**Question 1:**
A student buys a TV set of R11 000 on a hire purchase agreement. He agrees to pay a deposit of 20% and the balance over a period of two years in monthly instalments at 14% simple interest p.a. He also takes out an insurance premium of R18,50 per month. Determine the amount of each instalment.

**Question 2:**
Mikayla wants a new Polaroid camera. It costs R1 750, but her parents said she must buy it herself. She finds out that Hot Gadgets has a hire purchase contract at 11.5% interest for 3 years. She will need to pay a 15% deposit.

2.1 What will she have paid at the end of 2 years in total?
2.2 Calculate the monthly instalments.
2.3 After some more research on the internet, she saw that Amazon sells one at $95. But she needs to pay the shipping fees of $15 as well. What will the camera cost if the Rand/Dollar exchange rate is R13,99 per dollar? Take the shipping cost into consideration when calculating your answer.
2.4 Which option would be the best financially for Mikayla? Amazon or Hot Gadgets? Give a reason for your answer.
2.5 What will the cost of the camera be in 5 years if the inflation rate is 7,2 % per year? (use the Hot Gadgets amount)

**Question 3:**
A savings account is opened with an amount of R45 000 and three years later R23 000 is withdrawn. Six years after the account is opened, R11 000 was deposited. The interest rate was as follows: 6,5% per annum compounded yearly for the first five years and 4,2% per annum compounded yearly for the remainder of the period. Calculate the balance at the end of 10 years.
Question 4:

4.1 Alex deposited R120 000 into a savings account. Four years later he added R6 000. The interest is 9%, compounded annually for the first 3 years and then 7% compounded annually for the rest of the time. What total amount will he have at the end of 8 years?

4.2 If Alex wants R200 000 in his savings account at the end of 8 years, what should the compounded interest rate be if he invests R120 000 (rounded to two decimal places)?

Question 5:

5.1 If the exchange rate between Rand and American Dollar is R11,83: $1, and the exchange rate between Rand and British pound is R14,95: £1, find the exchange rate between $ and £.

5.2 Thabo buys a car radio costing R1 750 on hire purchase and pays a deposit of R170. He then pays 24 monthly payments of R75. Calculate:

5.2.1 The total simple interest paid (the amount).

5.2.2 The rate of simple interest.

Question 6:

Read the advertisement carefully and use the information in it to calculate the following question:

*CHEETAH’S SHARE BANK*

JOIN THE BAND OF HAPPY SAVERS. BEST RATES IN THE LAND:

10,05% p.a. simple interest.

6.1 Ryan invested R20 000 in the Cheetah’s Share Bank for 3 years. How much money did he receive at the end of the investment period?
6.2 Bernie wants to travel overseas when she finishes her studies in 4 years’ time. She needs R38 500 to do so. She has already saved R11 210. What rate of compound interest per year must she get to achieve her aim? (Correct to one decimal place.)

6.3 On a trip to New York, Taylor booked into a hotel for three nights. The exchange rate at that time was $1 = R9,10. The cost per night was $450. How much did she spend in Rands for the three nights?

**Question 7:**
Dylan is furnishing his townhouse and has chosen the sofa he wants. It costs R7 999 if he pays cash for it. He has chosen to buy it on hire purchase on the following terms:
- Deposit of R900.
- 24 months to pay it off.
- At a rate of 25% per annum.

Calculate his monthly instalments.

**Question 8:**
Zukiswa wants to triple her money in 4 years. At what interest rate, compounded monthly, does she need to invest the money (as a percentage to two decimal places)?

