

Platinum

Mathematical Literacy

Grade

12

Control Test Book

Grade 12

**MATHEMATICAL LITERACY
TEST ONE**

Marks: 60

QUESTION 1

Below is an extract from the Standard Bank website (*Source: <http://www.standardbank.co.za>*). It gives details about their service fees for transactions on a particular type of bank account, the Achiever Account. Transactions are deposits (paying money in) and withdrawals (taking money out). This can be done in various ways: by Autobank, over the counter in the bank itself, by electronic payment (by computer), or by debit order or stop order. Debit orders and stop orders are regular payments made by the bank out of your account (for example, for rent or school fees) with your permission. The bank charges a service fee for most of these transactions. The service charge is calculated for each transaction separately.

In the column under the heading ‘Service fee for transaction’, the first number given is an administration cost that is charged for the given transaction, no matter how much money is transacted. The percentage (%) quoted refers to the percentage of the amount transacted that will be charged in addition to the administration cost. A third number in this column is the maximum fee that will be charged for this service, no matter how much money is transacted. It includes both the percentage fee and the administration cost.

For example, a cash withdrawal of R25 from a Standard Bank Autobank will cost R3 + 0,9% of R25. An Autobank cash withdrawal of R1 000 will cost R3 + 0,9% of R1 000. In this case, there is no maximum charge. However, for an electronic account payment you will pay R3 + 0,55% of the amount of the payment. If this comes to more than R14,00, then you will pay R14,00. In this case, there is a maximum fee of R14,00.

Transaction type	Service fee for transaction
Deposits at a branch or an AutoBank	
Cheque deposits	free
Cash deposits	R3,00; 0,90%
Cash withdrawals	
Standard Bank AutoBank	R3,00; 0,90%
Branch cash withdrawal using a cheque card, credit card or Maestro card	0,90% (minimum R17,00)
Payments	
Electronic inter-account transfers	R3,00
Debit orders – to other Standard Bank customers or other banks	R3,00; 1,00%; R27,00
Stop orders – to all other accounts	R3,00; 0,55%; R14,00
Electronic account payments	R3,00; 0,55%; R14,00

- 1.1 What amount of money would you have to transfer using a single electronic account payment to pay the maximum service fee of R14,00?

(5)

- 1.2 Write a formula to calculate the service fee (F) on an electronic account payment for an amount (A) that is smaller than the amount calculated in question 1.1. (2)
- 1.3 Draw a neat sketch of a graph that shows the way that the service fee (F) for an electronic account payment depends on the amount (A) of the payment for amounts from R0 to R2 500. (5)
- 1.4 On the same axes that you drew in question 1.3, draw a graph to show how the service fee for a cash deposit depends on the amount of money deposited. (3)

Here is an extract from a person's Achiever Account bank statement.

Note: The fees for 'Electronic funds transfers' are paid by the person that pays in the money. So, the owner of this account would not pay any fees on these transactions.

Transaction	Explanation	Type	Amount
1	Rent from house	Cash deposit at Autobank	+R800,00
2	Salary	Electronic funds transfer	+R10 250,00
3	Salary	Electronic funds transfer	+R5 432,00
4	Petrol purchases	Cash withdrawal (Autobank)	-R2 000,00
5	Life insurance	Debit order	-R345,00
6	Household insurance	Debit order	-R514,38
7	Retirement savings	Debit order	-R689,29
8	Paying off credit card	Inter-account transfer	-R3 000,00
9	Home loan	Inter-account transfer	-R732,00
10	Payment Woolworths	Electronic account payment	-R483,95
11	Telephone account	Electronic account payment	-R532,00
13	School fees	Debit order	-R726,81

- 1.5 What will the total fees be for the payments done using electronic account payments? (4)
- 1.6 What will the service fees be for depositing the rent money into the account (see transaction 1)? (2)
- 1.7 How much money would the person save if they did not deposit the rent money, but instead used it for petrol, and then withdrew R800 less for petrol? (4)

[25]

QUESTION 2

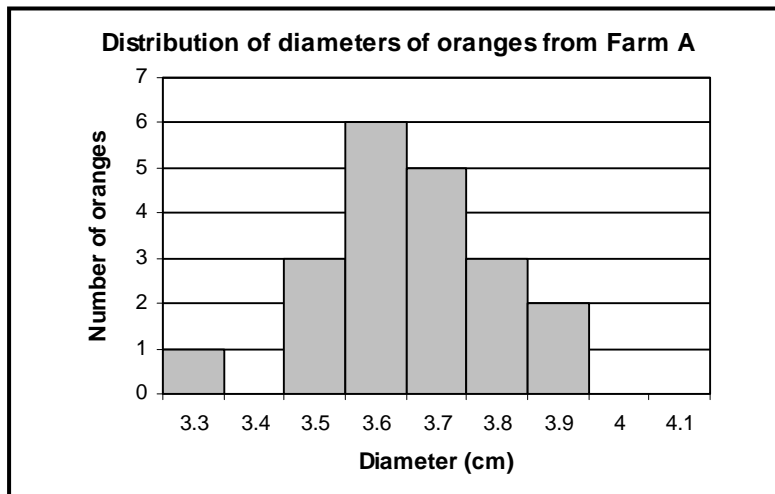
Batches of oranges are more likely to sell for a good price for fresh fruit if they are large and all the oranges in the batch are similar in size. An orange farmer has two batches of oranges coming from two different farms. He measures the diameters of 20 oranges from each batch to find out their average sizes and to see how much variability (spread) there is in the sizes.

These are the measurements for the diameters of the oranges in centimetres. The sizes have been arranged in order from smallest to largest.

FARM A	3,3	3,5	3,5	3,5	3,6	3,6	3,6	3,6	3,6	3,6	3,7	3,7	3,7	3,7	3,7	3,8	3,8	3,8	3,9	3,9
FARM B	3,6	3,7	3,7	3,7	3,7	3,7	3,7	3,8	3,8	3,8	3,8	3,8	3,8	3,8	3,9	3,9	3,9	3,9	4,0	4,1

- 2.1 Calculate the mean, median, mode, lower quartile, upper quartile, range, and inter-quartile range for diameters of the oranges from both of the farms above. (8)
- 2.2 Which farm produces larger oranges? Explain how you know. (2)
- 2.3 Which batch of oranges was more consistent? Explain which statistic you used to answer this question. (2)

Here is a histogram that shows the distribution of diameters of the oranges from Farm A.

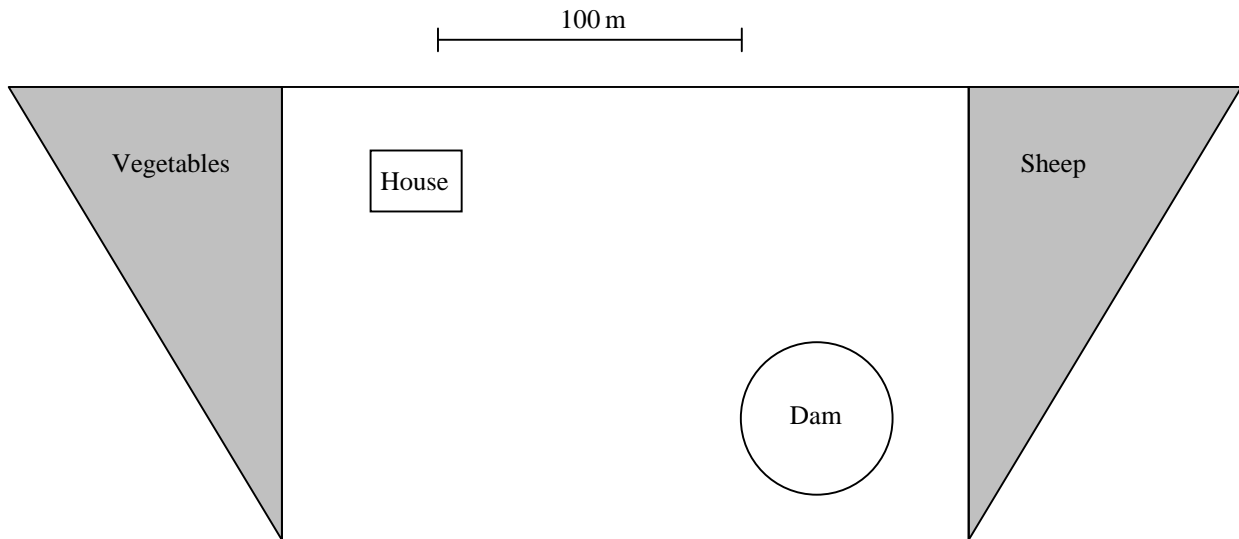


- 2.4 Draw up a frequency table and then sketch a similar histogram to illustrate the distribution of the diameters of the oranges from Farm B. (6)
- 2.5 If the farmer plans to sell one batch as fresh fruit and send the other batch to the factory for making orange juice, which batch should he send to the factory? Explain your answer. (2)

[20]

QUESTION 3

The scale drawing below shows the plan of a small farm.



