

FINANCE, GROWTH AND DECAY

Every question, eight papers

DBE · National Senior Certificate · Mathematics Paper 1

November 2021 - 2024 and May/June 2021, 2022, 2024, 2025

8 questions · 114 marks · 8 papers

Each question is a clip of the original DBE page. The wording, the mark allocations and the diagrams are exactly as they were printed - nothing has been retyped or redrawn. Only the blank answer space has been removed, so work in a separate book.

How it is arranged

One chapter per topic, so you can work through a whole skill at a time.

Inside a chapter the questions run from fewest marks to most. That is an order by size, not by difficulty: unlike the IEB, the DBE does not split its papers into an easier and a harder section, and its marking guidelines carry no cognitive-level tags. Nothing in these papers ranks one question as harder than another, so this booklet does not pretend otherwise.

Contents

■ One amount, then a series of payments

13 to 16 marks each

8 questions, 114 marks

One amount, then a series of payments

Every one of these is the whole finance topic in a single question, and every one of them is in two halves. First one amount growing or shrinking - a tractor depreciating, an investment doubling, a rate to be found from six months of growth. Then a series of payments - money going in every month towards a goal, or being drawn back out of a fund. The hard part is choosing the formula; once it is chosen the working is short.

8 questions · 114 marks

13 to 16 marks each

1. Find the rate from four years' growth, then a monthly savings plan

DBE NSC Paper 1 · May/June 2021 · Q7 · 13 marks

QUESTION 7

- 7.1 An amount of R10 000 was invested for 4 years, earning interest at $r\%$ p.a., compounded quarterly. At the end of the 4 years, the total amount in the account was R13 080. Determine the value of r . (4)
- 7.2 A businesswoman deposited R9 000 into an account at the end of January 2014. She continued to make monthly deposits of R9 000 at the end of each month up to the end of December 2018. The account earned interest at a rate of 7,5% p.a., compounded monthly.
- 7.2.1 Calculate how much money was in the account immediately after 60 deposits had been made. (3)
- 7.2.2 The businesswoman left the amount calculated in QUESTION 7.2.1 for a further n months in the account. The interest rate remained unchanged and no further payments were made. The total interest earned over the entire investment period was R190 214,14. Determine the value of n . (6)
- [13]

2. A phone's depreciation rate, then two people saving for one holiday

DBE NSC Paper 1 · May/June 2024 · Q7 · 13 marks

QUESTION 7

- 7.1 Six years ago, Thabo bought a phone for R13 000. The value of the phone depreciated annually according to the reducing-balance method. The value of the phone is now R8 337,75. Calculate the annual rate of depreciation. (3)
- 7.2 Eric and Thandi need to save R80 000 each to go on a holiday at the end of December 2027.
- Thandi decides that she will start saving at the end of January 2025. She will make 36 monthly deposits into a savings account that pays interest at 8,6% p.a., compounded monthly. The deposit will be made at the end of each month.
 - Eric calculates that if he makes 48 deposits of R1 402,31, starting at the end of January 2024, he will have enough money to go on holiday. He will make his deposits into a savings account at the end of each month. The savings account pays interest at 8,6% p.a., compounded monthly.
- Calculate the difference between the total amount that Eric and Thandi will deposit into their respective savings accounts over the given period. (4)
- 7.3 Lesibana was granted a loan of R225 000. The rate of interest for the loan is 9% p.a., compounded monthly. Lesibana will make monthly payments of R5 500, starting exactly four months after the loan was granted. How many payments will Lesibana make to settle the loan? (6)
- [13]

3. The effective rate, then drawing an income back out of an investment

DBE NSC Paper 1 · May/June 2025 · Q7 · 13 marks

QUESTION 7

- 7.1 John invests an amount of money in an account paying interest at a rate of 15% p.a., compounded monthly. Calculate the annual effective interest rate of this investment. (2)
- 7.2 Tino invests R500 000 in an account earning interest at the rate of 6% p.a., compounded quarterly. Tino decides to withdraw R11 250 at the end of every 3 months. Tino will continue making these regular withdrawals until there is no money in the account. How many withdrawals of R11 250 will Tino be able to make? (5)
- 7.3 On **1 March 2021**, Abby made a once-off deposit of R12 000 into an account earning interest at a rate of 9,5% p.a., compounded monthly. She deposited R500 into the same account on **1 April 2023** and continues to make these monthly deposits of R500 on the first day of each month thereafter.
- Calculate how much money was in the account immediately after the deposit of R500 is made on **1 March 2025**, exactly four full years after her initial deposit. (6)
- [13]