**Question 9:**
Karabo inherits some money from a relative and he decides that he would like to invest his money. He looks at the interest rates of the following accounts at FNB and Standard Bank:

<table>
<thead>
<tr>
<th>FNB Money on Call Account</th>
<th>Standard Bank MoneyMarket Call Account</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Amount invested (per annum)</strong></td>
<td><strong>Percentage interest rate</strong></td>
</tr>
<tr>
<td>R5 000–R19 999</td>
<td>2,75%</td>
</tr>
<tr>
<td>R20 000–R29 999</td>
<td>3,95%</td>
</tr>
<tr>
<td>R30 000–R39 999</td>
<td>4,00%</td>
</tr>
<tr>
<td>R40 000–R49 999</td>
<td>4,05%</td>
</tr>
<tr>
<td>R50 000–R59 999</td>
<td>4,10%</td>
</tr>
<tr>
<td>R60 000–R69 999</td>
<td>4,15%</td>
</tr>
<tr>
<td>R70 000–R79 999</td>
<td>4,20%</td>
</tr>
<tr>
<td>R80 000–R89 999</td>
<td>4,25%</td>
</tr>
<tr>
<td>R90 000–R99 999</td>
<td>4,30%</td>
</tr>
<tr>
<td>R100 000 +</td>
<td>4,35%</td>
</tr>
</tbody>
</table>


9.1 If Karabo decides to invest R200 000, which account will earn him the most interest?
9.2 Karabo eventually decides to invest the money in the FNB Money on Call account. Calculate how much money Karabo will have in his account after 2 years.

9.3 If Karabo wants to buy a car that sells for R210 500 and the rate of depreciation is 17% per annum, then calculate how much the car will be worth in 2 years' time.

9.4 If the current average rate of inflation is 9.2% per annum, calculate the cost of the same car in 2 years' time.

**Question 10:**

Fill in the missing values in the following table.

<table>
<thead>
<tr>
<th>Compounding Period</th>
<th>Principal</th>
<th>Yearly rate</th>
<th>Time</th>
<th>Period rate (the interest paid per compounding period)</th>
<th>Number of periods</th>
<th>Total Interest</th>
<th>Total Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Annually</td>
<td>R1 000</td>
<td>9%</td>
<td>5 years</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Semi-annually</td>
<td>R1 000</td>
<td>9%</td>
<td>5 years</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Quarterly</td>
<td>R500</td>
<td>8%</td>
<td>3 years</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Monthly</td>
<td>R350</td>
<td>12%</td>
<td>5 years</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Quarterly</td>
<td>R800</td>
<td>12%</td>
<td>90 days</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Quarterly</td>
<td>R 1 250</td>
<td>16%</td>
<td>450 days</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Question 11:*

Imagine that you save R1 370,50 per month at an interest rate of 5% per annum compounded monthly for 2 years in a savings account. Use the formula below to calculate how much you would save in total.

\[ F = \frac{X[(1+i)^n-1]}{i}, \text{ where } F \text{ is the total, } i \text{ is the monthly interest as a decimal, } X \text{ is the} \]

**Monthly savings amount and } n \text{ is the number of months.**
MEMORANDUM

Question 1:
A student buys a TV set of R11 000 on a hire purchase agreement. He agrees to pay a deposit of 20% and the balance over a period of two years in monthly instalments at 14% simple interest p.a. He also takes out an insurance premium of R18,50 per month. Determine the amount of each instalment.

Deposit: \( 20\% \times R11\ 000 = R2\ 200 \)

Balance: \( R11\ 000 - R2\ 200 = R8\ 800 \)

\[ A = P(1 + i \times n) \]

\[ A = 8\ 800(1 + 0.14 \times 2) \]

\[ A = R11\ 264 \div 24 = R469,33 \]

\( R469,33 + R18.50 = R487,83 \)

Question 2:
Mikayla wants a new Polaroid camera. It costs R1 750, but her parents said she must buy it herself. She finds out that Hot Gadgets has a hire purchase contract at 11.5% interest for 3 years. She will need to pay a 15% deposit.

2.1 What will she have paid at the end of 2 years in total?

Deposit: \( 15\% \times R1\ 750 = R262,50 \)

Balance: \( R1\ 750 - R262,50 = R1\ 487,50 \)

\[ A = P(1 + i \times n) \]

\[ A = 1\ 487,50(1 + 0,115 \times 3) \]

\[ A = R2\ 000,69 + R262,50 = R2\ 263,19 \]

2.2 Calculate the monthly instalments.

\( R2\ 000,69 \div 36 = R55,57 \)

2.3 After some more research on the internet, she saw that Amazon sells one at $95. But she needs to pay the shipping fees of $15 as well. What will the camera cost if the Rand/Dollar exchange rate is R13,99 per dollar? Take the shipping cost into consideration when calculating your answer.