- 3.1 What is the total area of the farm? (7)
- 3.2 Estimate how far it is from the corner of the house nearest to the dam to the edge of the dam itself. (2)
- 3.3 What is the area of the dam? (The area of a circle is πr^2 .) (3)
- 3.4 If the dam is 3 m deep, how many litres of water does it contain? ($1 \text{ m}^3 = 1 \text{ kl}$) (3)

[15]

[TOTAL: 60 marks]

Grade 12

**MATHEMATICAL LITERACY
TEST TWO**

Marks: 60

QUESTION 1

A friend of yours has a job and wants to borrow money from a bank to buy furniture. Here is some information about personal loans available from a bank. Your friend asks you to help her make sense of it.

You can apply for a loan with a fixed instalment, or repayment, that you pay over a relatively short term. This loan is ideal for first-time borrowers and is often used for relatively small loan amounts.

Amount you could qualify for

You could qualify for a loan of between one and two-and-a-half times your gross monthly income.

The minimum amount you may borrow is R3 500 and the maximum amount is R30 000.

Minimum monthly repayment

The minimum monthly instalments remain fixed at $\frac{1}{20}$ th or $\frac{1}{30}$ th of the original amount that you borrowed. In other words, if you borrow R8 000 and your loan has an instalment

factor of $\frac{1}{20}$ th, your monthly instalment will be $\frac{R8\ 000}{20} = R400$.

Repayment period

A loan with a $\frac{1}{20}$ th instalment factor will take approximately 23 months to repay.

A loan with a $\frac{1}{30}$ th instalment factor will take approximately 36 months to repay.

Source: data adapted from the Standard Bank website (<http://www.standardbank.co.za>)

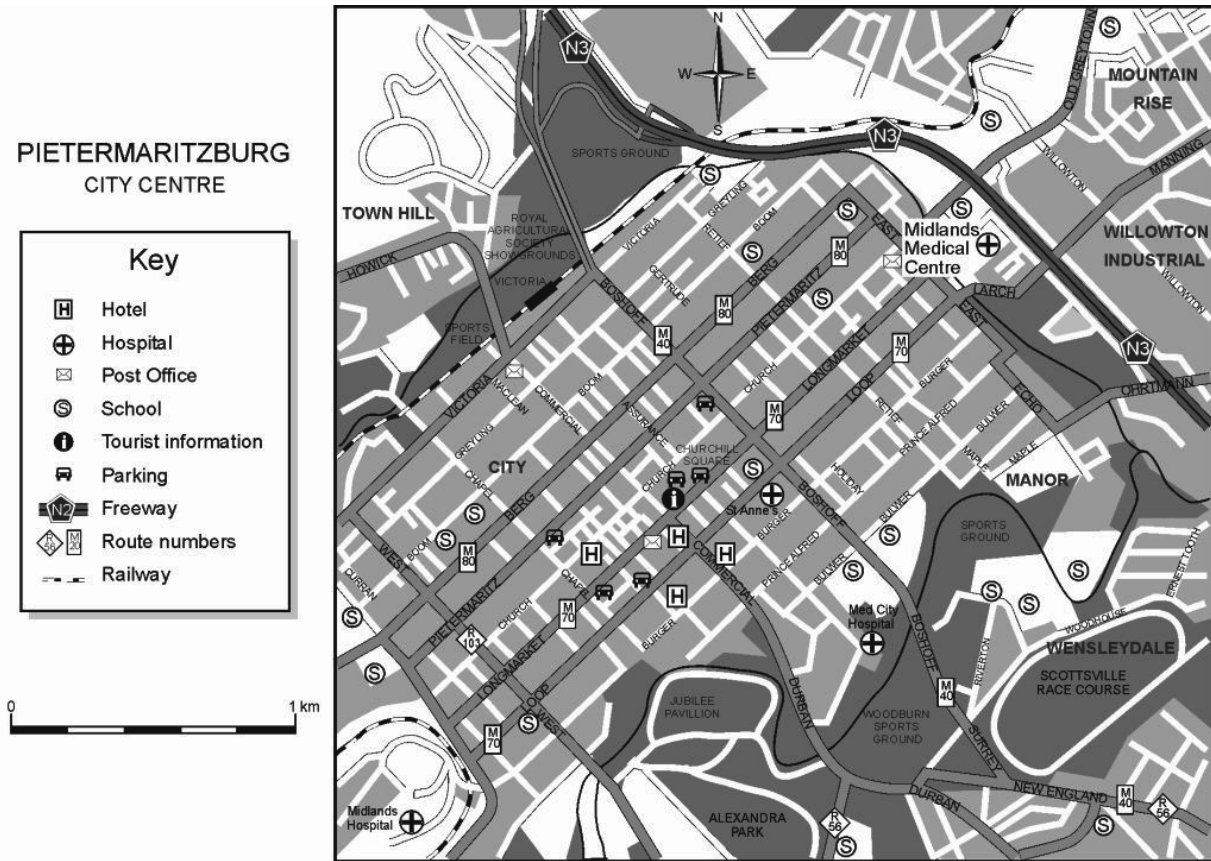
- 1.1 If your friend has a gross monthly income of R3 500, what is the maximum amount that she will be able to borrow on this loan plan? (1)
- 1.2 If your friend has a gross monthly income of R13 000, what is the maximum amount that she will be able to borrow on this loan plan? (1)
- 1.3 Your friend decides that she would like to borrow R10 000. What would her monthly instalment be:
- a) if the bank offered her an instalment factor of $\frac{1}{20}$ th (1)
- b) if the bank offered her an instalment factor of $\frac{1}{30}$ th? (1)

- 1.4 If she borrowed R10 000 and had to pay $\frac{1}{20}$ th of this every month for 23 months:
- a) how much would she pay in total (1)
 - b) how much of the total amount she paid back would have been for interest? (1)
- 1.5 If she borrowed R10 000 and had to pay $\frac{1}{30}$ th of this every month for 36 months:
- a) how much would she pay in total (1)
 - b) how much of the total amount she paid back would have been for interest? (1)
- 1.6 Would you recommend that she asks for the $\frac{1}{20}$ th or the $\frac{1}{30}$ th instalment factor? Explain your answer. (2)
- 1.7 Write a formula that expresses how the total amount repaid (T) on the R10 000 loan will depend on the number of months (N) that she will have been paying for:
- a) for the $\frac{1}{20}$ th instalment factor (2)
 - b) for the $\frac{1}{30}$ th instalment factor. (2)
- 1.8 Draw a neat sketch of two graphs on the same set of axes that shows how the total amount repaid (T) depends on the number of months (N) for both of the instalment factors. Make sure your graph is properly labelled and has a suitable title. (7)
- 1.9 On your graph, label the points that show the total amount repaid using each repayment plan. (2)
- 1.10 On which instalment factor is the loan paid off at a faster rate? How is this faster rate represented on the graph? (2)

[25]

QUESTION 2

Use the following map to answer the questions below.