4. The rate from 24 months' growth, then a run of monthly deposits

DBE NSC Paper 1 · November 2022 · Q6 · 14 marks

QUESTION 6

- 6.1 R12 000 was invested in a fund that paid interest at $m\%$ p.a., compounded quarterly. After 24 months, the value of the investment was R13 459.
- Determine the value of m . (4)
- 6.2 On 31 January 2022, Tino deposited R1 000 in an account that paid interest at 7,5% p.a., compounded monthly. He continued depositing R1 000 on the last day of every month. He will make the last deposit on 31 December 2022.
- Will Tino have sufficient funds in the account on 1 January 2023 to buy a computer that costs R13 000? Justify your answer by means of an appropriate calculation. (4)
- 6.3 Thabo plans to buy a car that costs R250 000. He will pay a deposit of 15% and take out a loan for the balance. The interest on the loan is 13% p.a., compounded monthly.
- 6.3.1 Calculate the value of the loan. (1)
- 6.3.2 The first repayment will be made 6 months after the loan has been granted. The loan will be repaid over a period of 6 years after it has been granted. Calculate the MONTHLY instalment. (5)
- [14]

5. Sixteen years of compound growth, then the rate that halves a value

DBE NSC Paper 1 · November 2024 · Q7 · 14 marks

QUESTION 7

- 7.1 Mary's grandparents deposited R5 000 into a savings account on the day that she was born. The account pays interest at a rate of 6,8% p.a., compounded quarterly. Calculate the accumulated amount in this account on Mary's 16th birthday. (3)
- 7.2 After 4 years, the value of a printer was half of its original value. Determine the rate at which the value of the printer depreciated over this period, if depreciation was calculated according to a straight-line method. (2)
- 7.3 Tshepo was granted a loan of R100 000 on 1 March 2022 at an interest rate of 13,5% p.a., compounded monthly. Tshepo agreed to repay the loan over 5 years in monthly instalments of R2 300,98, starting on 1 April 2022.
- 7.3.1 Calculate the total interest that he will pay over the 5 years. (2)
- 7.3.2 Tshepo paid R22 300,98 (his monthly instalment and an additional R20 000) on 1 March 2024 into the loan account. He continues to pay the original monthly instalment thereafter. How many months earlier will Tshepo repay the loan? (7)

[14]

6. How long an investment takes to double, then machinery losing its value

DBE NSC Paper 1 · May/June 2022 · Q7 · 15 marks

QUESTION 7

- 7.1 How many years will it take for an investment to double in value, if it earns interest at a rate of 8,5% p.a., compounded quarterly? (4)
- 7.2 A company purchased machinery for R500 000. After 5 years, the machinery was sold for R180 000 and new machinery was bought.
- 7.2.1 Calculate the rate of depreciation of the old machinery over the 5 years, using the reducing-balance method. (4)
- 7.2.2 The rate of inflation for the cost of the new machinery is 6,3% p.a. over the 5 years. What will the new machinery cost at the end of 5 years? (2)
- 7.2.3 The company set up a sinking fund and made the first payment into this fund on the day the old machinery was bought. The last payment was made three months before the new machinery was purchased at the end of the 5 years. The interest earned on the sinking fund was 10,25% p.a., compounded monthly. The money from the sinking fund and the R180 000 from the sale of the old machinery was used to pay for the new machinery.
- Calculate the monthly payment into the sinking fund. (5)
- [15]**

7. A tractor's book value, then how long R75 000 takes to grow

DBE NSC Paper 1 · November 2021 · Q8 · 16 marks

QUESTION 8

- 8.1 A farmer bought a tractor for R980 000. The value of the tractor depreciates annually at a rate of 9,2% p.a. on the reducing-balance method. Calculate the book value of the tractor after 7 years. (3)
- 8.2 How many years will it take for an amount of R75 000 to accrue to R116 253,50 in an account earning interest of 6,8% p.a., compounded quarterly? (4)
- 8.3 Thabo wanted to save R450 000 as a deposit to buy a house on 30 June 2018.
- 8.3.1 He deposited a fixed amount of money at the end of every month into an account earning interest of 8,35% p.a., compounded monthly. His first deposit was made on 31 July 2013 and his 60th deposit on 30 June 2018. Calculate the amount he deposited monthly. (3)
- 8.3.2 Thabo bought a house costing R1 500 000 and used his savings as the deposit. He obtained a home loan for the balance of the purchase price at an interest of 12% p.a., compounded monthly over 25 years. He made his first monthly instalment of R11 058,85 towards the loan on 31 July 2018.
- (a) What will the balance outstanding on the loan be on 30 June 2039, 21 years after the loan was granted? (3)
- (a) Calculate the interest Thabo will have paid over the first 21 years of the loan. (3)
- [16]