Amazon: $95 + $15 = $110

Rand : Dollar

13,99 : 1
\[ x : 110 \]

\[ x = 13.99 \times 110 = R1 \, 538.90 \]

2.4 Which option would be the best financially for Mikayla? Amazon or Hot Gadgets? Give a reason for your answer.

Amazon works out cheaper.

2.5 What will the cost of the camera be in 5 years if the inflation rate is 7.2% per year? (use the Hot Gadgets amount)

\[ A = P(1 + i)^n \]

\[ A = 1 \, 750(1 + 0.072)^5 \]

\[ A = R2477.49 \]

Question 3:

A savings account is opened with an amount of R45 000 and three years later R23 000 is withdrawn. Six years after the account is opened, R11 000 was deposited. The interest rate was as follows: 6.5% per annum compounded yearly for the first five years and 4.2% per annum compounded yearly for the remainder of the period. Calculate the balance at the end of 10 years.

Year 1 – 3:

\[ A = P(1 + i)^n \]

\[ A = 45 \, 000(1 + 0.065)^3 = R54 \, 357.73 \]

Year 3 – 5:

Year 3:

\[ R54 \, 357.73 - R23 \, 000 = R31 \, 357.73 \]

\[ A = 31 \, 357.73(1 + 0.065)^2 = R35 \, 566.73 \]

Year 5 – 6:

\[ A = 35 \, 566.73(1 + 0.042)^1 = R37 \, 060.53 \]

Year 6:

\[ R37 \, 060.53 + R11 \, 000 = R48 \, 060.53 \]

Year 6 – 10:

\[ A = 48 \, 060.53(1 + 0.042)^4 = R56 \, 657.76 \]

Question 4:

4.1 Alex deposited R120 000 into a savings account. Four years later he added R6 000. The interest is 9%, compounded annually for the first 3 years and then 7% compounded annually for the rest of the time. What total amount will he have at the end of 8 years?

Year 1 – 3:
\[ A = P (1 + i)^n \]

\[ A = 120 \ 000 (1 + 0,09)^3 = R155 \ 403,48 \]

Year 3:

\[ A = 155 \ 403,48 (1 + 0,07)^1 = R166 \ 281,72 \]

Year 4 - 8:

\[ R166 \ 281,72 + R6 \ 000 = R172 \ 281,72 \]

\[ A = 172 \ 281,72 (1 + 0,07)^4 = R225 \ 826,19 \]

4.2 If Alex wants \( R200 \ 000 \) in his savings account at the end of 8 years, what should the compounded interest rate be if he invests \( R120 \ 000 \) (rounded to two decimal places)?

\[ A = P (1 + i)^n \]

\[ 200 \ 000 = 120 \ 000 (1 + i)^8 \]

\[ \frac{5}{3} = (1 + i)^8 \]

\[ 1 + i = \sqrt[8]{\frac{5}{3}} = 1,069 ... \]

\[ i = 0,0659 ... \]

\[ i = 6,59\% \]

Question 5:

5.1 If the exchange rate between Rand and American Dollar is \( R11,83 : $1 \), and the exchange rate between Rand and British pound is \( R14,95 : £1 \), find the exchange rate between $ and £.

\[ $1 = R11,83 \]

\[ £1 = R14,95 \]

\[ \therefore £ : $ \]

\[ 14,95 : 11,83 \]

\[ $1,26 = £1 \text{ or } £0,79 = $1 \]

5.2 Thabo buys a car radio costing \( R1 \ 750 \) on hire purchase and pays a deposit of \( R170 \). He then pays 24 monthly payments of \( R75 \). Calculate:

5.2.1 The total simple interest paid (the amount).

\[ R1750 - R170 = R1580 \]

\[ R75 \times 24 = R1800 \]