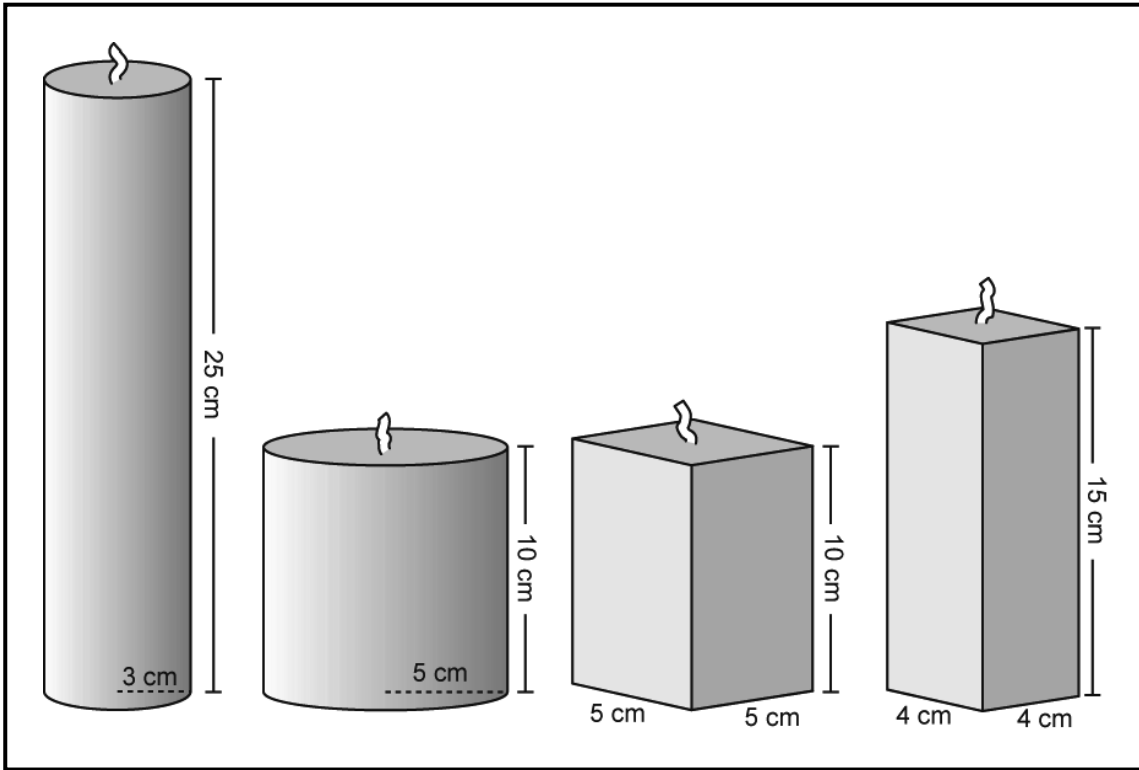


- 2.1 In which direction will an ambulance be travelling for most of its journey if it is going from Midlands Hospital to Midlands Medical Centre by the shortest route? (1)
- 2.2 If the average building in the city centre is 20 m wide, how many buildings do you estimate there are in Longmarket Street? (4)
- 2.3 The station is at the end of Longmarket Street near the bottom left of the map. Write a description that explains to someone how to get from the station to St Anne's hospital. (3)
- 2.4 If a person travels in a car at an average of 60kms per hour for 10 minutes, how far will they have travelled? (2)

[10]

QUESTION 3

Lolwana is making candles in different shapes to sell at craft markets. She makes cylindrical candles and candles in the shape of prisms on a square base. The different sizes are shown in the diagram below.



- The formula for the area of a circle is $\text{area} = \pi r^2$.
- The formula for the perimeter of a circle is $\text{perimeter} = 2\pi r$.
- The formula for the volume of a cylinder is $\text{volume} = \text{area of base} \times \text{height}$.

The dimensions are summarised in the following table.

	Radius (cm)	Base (cm)	Height (cm)
Candle A	3	-	25
Candle B	5	-	10
Candle C	-	5×5	10
Candle D	-	4×4	15

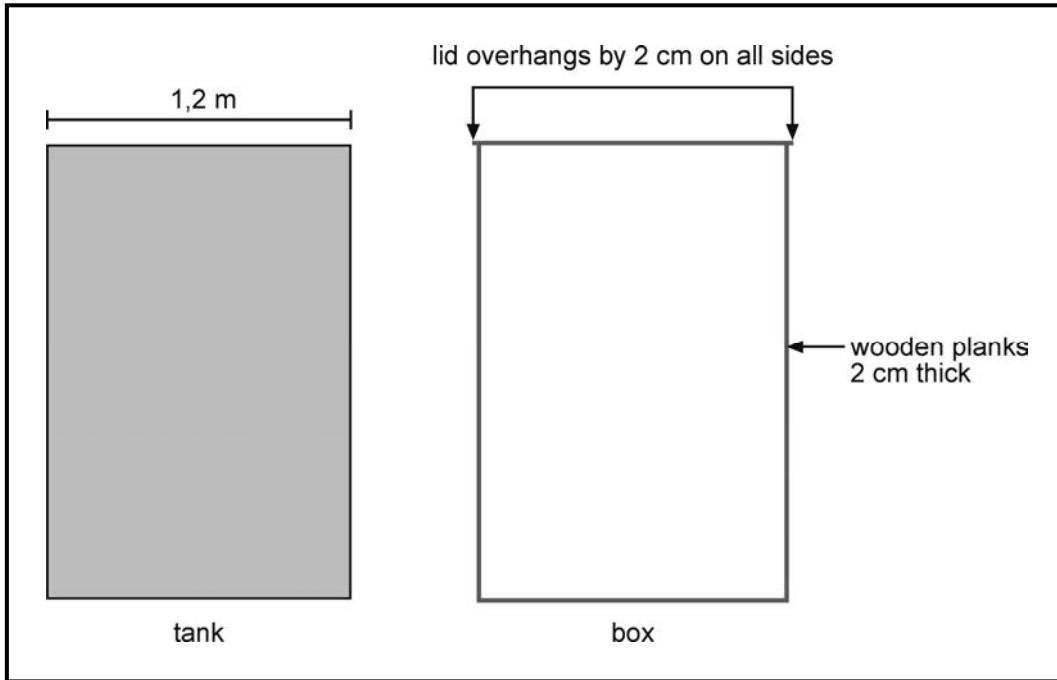
- 3.1 For each different type of candle, what volume of wax (to the nearest cm^3) does she need to make one candle? (2)

- 3.2 She melts the wax in batches of 4 litres at a time to pour into the moulds to make the candles. How many candles of type D can she make with 4 litres of wax? (Remember that 1 litre is the same as $1\,000\text{ cm}^3$.) (1)
- 3.3 About 5% of the wax she melts goes to waste in the process of making the candles. How many candles of type D can she really expect to make with 4 litres of wax? (2)
- 3.4 What is the total outside surface area (to the nearest cm^2) of each type of candle? (2)
- 3.5 She paints the whole outside surface of some of the candles with silver or gold paint. The type of paint she uses has to be put on in a layer that is 0,5 mm thick. This means that 1 ml of paint will cover 20 cm^2 of candle surface area. (You can check this by remembering that 1 ml is the same as 1 cm^3 .) For Candle B, how much paint does she need to paint one candle? (1)
- 3.6 Would you expect the candle with the biggest volume also to have the biggest surface area? Explain why or why not. (2)

[10]

QUESTION 4

This is a scale drawing of a box with a square base, into which a cylindrical water tank must fit, seen from the side. The box is made of wooden planks with a base and a wooden lid, as in the sketch. The box looks the same from all four sides. The wooden planks are 2 cm thick and the wooden lid must hang over by 2 cm on all sides, as in the sketch.



- 4.1 Calculate the following dimensions of the tank:
- a) radius (1)
 - b) height (3)
 - c) volume in m^3 and in kilolitres. (1 litre = $10 \text{ cm} \times 10 \text{ cm} \times 10 \text{ cm} = 1\,000 \text{ cm}^3$) (3)
- 4.2 Estimate the volume of the inside of the square box into which the tank will be placed. (3)
- 4.3 Estimate the total area of all the wooden planks used in the construction of the box. (5)
- [15]**

[TOTAL: 60 marks]

Grade 12

**MATHEMATICAL LITERACY
TEST THREE**

Marks: 60

QUESTION 1

This is an extract from the information that was provided to taxpayers who earned a salary in 2006. The information explains how to work out how much tax you have to pay on your income. Note that there are six different ‘tax brackets’ where different tax rates are applied.

Tax rates applicable to individuals	
Where the taxable income:	
is not more than R80 000	18% of each R1 of the taxable income
is more than R80 000 but not more than R130 000	R14 400 plus 25% of the amount by which the taxable income is more than R80 000
is more than R130 000 but not more than R180 000	R26 900 plus 30% of the amount by which the taxable income is more than R130 000
is more than R180 000 but not more than R230 000	R41 900 plus 35% of the amount by which the taxable income is more than R180 000
is more than R230 000 but not more than R300 000	R59 400 plus 38% of the amount by which the taxable income is more than R230 000
is more than R300 000	R86 000 plus 40% of the amount by which the taxable income is more than R300 000

