bookvalue of the gaming computer after 5 years. (2)
- 7.2 Brett wants to buy a car that costs R180 000. He decides to save for the car by depositing R4 494,35 at the end of each month into a savings account that earns interest at 7,2% p.a. compounded monthly. (4)
- Determine the number of months it will take Brett to save R180 000.
- 7.3 Nabeel takes out a loan of R350,000 to renovate his house. The loan carries an interest rate of 11.5% per annum, compounded monthly, and is to be repaid over a period of 15 years. He makes regular monthly payments for the first 5 years. At the end of this 5-year period, he makes an additional lump sum payment of R40,000. (6)
- 7.3.1 Calculate the outstanding balance of the loan immediately after the additional payment has been made. (4)
- 7.3.2 After 5 years, Nabeel misses the next 8 payments. Calculate his new monthly payment if he wants to settle the loan in the given period. [16]



QUESTION 8

- 6.1 Siphokazi invested R6 500 for 4 years at an interest rate of r % p.a., compounded quarterly. At the end of this period, she received R13 460. Calculate r , correct to ONE decimal place. (4)
- 6.2 Terence has been planning to go on an overseas tour during December 2024. He needs R65 000 for this tour. Starting from 31 July 2023, he has been depositing Rx in a savings account at the end of each month. He will continue doing this until 30 November 2024, at which time there will be enough money in the account.
- Terence will withdraw all the money in the savings account on 30 November 2024, immediately after depositing the last Rx .
- Calculate the value of x , if interest was calculated at 8% p.a., compounded monthly. (3)
- 6.3 Mrs Naidoo plans to buy a house. She will need a bank loan for R650 000. The bank charges interest at 11% p.a., compounded monthly, and will require her to pay a monthly instalment of R7 000.
- 6.3.1 How many instalments of R7 000 will Mrs Naidoo have to pay? (4)
- 6.3.2 Calculate the final payment that Mrs Naidoo will have to pay to settle the loan. (4)





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QUESTION 9

- 7.1 At what annual percentage interest rate, compounded quarterly, should a lump sum be invested in order for it to double in 6 years? (3)
- 7.2 Micaela buys furniture to the value of R10 000. She borrows the money on 1 February 2023 from a financial institution that charges interest at a rate of 9,5% *p.a.* compounded monthly. Micaela agrees to pay monthly instalments of R450. The loan agreement allows Micaela to start paying equal monthly instalments from 01 August 2023.
- 7.2.1 Calculate the total amount owing to the financial institution on 1 July 2023. (3)
- 7.2.2 How many months will it take Micaela to pay back the loan? (4)
- 7.2.3 What is the balance of the loan immediately after Micaela has made the 25th payment? (3)
- [13]

QUESTION 10

- 6.1 Alec invests a lump sum of R5000 in a savings account for exactly 2 years. The investment earns interest at 10% *p.a.*, compounded quarterly.
- 6.1.1 What is the quarterly interest rate for Alec's investment? (1)
- 6.1.2 Calculate the amount in Alec's savings account at the end of the 2 years. (3)
- 6.2. A school issued new laptops to each of its 110 employees at the beginning of the year. The school was advised to set up a sinking fund to ensure that there would be enough money to replace them at the end of the 5th year.
- The following applies:
- They paid R6000.00 for each laptop.
 - The laptops depreciate at 15% *p.a.* on reducing balance basis.
 - Inflation is estimated to be 6% *p.a.* over the 5-year period.
 - A sinking fund is set up such that all payments will receive 12% interest *p.a.* compounded monthly.
- 6.2.1 Determine the amount of money required at the end of 5 years to replace the laptops (5)
- 6.2.2 Determine the monthly payments that should be made into the sinking fund to ensure that all 110 laptops can be replaced at the end of 5-years. (4)
- [13]



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QUESTION 11

- 6.1 The value of a vehicle worth R150 000 depreciate at 13% p.a. Calculate the value of the vehicle in 6 years if depreciation is calculated on the reducing-balance method. (3)
- 6.2 A loan of R300 000 is taken out at an interest rate of 5,3% p.a. compounded quarterly. The loan was taken out on the 1st of March 2016. The first payment was made on 1 December 2016 and is repaid in 72 equal quarterly payments.
- 6.2.1 What is the outstanding balance of the loan on 1 September 2016? (3)
- 6.2.2 Determine the quarterly repayments required to pay back the loan. (3)
- 6.3 Gert landed a job which remunerated him R27 562,50 quarterly. He then decided to open an investment account and deposit 11% of his salary at the end of every quarter into the investment account, earning an interest of 7,9% p.a. compounded monthly for eight years.
- What amount will be in the account at the end of eight years? (6)