The interest amount = \( R1 \ 800 - R1 \ 580 = R220 \)

5.2.2 The rate of simple interest.
\[ A = P(1 + i \times n) \]

\[ 1800 = 1580(1 + i \times 2) \]
\[ \frac{90}{79} = 1 + i \times 2 \]
\[ \frac{11}{79} = 2i \]
\[ i = 0,069 \ldots \]
\[ i = 6,96\% \]

**Question 6:**
Read the advertisement carefully and use the information in it to calculate the following question:

**CHEETAH’S SHARE BANK**

JOIN THE BAND OF HAPPY SAVERS. BEST RATES IN THE LAND:

10,05% p.a. simple interest.

6.1 Ryan invested \( R20 \, 000 \) in the Cheetah’s Share Bank for 3 years. How much money did he receive at the end of the investment period?

\[ A = P(1 + i \times n) \]
\[ A = 20000(1 + 0,1005 \times 3) \]
\[ A = R26 \, 030 \]

6.2 Bernie wants to travel overseas when she finishes her studies in 4 years’ time. She needs \( R38 \, 500 \) to do so. She has already saved \( R11 \, 210 \). What rate of compound interest per year must she get to achieve her aim? (Correct to one decimal place.)

\[ A = P(1 + i)^n \]
\[ 38 \, 500 = 11 \, 210(1 + i)^4 \]
\[ \frac{3850}{1121} = (1 + i)^4 \]
1 + \( i = \frac{\sqrt[4]{3850}}{1121} = 1,361 \ldots \)

\( i = 0,3613 \ldots \)

\( i = 36,1\% \)

6.3 On a trip to New York, Taylor booked into a hotel for three nights. The exchange rate at that time was \$1 = R9,10. The cost per night was \$450. How much did she spend in Rands for the three nights?

\[
\$450 \times 3 = \$1\ 350
\]

\[
\$1 = R9,10
\]

\[
\$1\ 350 = x
\]

\[
x = 9,10 \times 1\ 350 = R12\ 285
\]

Question 7:

Dylan is furnishing his townhouse and has chosen the sofa he wants. It costs \( R7\ 999 \) if he pays cash for it. He has chosen to buy it on hire purchase on the following terms:

- Deposit of \( R900 \).
- 24 months to pay it off.
- At a rate of 25% per annum.

Calculate his monthly instalments.

\[
R7\ 999 - R900 = R7\ 099
\]

\[
A = P(1 + i \times n)
\]

\[
A = 7\ 099(1 + 0,25 \times 2)
\]

\[
A = R10\ 648,50 \div 24 = R443,69 \text{ per month}
\]

Question 8:

Zukiswa wants to triple her money in 4 years. At what interest rate, compounded monthly, does she need to invest the money (as a percentage to two decimal places)?

\[
A = P(1 + i)^n
\]

\[
3 = 1 \left(1 + \frac{i}{12}\right)^{48}
\]

\[
3 = (1 + \frac{i}{12})^{48}
\]

\[
1 + \frac{i}{12} = \sqrt[48]{3} = 1,023 \ldots
\]

\[
\frac{i}{12} = 0,023 \ldots
\]
Mathematics            Grade 10

i = 0,2778 ...
i = 27,78%

Question 9:
Karabo inherits some money from a relative and he decides that he would like to invest his money. He looks at the interest rates of the following accounts at FNB and Standard Bank:

<table>
<thead>
<tr>
<th>FNB Money on Call Account</th>
<th>Percentage interest rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>R5 000–R19 999</td>
<td>2.75%</td>
</tr>
<tr>
<td>R20 000–R29 999</td>
<td>3.95%</td>
</tr>
<tr>
<td>R30 000–R39 999</td>
<td>4.00%</td>
</tr>
<tr>
<td>R40 000–R49 999</td>
<td>4.05%</td>
</tr>
<tr>
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<td>4.10%</td>
</tr>
<tr>
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<td>4.15%</td>
</tr>
<tr>
<td>R70 000–R79 999</td>
<td>4.20%</td>
</tr>
<tr>
<td>R80 000–R89 999</td>
<td>4.25%</td>
</tr>
<tr>
<td>R90 000–R99 999</td>
<td>4.30%</td>
</tr>
<tr>
<td>R100 000 +</td>
<td>4.65%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Standard Bank MoneyMarket Call Account</th>
<th>Percentage interest rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>R20 000–R99 999</td>
<td>5.25%</td>
</tr>
<tr>
<td>R100 000–R249 999</td>
<td>5.65%</td>
</tr>
<tr>
<td>R250 000–R499 999</td>
<td>5.65%</td>
</tr>
<tr>
<td>R500 000–R999 999</td>
<td>5.65%</td>
</tr>
<tr>
<td>R1 000 000–R19 999 999</td>
<td>5.70%</td>
</tr>
<tr>
<td>R20 000 000 +</td>
<td>5.75%</td>
</tr>
</tbody>
</table>


9.1 If Karabo decides to invest R200 000, which account will earn him the most interest?
Standard Bank MoneyMarket Call account

9.2 Karabo eventually decides to invest the money in the FNB Money on Call account. Calculate how much money Karabo will have in his account after 2 years.

\[ A = P(1 + i \times n) \]

\[ A = 200 000(1 + 0,045 \times 2) \]

\[ A = R218 000 \]

9.3 If Karabo wants to buy a car that sells for R210 500 and the rate of depreciation is 17% per annum, then calculate how much the car will be worth in 2 years' time.

\[ A = P(1 - i)^n \]

\[ A = 210 500(1 - 0,17)^2 \]

\[ A = R145 013,45 \]

9.4 If the current average rate of inflation is 9,2% per annum, calculate the cost of the same car in 2 years' time.

\[ A = P(1 + i)^n \]

\[ A = 210 500(1 + 0,092)^2 \]
Question 10:
Fill in the missing values in the following table.

<table>
<thead>
<tr>
<th>Compounding Period</th>
<th>Principal</th>
<th>Yearly rate</th>
<th>Time</th>
<th>Period rate (the interest paid per compounding period)</th>
<th>Number of periods</th>
<th>Total Interest</th>
<th>Total Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Annually</td>
<td>R1 000</td>
<td>9%</td>
<td>5 years</td>
<td>9%</td>
<td>5</td>
<td>R538,62</td>
<td>R1 538,62</td>
</tr>
<tr>
<td>Semi-annually</td>
<td>R1 000</td>
<td>9%</td>
<td>5 years</td>
<td>4.5%</td>
<td>10</td>
<td>R552,97</td>
<td>R1 552,97</td>
</tr>
<tr>
<td>Quarterly</td>
<td>R500</td>
<td>8%</td>
<td>3 years</td>
<td>2%</td>
<td>12</td>
<td>R134,12</td>
<td>R634,12</td>
</tr>
<tr>
<td>Monthly</td>
<td>R350</td>
<td>12%</td>
<td>5 years</td>
<td>1%</td>
<td>60</td>
<td>R285,84</td>
<td>R635,84</td>
</tr>
<tr>
<td>Quarterly</td>
<td>R800</td>
<td>12%</td>
<td>90 days</td>
<td>3%</td>
<td>1</td>
<td>R24,00</td>
<td>R824,00</td>
</tr>
<tr>
<td>Quarterly</td>
<td>R 1 250</td>
<td>16%</td>
<td>450 days</td>
<td>4%</td>
<td>5</td>
<td>R270,82</td>
<td>R1 520,82</td>
</tr>
</tbody>
</table>

* Question 11:
Imagine that you save R1 370,50 per month at an interest rate of 5% per annum compounded monthly for 2 years in a savings account. Use the formula below to calculate how much you would save in total.

\[ F = \frac{x((1+i)^n-1)}{i} \]

where \( F \) is the total, \( i \) is the monthly interest as a decimal, and \( x \) is the Monthly savings amount and \( n \) is the number of months.

\[ F = \frac{1370.50((1+\frac{5\%}{12})^{24}-1)}{\frac{5\%}{12}} = R34 517,30 \]