Tax rebates	
Rebates: primary rebate is R6 300	65 years and older: R4 500

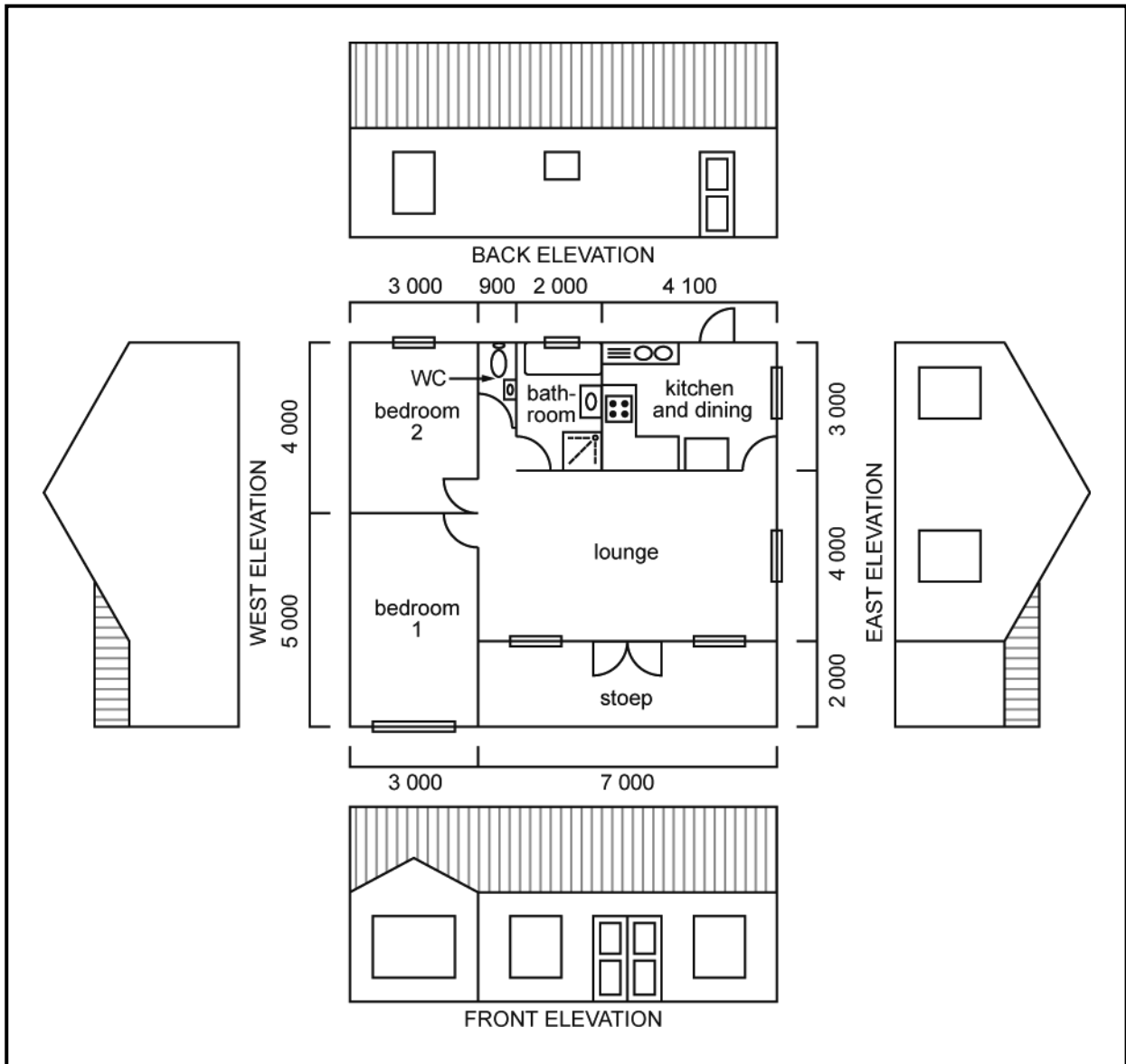
The following example illustrates the calculation of the tax payable and the application of the rebates.

Your taxable income is:	R167 025,00
Tax on R130 000,00	R26 900,00
Plus 30% of R37 025,00 (R167 025,00 – R130 000,00)	R11 107,50
Total payable before the rebate	<u>R38 007,50</u>
Less applicable rebate (under 65 years)	<u>R6 300,00</u>
Final amount of tax to be paid	<u>R31 707,50</u>

- 1.1 Explain how the amount of R14 400 near the top of the right-hand column of the table is calculated. (3)
- 1.2 Write out an example similar to the one provided that explains how a person under 65 years, who earns an annual salary of R215 000, would use the information provided to calculate the tax that they have to pay. (7)
- 1.3 In the form of an expression, write out the calculation for the total tax to be paid on an annual salary of R215 000. (3)
- 1.4 Some people might find it easier to read off the value of the tax they have to pay from a graph. Draw a graph that shows the tax that has to be paid by a person under 65 years on the vertical axis and the possible values for the salary (ranging from R60 000 to R400 000) on the horizontal axis. Given that the tax payable is calculated differently for different 'tax brackets', you will expect your graph to have different sections with different slopes. Label the points on the graph to show the values of the tax at the endpoints of all the tax brackets, as well as for salaries of R60 000 and R400 000. (12)
- [25]

QUESTION 2

Here is a scale drawing plan for a house that a painter needs to paint. The house does have a ceiling. All the doors are the same size. All lengths shown on the diagram below are measured in millimetres (mm).



- 2.1 What is the approximate surface area of the outside walls of the house? (6)
- 2.2 What is the approximate surface area of the inside walls of the house? (8)

- 2.3 The painter knows that he can paint about 6 m^2 with every litre of paint. He knows he must use exterior paint to paint the outside of the house. He knows he can use either interior or exterior paint for the inside walls. He goes to the shop and finds out the price of various sizes of tins of paint.

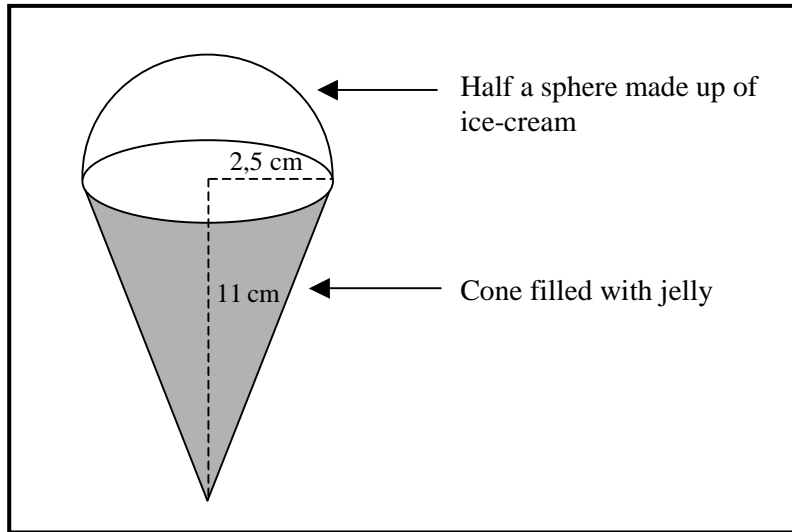
Type	Size of tin (litres)	Price (R)
Exterior	2	38,00
Exterior	5	86,00
Exterior	10	175,00
Interior	2	35,00
Interior	5	59,20
Interior	10	74,00

- a) Decide which paint he should use for the interior and how many tins of each size he must buy to spend the least amount of money to paint the inside walls of the house. (5)
- b) Decide how many tins of each size he must buy to spend the least amount of money to paint the outside walls of the house. (6)

[25]

QUESTION 3

You are given the task of preparing ice-cream cones for your younger sister's birthday party. You decide to fill the cones with jelly and put a scoop of ice-cream on top of each cone.



You assume that the scoop of ice-cream is exactly half a sphere (ball shape) and the cone is a perfect cone. You read up in the encyclopaedia to find the formulae for the volumes of these shapes. The encyclopaedia gives the following information.

	Surface area sides	Surface area base	Volume
Prism	perimeter \times height		area base \times height
Cone	$\pi r \sqrt{\text{height}^2 + \text{radius}^2}$	πr^2	$\frac{\pi r^2 h}{3}$
Regular pyramid	perimeter \times slant height		$\frac{1}{3} \times \text{area base} \times \text{height}$
Sphere	$4\pi r^2$		$\frac{4}{3} \pi r^3$

- 3.1 Show how you calculate that the volume of the ice-cream cone is 72 cm^3 . (2)
- 3.2 Show how you calculate that the volume of the ice-cream scoop on one ice-cream cone is 33 cm^3 . (2)
- 3.3 If there are 35 children coming to your sister's party, what volume of jelly and what volume of ice-cream do you need to make 35 ice-cream cones? (2)

- 3.4 The encyclopaedia states that 1 litre = 1 decimetre cubed. It also states that 1 decimetre = 10 centimetres. Use this information to calculate how much jelly and how much ice-cream you need, in litres, for the cones. (3)
- 3.5 If the ice-cream is sold in 1-litre containers, how many containers of ice-cream do you need to buy? (1)

[10]

[TOTAL: 60 marks]

Grade 12

MATHEMATICAL LITERACY
TEST FOUR

Marks: 60

QUESTION 1

If you have a 'pre-paid' electricity meter, you buy units of electricity in advance and then enter them into your meter at home. This information is provided to customers who buy electricity.