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QUESTION 12

- 5.1 How long will it take an item to depreciate to one quarter of its initial value if it does so at a rate of 11, 84% p.a. on the reducing balance-method? (3)
- 5.2 Daniel wishes to purchase a bike for R72 000. He takes out a loan at a rate of 9,8% per annum compounded monthly. Calculate:
- 5.2.1 the monthly instalment if the loan is to be paid back over 5 years. He makes his first payment one month after the loan is granted. (4)
- 5.2.2 the outstanding balance after 3,5 years. (3)
- 5.2.3 the amount that would be saved by settling the loan after 3,5 years instead of 5 years. (3)
- 5.3 After making the 6th-payment, Kgosi has an outstanding balance of R793749,25 from a loan of R800 000. He then missed the 7th, 8th and 9th payment due to financial difficulties. He resumed payments at the end of 10th month onwards. Calculate his increased monthly payments in order to settle the loan within the stipulated 20 years, if interest was 10,25% per annum, compounded monthly. (5)

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QUESTION 13

- 7.1 Lufezo deposited R97 000 into an account that offered interest at 9,1% p.a. compounded quarterly. Calculate how many years it took for his investment to reach R166 433. (4)
- 7.2 On 1 January 2018 a school bought a new bus for R482 000. On that day they also started a sinking fund to make provision for a new bus in 5 years' time.
- 7.2.1 Over the next 5 years the value of the bus depreciated at 14,7% p.a. on the reducing-balance method. Calculate the trade-in value of the bus after 5 years. (2)
- 7.2.2 The price of these buses increases by 8,1% per year. Calculate the price of a new bus on 1 January 2023, i.e. after 5 years. (2)
- 7.2.3 The bank offered an interest rate of 7,3% p.a., compounded monthly, for the sinking fund. The first payment, x rands, was made in the fund on 1 January 2018 and thereafter the same amount was deposited on the first day of every month. The last payment was made on 1 December 2022.
- On 31 December 2022 the school bought a new bus and used the trade-in value of the old bus as a deposit.
- Calculate the monthly payment into the sinking fund. (6)
- [14]



QUESTION 14

- 7.1 Convert an effective interest rate of 11,3% p.a. to its equivalent nominal rate per annum, compounded quarterly. (3)
- 7.2 Lisa opened a savings account and deposited R10 000 immediately into the account. The account paid interest at 5,3% per annum, compounded monthly. She started making additional monthly deposits of R500 into the account three months after the account was opened. Her last monthly deposit of R500 was made 5 years after the account was opened.
- How much money was in the account 5 years after the account was opened? (5)
- 7.3 Sam wants to buy a house and takes out a loan of R860 000. He can only afford to pay R7 200 per month starting one month after the loan is granted. The interest rate is compounded monthly at 9,5% p.a.
- 7.3.1 Calculate the number of payments that Sam will make to repay the loan. (4)
- 7.3.2 How much will Sam pay in the last month to settle the loan? (5)
- [17]





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QUESTION 15

- 6.1 Jane deposits R x into an investment account. How long will it take for the value of the investment to double if the interest rate is 5,4% p.a. compounded annually? (3)
- 6.2 Thabo starts a printing company and needs to borrow money for start-up costs. He can make equal monthly payments of R3 300. What amount can Thabo borrow if the interest rate on the loan is 12% p.a. compounded monthly and the loan is granted over 5 years? (4)
- 6.3 A group of investors consider investing in a fund that promises growth at a rate of 5% p.a. compounded quarterly. Calculate the effective annual percentage rate of the growth promised. (3)
- 6.4 Sarah is 18 years old and wishes to accumulate R10 000 000 by the month before her 50th birthday. She will deposit equal monthly payments into an account that pays 15% p.a. compounded monthly. The first payment starts on her 18th birthday and the last payment one month before her 50th birthday. Calculate the monthly instalment that Sarah will make. (3)
- [13]

ACTIVITY 16

Frits deposited R3 000 into a savings account at the end of January 2004. He continued to make monthly deposits of R3 000 at the end of each month up to the end of December 2023. The savings account earned interest of 7,5% per annum, compounded monthly.

- 6.1 Calculate how much money will be in the account on 31 December 2023. (4)
- 6.2 Two years after Frits opened the savings account, he decided to invest R x of his bonus each year at the end of the year to boost his savings account. He made his last deposit of R x two years before 31 December 2023.
- 6.2.1 Calculate the yearly effective interest rate on his investment. Give your answer correct to 4 decimal places. (3)
- 6.2.2 Calculate his yearly deposit of R x if he wants R3 500 000 in his savings account on 31 December 2023. (6)
- [13]