8. r and the effective rate from six months, then replacing a laptop

DBE NSC Paper 1 · November 2023 · Q6 · 16 marks

QUESTION 6

- 6.1 Patrick deposited an amount of R18 500 into an account earning $r\%$ interest p.a., compounded monthly. After 6 months, his balance was R19 319,48.
- 6.1.1 Calculate the value of r . (3)
- 6.1.2 Calculate the effective interest rate. (2)
- 6.2 Kuda bought a laptop for R10 000 on 31 January 2019. He will replace it with a new one in 5 years' time on 31 January 2024.
- 6.2.1 The value of the old laptop depreciates annually at a rate of 20% p.a. according to the straight-line method. After how many years will the laptop have a value of R0? (2)
- 6.2.2 Kuda will buy a laptop that costs R20 000. In order to cover the cost price, he made his first monthly deposit into a savings account on 28 February 2019. He will make his 60th monthly deposit on 31 January 2024. The savings account pays interest at 8,7% p.a., compounded monthly. Calculate Kuda's monthly deposit into this account. (4)
- 6.3 Tino wins a jackpot of R1 600 000. He invests all of his winnings in a fund that earns interest of 11,2% p.a., compounded monthly. He withdraws R20 000 from the fund at the end of each month. His first withdrawal is exactly 1 month after his initial investment. How many withdrawals of R20 000 will Tino be able to make from this fund? (5)
- [16]

Index by paper

Every finance question in each paper, and where it sits in this booklet.

May/June 2021		1 question, 13 of 150 marks
Q7	Find the rate from four years' growth, then a monthly savings plan	13 marks p3
November 2021		1 question, 16 of 150 marks
Q8	A tractor's book value, then how long R75 000 takes to grow	16 marks p7
May/June 2022		1 question, 15 of 150 marks
Q7	How long an investment takes to double, then machinery losing its value	15 marks p6
November 2022		1 question, 14 of 150 marks
Q6	The rate from 24 months' growth, then a run of monthly deposits	14 marks p4
November 2023		1 question, 16 of 150 marks
Q6	r and the effective rate from six months, then replacing a laptop	16 marks p8
May/June 2024		1 question, 13 of 150 marks
Q7	A phone's depreciation rate, then two people saving for one holiday	13 marks p3
November 2024		1 question, 14 of 150 marks
Q7	Sixteen years of compound growth, then the rate that halves a value	14 marks p5
May/June 2025		1 question, 13 of 150 marks
Q7	The effective rate, then drawing an income back out of an investment	13 marks p4

Index by topic

A question appears under every topic it uses, so it can be found even when it is filed in another chapter.

Compound interest

5 questions

1. Find the rate from four years' growth, then a monthly savings plan p3
3. The effective rate, then drawing an income back out of an investment p4
4. The rate from 24 months' growth, then a run of monthly deposits p4
5. Sixteen years of compound growth, then the rate that halves a value p5
6. How long an investment takes to double, then machinery losing its value p6

Depreciation on the reducing balance

4 questions

2. A phone's depreciation rate, then two people saving for one holiday p3
5. Sixteen years of compound growth, then the rate that halves a value p5
6. How long an investment takes to double, then machinery losing its value p6
7. A tractor's book value, then how long R75 000 takes to grow p7

Nominal and effective interest rates

2 questions

3. The effective rate, then drawing an income back out of an investment p4
8. r and the effective rate from six months, then replacing a laptop p8

Solving for the interest rate

5 questions

1. Find the rate from four years' growth, then a monthly savings plan p3
2. A phone's depreciation rate, then two people saving for one holiday p3
4. The rate from 24 months' growth, then a run of monthly deposits p4
5. Sixteen years of compound growth, then the rate that halves a value p5
8. r and the effective rate from six months, then replacing a laptop p8

Solving for n - how long it takes

2 questions

6. How long an investment takes to double, then machinery losing its value p6
7. A tractor's book value, then how long R75 000 takes to grow p7

Future value: saving with regular payments

5 questions

1. Find the rate from four years' growth, then a monthly savings plan p3
2. A phone's depreciation rate, then two people saving for one holiday p3
4. The rate from 24 months' growth, then a run of monthly deposits p4
7. A tractor's book value, then how long R75 000 takes to grow p7
8. r and the effective rate from six months, then replacing a laptop p8

Present value: loans, and drawing money out

1 question

3. The effective rate, then drawing an income back out of an investment p4

Replacing an asset

1 question

8. r and the effective rate from six months, then replacing a laptop p8

Where these came from

So that "every finance question" is a claim you can check.

Eight DBE NSC Mathematics Paper 1 papers were read end to end:
November 2021, 2022, 2023, 2024 and May/June 2021, 2022, 2024, 2025.

All 338 questions in them were classified. These papers are scans - they carry no text layer at all - so the structure was rebuilt by reading them with OCR, and then checked three ways: every paper adds back up to exactly 150, the Afrikaans paper matches the English question for question, and the official marking guideline, which IS ordinary text, agrees with the marks read off every question.

DBE publishes an official marking guideline for every one of these papers. The companion file "CAPS_P1_Finance_Solutions.pdf" carries the guideline for each question here, in the same order and under the same numbers.