Attention electricity consumers!!!

If your slip says 'low consumption', you pay 45,99c per unit. There is no service charge and you get 60 units of electricity per month for free.

If your slip says 'high consumption', you pay 33,277c per unit. You get no free units and you pay a service charge of R1,48 per day.

- 1.1 Write a formula that expresses how the total number of rands paid for electricity for a 30-day month (P) depends on the number of units of electricity consumed (N) in that month for:
- a) low consumption
 - b) high consumption. (6)
- 1.2 Draw two graphs on the same set of axes to show how the total number of rands paid for electricity for a 30-day month (P) varies with the number of units consumed (N) for both low consumption and high consumption. Plot the number of units on the horizontal axis and the total cost on the vertical axis. (7)
- 1.3 From your graphs, determine approximately how many units per month will cost the same whether you are charged for low consumption or for high consumption. (1)
- 1.4 Show how you can determine this number of units accurately without using the graph. (5)
- 1.5 How do you think they decide whether you are a 'low consumer' or a 'high consumer'? (1)

The table below shows the dates when a woman bought electricity over a six-month period. The table also shows how long each quantity of electricity lasted before she had to buy more. (Assume she only bought electricity once she had run out.) The number of units she bought each time and the number of days that they lasted are also listed in the table.

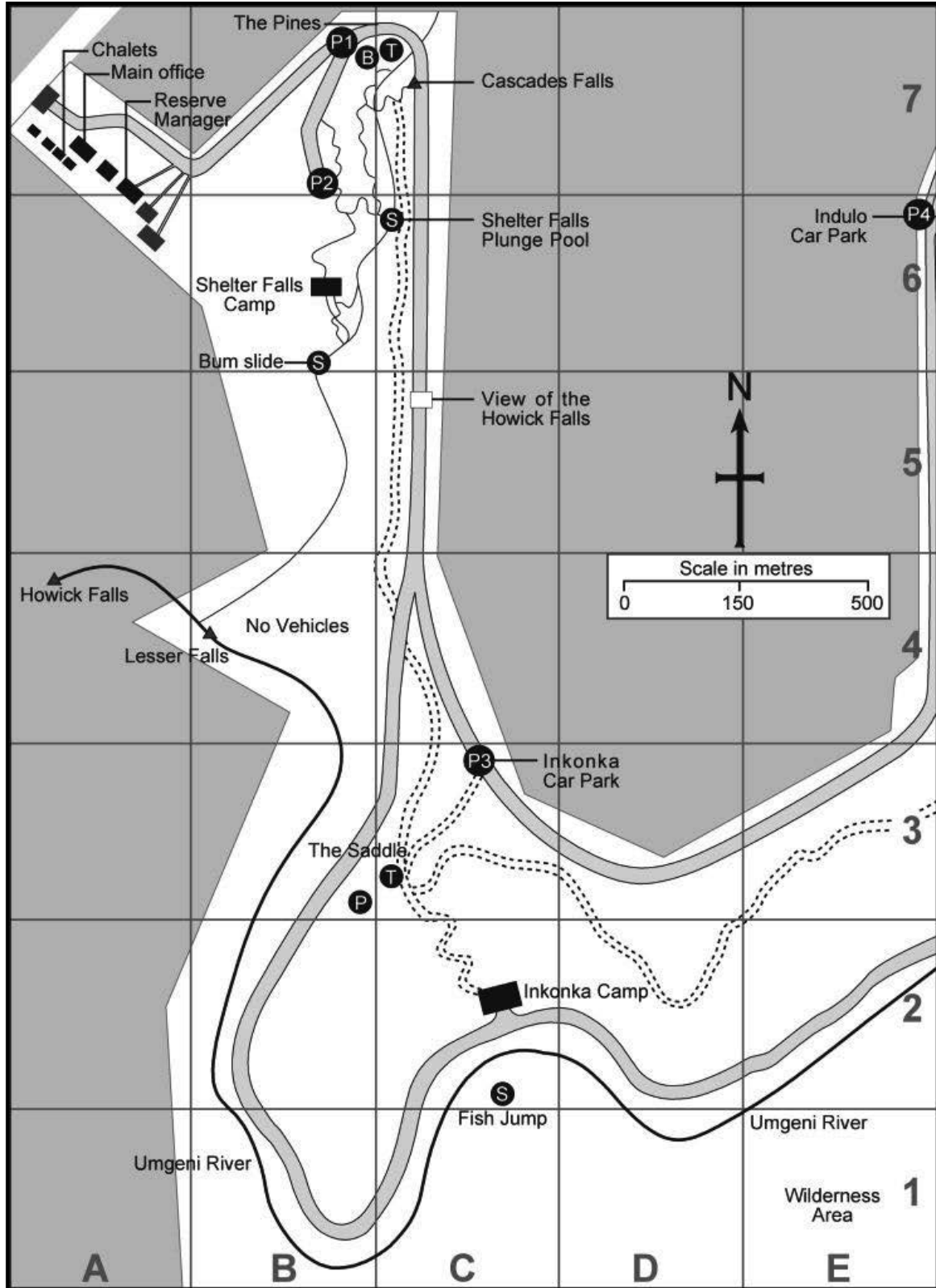
Date and time	Value of electricity bought (R)	Number of units of electricity bought	Number of days that electricity bought on this day lasted
Thu 05 Jan 2006	300	796,30	not known
Mon 12 Dec 2005	300	752,40	24
Tue 08 Nov 2005	300	791,90	34
Fri 14 Oct 2005	300	796,30	A
Tue 20 Sep 2005	300	778,80	B
Tue 23 Aug 2005	300	761,20	28
Fri 22 Jul 2005	300	768,40	32

- 1.6 What value do the letters A and B in the table represent? Show your working. (2)
- 1.7 Why does it say 'not known' in the top of the fourth column? (1)
- 1.8 Is this woman a 'low consumer' or a 'high consumer'? Explain how you determined this. (2)

[25]

QUESTION 2

Study this map of the western side of the Umgeni Valley Nature Reserve.




- 2.1 In which grid block do you find Inkonka Camp? (1)
- 2.2 In which general direction would you be travelling if you were going:
- a) from Shelter Falls Camp to the main office?
 - b) from Shelter Falls Camp to Inkonka Camp? (1)
- 2.3 Estimate the distance by road, to the nearest km, from the main office to Inkonka Camp. (3)
- 2.4 What is the actual area, in m^2 , represented by one grid block on this map? (3)
- 2.5 The shaded area on the map represents wild vegetation. Estimate the total number of squares that the wild vegetation occupies on the north-eastern region of the map. (1)
- 2.6 Use your estimate in question 2.5 to estimate the total area, in m^2 , that the wild vegetation occupies on the north-eastern region of the map. (1)

[10]

QUESTION 3

This is an advertisement for a loan.

<p>Your loan options</p> <p>Use this handy instalment table to choose the loan that will suit your budget and circumstances. Find the loan amount you need and choose the repayment period that offers you a monthly repayment you feel comfortable with.</p> <ul style="list-style-type: none"> • Choice of loan term – with up to 5 years to repay your loan! • Fixed interest rate – for the full term of your loan! • Cash to use as you choose – for anything that is important to you! <p>The monthly repayment amounts in the table do not include the monthly administration fee of R9,50 and an insurance premium of 0,5% of the original loan amount.</p>	<div style="text-align: center; margin-bottom: 20px;">  <p>Loans from MoneyCo.</p> </div> <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th style="padding: 5px;">Amounts</th> <th style="padding: 5px;">24 months</th> <th style="padding: 5px;">36 months</th> <th style="padding: 5px;">48 months</th> <th style="padding: 5px;">60 months</th> </tr> </thead> <tbody> <tr> <td style="padding: 5px;">R6 000</td> <td style="padding: 5px;">R310</td> <td style="padding: 5px;">R227</td> <td style="padding: 5px;">R187</td> <td style="padding: 5px;">R163</td> </tr> <tr> <td style="padding: 5px;">R8 000</td> <td style="padding: 5px;">R407</td> <td style="padding: 5px;">R297</td> <td style="padding: 5px;">R244</td> <td style="padding: 5px;">R212</td> </tr> <tr> <td style="padding: 5px;">R10 000</td> <td style="padding: 5px;">R509</td> <td style="padding: 5px;">R372</td> <td style="padding: 5px;">R304</td> <td style="padding: 5px;">R265</td> </tr> <tr> <td style="padding: 5px;">R20 000</td> <td style="padding: 5px;">R988</td> <td style="padding: 5px;">R713</td> <td style="padding: 5px;">R577</td> <td style="padding: 5px;">R497</td> </tr> <tr> <td style="padding: 5px;">R25 000</td> <td style="padding: 5px;">R1 236</td> <td style="padding: 5px;">R891</td> <td style="padding: 5px;">R721</td> <td style="padding: 5px;">R621</td> </tr> </tbody> </table> <p style="font-size: small; text-align: center;">This loan option table is only a guide and could vary according to your personal circumstances.</p>	Amounts	24 months	36 months	48 months	60 months	R6 000	R310	R227	R187	R163	R8 000	R407	R297	R244	R212	R10 000	R509	R372	R304	R265	R20 000	R988	R713	R577	R497	R25 000	R1 236	R891	R721	R621
Amounts	24 months	36 months	48 months	60 months																											
R6 000	R310	R227	R187	R163																											
R8 000	R407	R297	R244	R212																											
R10 000	R509	R372	R304	R265																											
R20 000	R988	R713	R577	R497																											
R25 000	R1 236	R891	R721	R621																											

Suppose you want to buy a car that costs R25 000. You have just got your first job, so you have no savings that you can use to buy the car.

- 3.1 If you borrow R25 000 from MoneyCo., how much money will you pay for your insurance premium each month? (2)
- 3.2 If you borrow R25 000 from MoneyCo. and pay it back over 24 months, how much will you pay in total? (2)
- 3.3 If you borrow R25 000 from MoneyCo. and pay it back over 60 months, how much will you pay in total? (2)
- 3.4 Explain fully why you pay more in total for borrowing R25 000 from MoneyCo. and paying it back over 60 months than you do if you pay it back over 24 months. (3)

- 3.5 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 n is the number of months. (4)

- 3.6 Assume that the price of the car increases by 0,5% per month. How long would it take you to save enough money to buy the car if you save R1 370,50 every month at 5% interest per annum compounded monthly? Draw up a table of values showing the car price and the amount saved for at least four different time periods. Then, draw graphs on the same axes to help you obtain an approximate answer. (10)

- 3.7 How much less do you pay in total for your car if you save R1 370,50 per month at 5% interest per annum compounded monthly for 24 months to buy it, rather than taking a loan? (2)

[25]

[TOTAL: 60 marks]

Grade 12

**MATHEMATICAL LITERACY
TEST ONE MEMO**

QUESTION 1

$$1.1 \quad 3 + \frac{0,55}{100} \times x = 14 \quad \checkmark \checkmark$$

$$x = \frac{100}{0,55} \times (14 - 3) \quad \checkmark \checkmark$$

$$x = R2\,000$$

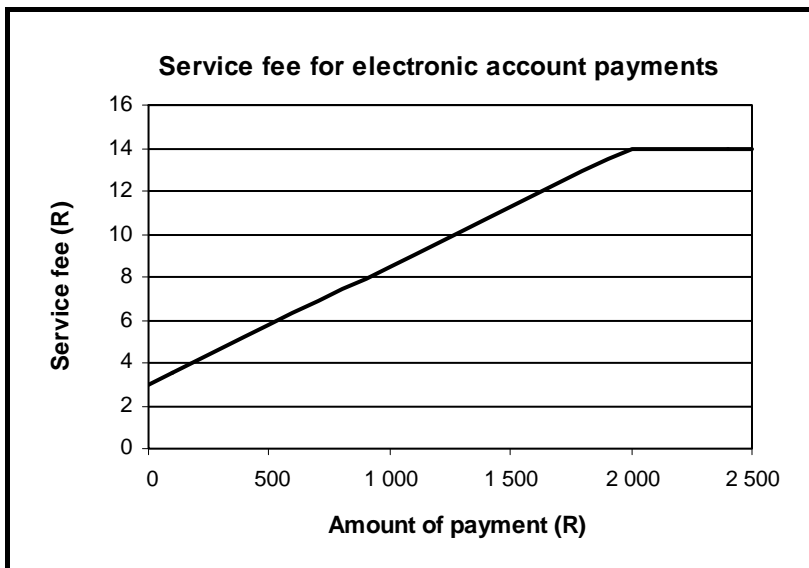
\therefore Amount of electronic account payment that is charged to pay the maximum fee is R2 000,00 or more. \checkmark

(5)

$$1.2 \quad F = 3 + \frac{0,55}{100} \times A \quad \text{or} \quad F = 0,0055A \quad \checkmark \checkmark$$

(2)

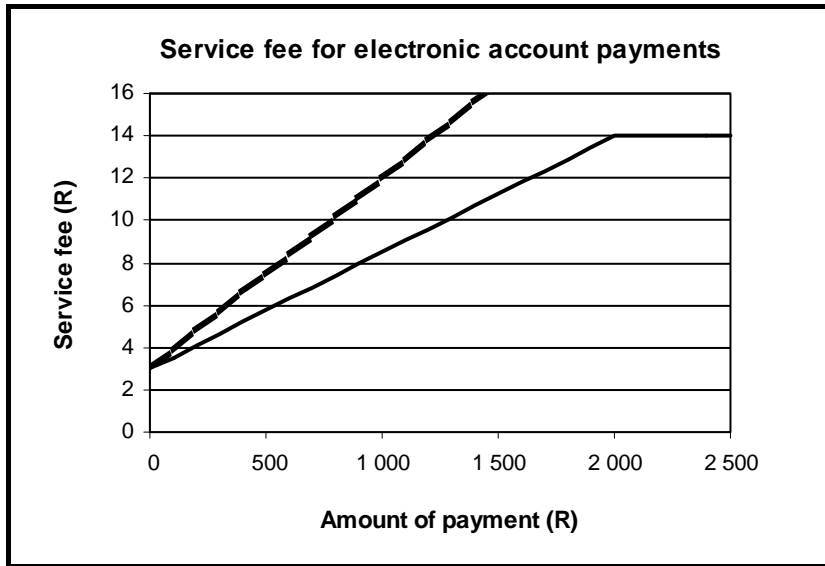
1.3



- Axes correctly labelled with units \checkmark
- x -axis from R0 to R2 500 \checkmark
- Start with a fee of R3 for a transaction of R0 \checkmark
- The graph is horizontal (at a fee of R14,00) from transaction amounts starting at R2 000 \checkmark
- A suitable title. \checkmark

(5)

1.4



- Start with a service fee of R3 for a transaction of R0 ✓
- Pass through the point that represents a service fee of R12,00 for a withdrawal of R1 000. ✓✓ (3)

1.5 $[R3 \times 2] \checkmark + [(483,95 + 532,00) \checkmark \times 0,55\% \checkmark] \approx R11,59 \checkmark$ (4)

1.6 $R3 + (800 \times 0,9\%) \checkmark = R10,20 \checkmark$ (2)

1.7 $Savings = [800 \checkmark \times 0,9\% \checkmark] + 10,20 \checkmark = R17,40 \checkmark$ (4)

[25]

QUESTION 2

2.1 Farm A:

- Mean = $73,1 \div 20 = 3,7$ cm ✓✓
- Median = 3,7 cm ✓✓
- Range = $3,9 - 3,3 = 0,6$ cm ✓
- Lower quartile = 3,6 cm
- Upper quartile = 3,75 cm
- Inter-quartile range 0,15 cm

Farm B:

- Mean = $76,1 \div 20 = 3,8$ cm ✓
- Median = 3,8 cm ✓
- Range = $4,1 - 3,6 = 0,5$ cm ✓
- Lower quartile = 3,7 cm
- Upper quartile = 3,9 cm
- Inter-quartile range = 0,1 cm

(8)

2.2 Farm B produces larger oranges, on average. ✓ Both the mean and the median diameters are larger for Farm B's oranges. ✓

(2)

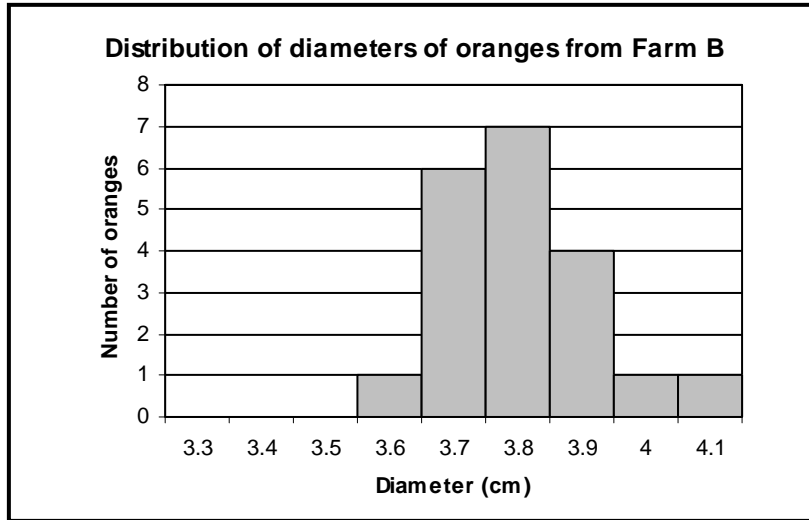
2.3 The diameters of Farm B's oranges have the smallest variability and the most consistency. ✓ You can see this from the fact that this batch has a smaller range than Farm A's batch. ✓

(2)

2.4

Diameter (cm)	Frequency (number of oranges)
3,6	1
3,7	6
3,8	7
3,9	4
4,0	1
4,1	1

- Table with column headings ✓
- Values in first column ✓
- Values in frequency column ✓



- Presence of suitable heading and labels similar to those given in example ✓
- Data that is in frequency table plotted correctly. ✓✓ (6)

2.5 He should sell Farm A's oranges for making orange juice, because they are smaller on average ✓ and more variable in size. ✓ (2)
[20]

QUESTION 3

Note: Different printer settings will cause the scale diagrams to print differently. The final answer in each case should remain the same, but workings may vary. The solutions provided are intended as a guide regarding method and mark allocation.

3.1 The rectangle is $9 \text{ cm} \times 6 \text{ cm}$. Each triangle has base $3,6 \text{ cm}$ and height 6 cm .
So the rectangle is $(9 \times 25 \times 6 \times 25) \text{ m}^2 = 33\,750 \text{ m}^2$
Area of the triangle is $(0,5 \times 3,6 \times 25 \times 6 \times 25) \text{ m}^2 = 6\,750 \text{ m}^2$
Total area = $33\,750 + (2 \times 6\,750) = 47\,250 \text{ m}^2$ (7)

3.2 Distance $\approx 4,4 \text{ cm} = 4,4 \times 25 = 110 \text{ m}$ (2)

3.3 Diameter of the dam is 2 cm . So the radius is $1 \times 25 \text{ m} = 25 \text{ m}$.
Area = $\pi \times (25)^2 = 1\,963,5 \text{ m}^2$ (3)

3.4 Volume = $1\,963,5 \text{ m}^2 \times 3 \text{ m} = 5\,890,5 \text{ m}^3 = 5\,890,5 \text{ kl} = 5\,890\,500 \text{ litres}$ (3)
[15]

[TOTAL: 60 marks]

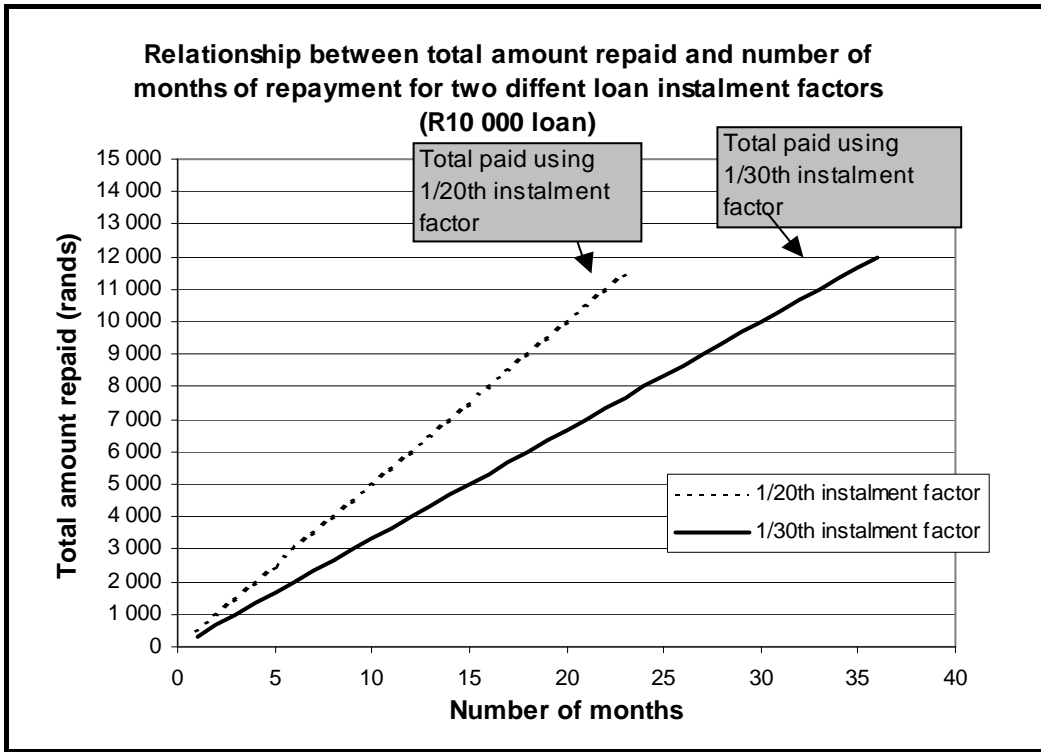
Grade 12

MATHEMATICAL LITERACY
TEST TWO MEMO

QUESTION 1

- 1.1 $2,5 \times R3\,500 = R8\,750$ ✓ (1)
- 1.2 $2,5 \times R13\,000 = R32\,500$. This is more than R30 000. So, the maximum she could borrow would be R30 000. ✓ (1)
- 1.3 a) $R10\,000 \div 20 = R500$ ✓ (1)
b) $R10\,000 \div 30 = R333,33$ ✓ (1)
- 1.4 a) $23 \times R500 = R11\,500$ ✓ (1)
b) $R11\,500 - R10\,000 = R1\,500$ for interest ✓ (1)
- 1.5 a) $R333,33 \times 36 = R11\,999,88 \approx R12\,000$ ✓ (1)
b) $R12\,000 - R10\,000 = R2\,000$ for interest ✓ (1)
- 1.6 Either of the following (marks allocated for explanation):
• 1/20th: R500 less interest will be paid. ✓✓ (2)
• 1/30th: lower monthly payments. ✓✓ (2)
- 1.7 a) $T = 500N$ ✓✓ (2)
b) $T = 333,33N$ ✓✓ (2)

1.8



- Suitable descriptive title ✓
- Horizontal axis scale and label ✓
- Vertical axis scale and label ✓
- 1/20th factor line plotted correctly ✓ ½
- 1/30th factor line plotted correctly ✓ ½
- Legends correctly identifying the two graphs. ✓ (7)

1.9 Total repaid using 1/20th factor correctly labelled (see graph) ✓ (2)
 Total repaid using 1/30th factor correctly labelled (see graph). ✓

1.10 The loan is paid off faster using the 1/20th instalment factor. ✓ On the graph, this is shown by the steeper slope of the line. ✓ (2)
[25]

QUESTION 2

Note: Different printer settings will cause the scale diagrams to print differently. The final answer in each case should remain the same, but workings may vary. The solutions provided are intended as a guide regarding method and mark allocation.

- 2.1 North-east ✓ (1)
- 2.2 Longmarket Street is 8,8 cm long on the map. ✓
According to the scale, 3,7 cm on the map is 1 km. ✓
So Longmarket Street is $\frac{8,8}{3,7} \approx 2,4 \text{ km} = 2\,400 \text{ m}$ long. ✓
There will be $\frac{2 \times 2\,400}{20} = 240$ buildings on the two sides of the street. ✓ (4)
- 2.3 Turn right after you leave the station ✓ and then very soon turn left and go up Loop Street. ✓ After travelling a little more than 1 km, you will see St Anne's hospital on the right-hand side of the road, ✓ just before you get to Boshoff Street.
(There are other possible correct answers.) (3)
- 2.4 6 kilometres. (2)

[10]

QUESTION 3

- 3.1 A: Volume = $\pi \times 3^2 \times 25 = 707 \text{ cm}^3$ (½)
 B: Volume = $\pi \times 5^2 \times 10 = 785 \text{ cm}^3$ (½)
 C: Volume = $5^2 \times 10 = 250 \text{ cm}^3$ (½)
 D: Volume = $4^2 \times 15 = 240 \text{ cm}^3$ (½) (2)
- 3.2 $4\,000 \text{ cm}^3 \div 240 \text{ cm}^3 = 16,7$ i.e. 16 candles ✓ (1)
- 3.3 $\frac{95}{100} \times 4\,000 = 3\,800$ ✓
 $3\,800 \text{ cm}^3 \div 240 \text{ cm}^3 = 15,8$ i.e. 15 candles ✓ (2)
- 3.4 A: Surface area = $2 \times \pi \times 3^2 + 2 \times \pi \times 3 \times 25 = 528 \text{ cm}^2$ (½)
 B: Surface area = $2 \times \pi \times 5^2 + 2 \times \pi \times 5 \times 10 = 471 \text{ cm}^2$ (½)
 C: Surface area = $2 \times 5^2 + 4 \times 5 \times 10 = 250 \text{ cm}^2$ (½)
 D: Surface area = $2 \times 4^2 + 4 \times 5 \times 15 = 332 \text{ cm}^2$ (½) (2)
- 3.5 $471 \text{ cm}^2 \div 20 \text{ cm}^2 = 23,6$ ml ✓ (1)
- 3.6 No, ✓ because candle B has the largest volume but has a surface area less than that of candle A. ✓ (2)

[10]

QUESTION 4

Note: Different printer settings will cause the scale diagrams to print differently. The final answer in each case should remain the same, but workings may vary. The solutions provided are intended as a guide regarding method and mark allocation.

- 4.1 a) Radius = $1,2 \div 2 = 0,6$ m ✓ (1)
 b) From the scale, 4 cm = 1,2 m. So, 1 cm = 0,3 m. ✓
 The tank is 6 cm tall. ✓ So, its height is $0,3 \times 6 = 1,8$ m. ✓ (3)
 c) Volume = area of base \times height = $\pi r^2 \times h = \pi(0,6)^2 \times 1,8$ ✓ $\approx 2,04$ m³ ✓
 \therefore Volume = 2,04 kilolitres ✓ (3)
- 4.2 Volume of the inside of the square box is $1,2 \text{ m} \times 1,2 \text{ m} \times 1,8 \text{ m} = 2,592 \text{ m}^3$. ✓✓✓ (3)
- 4.3 There are four sides. ✓
 These are each $1,22 \text{ m} \times 1,8 \text{ m} = 2,196 \text{ m}^2$. ✓
 There is a base that is $1,24 \text{ m} \times 1,24 \text{ m} = 1,5376 \text{ m}^2$. ✓
 There is a lid that is $1,28 \text{ m} \times 1,28 \text{ m} = 1,6384 \text{ m}^2$. ✓
 Total area of all the wooden planks is $(4 \times 2,196) + 1,5376 + 1,6384 \approx 11,96 \text{ m}^2$ ✓ (5)
[15]

[TOTAL: 60 marks]

Grade 12

**MATHEMATICAL LITERACY
TEST THREE MEMO**

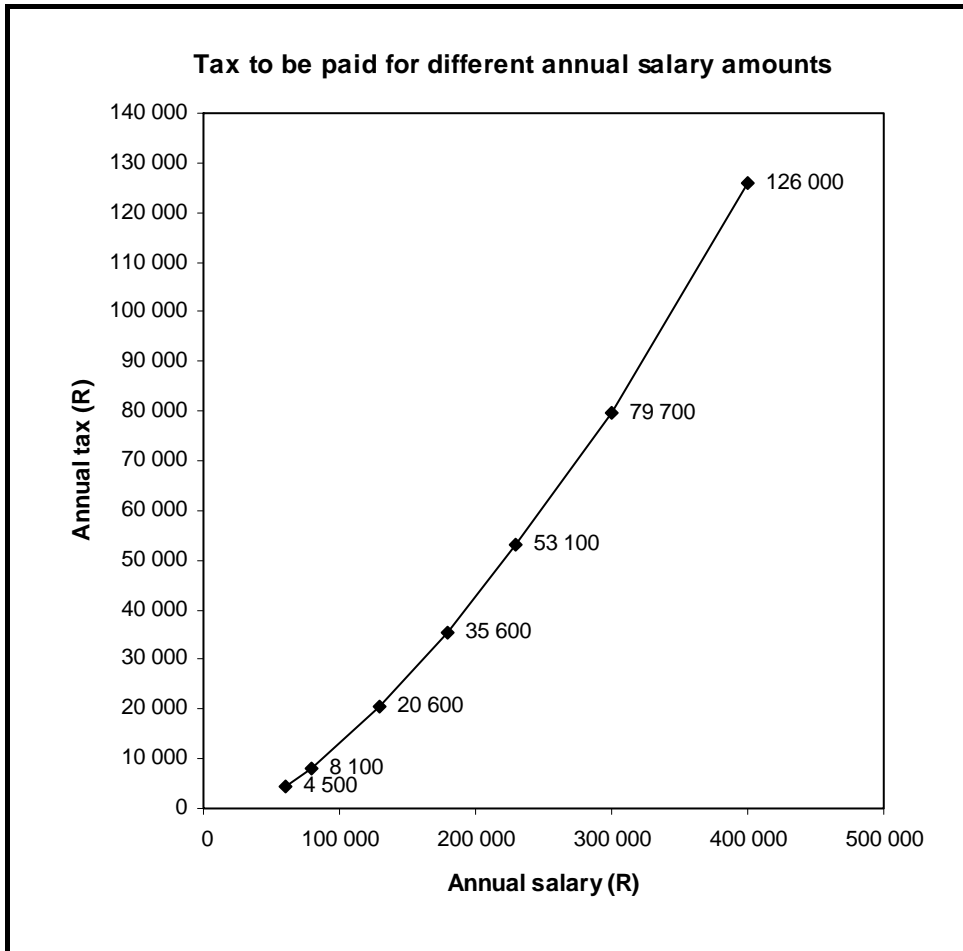
QUESTION 1

1.1 The R14 400 is the tax that is paid on the first R80 000 of the salary. ✓ This money is taxed at a rate of 18%. ✓ $18\% \text{ of } R80\,000 = R80\,000 \times 0,18 = R14\,400$ ✓ (3)

1.2	Your taxable income is:	R215 000,00	
	Tax on R180 000,00 ✓	R41 900,00 ✓	
	Plus 35% ✓ of R35 000,00 ✓ ($R215\,000,00 - R180\,000,00$)	R12 250,00 ✓	
	Total payable before the rebate	<u>R54 150,00 ✓</u>	
	Less applicable rebate (under 65 years)	R6 300,00	
	Final amount of tax to be paid	<u>R47 850,00 ✓</u>	(7)

1.3 Total tax = $R41\,400 + [0,35 \times (R215\,000 - R180\,000)] - R6\,300$ ✓✓✓ (3)

1.4



- Suitable title ✓
- Linear scale numbered correctly on horizontal axis (½)
- Linear scale numbered correctly on vertical axis (½)
- Label for horizontal axis with units ✓
- Label for vertical axis with units ✓
- Seven correct tax values for the labelled points ✓✓✓ (½)
- Seven correctly plotted points ✓✓✓ (½) (credit if incorrectly calculated values are plotted correctly)
- Straight lines joining points (not curve). ✓

(12)
[25]

QUESTION 2

Note: Different printer settings will cause the scale diagrams to print differently. The final answer in each case should remain the same, but workings may vary. The solutions provided are intended as a guide regarding method and mark allocation.

- 2.1 The front is 10 m long and the side is 9 m wide. ✓ 1 cm on the plan = 1,6 m on the ground. So, the height (which is 1,6 cm on the plan) is $(1,6 \times 1,6) \text{ m} = 2,56 \text{ m}$. ✓
 Area = $(10 + 9 + 10 + 9) \times 2,56 \approx 97 \text{ m}^2$ ✓✓
 We have not included the two triangular pieces at the top of the side walls. However, we have included the area of the doors and windows because these two areas are probably similar. ✓✓ (6)
 (There are other ways to approximate the area. Learners could calculate the area more exactly by adding the area of the two triangles and subtracting the area of the doors and windows.)
- 2.2 There are 97 m^2 of interior wall and then we must add the area of the inner walls. ✓
 There is an inner wall of length 10 m and height 2,56 m, so its area will be:
 • $2,56 \times 10 = 15,6 \text{ m}^2$ ✓
 There is an inner wall of length 9 m and height 2,56 m, so its area will be:
 • $9 \times 2,56 \approx 23 \text{ m}^2$ ✓
 There is an additional inner wall that has length 1,6 cm on the diagram, so it is 2,56 m on the ground. Its area will be:
 • $2,56 \times 2,56 \approx 6,6 \text{ m}^2$ ✓
 We then need to subtract the area of the doors and windows.
 • The height of a door is $1,3 \text{ cm} \times 1,6 = 2,08 \text{ m}$.
 • The width of a door is $0,7 \text{ cm} \times 1,6 = 1,12 \text{ m}$.
 • So, the area of a door is $1,12 \times 2,08 \approx 2,3 \text{ m}^2$.
 • The width of a front window is $1,2 \text{ cm} \times 1,6 = 1,92 \text{ m}$.
 • The height of a front window is $0,9 \text{ cm} \times 1,6 = 1,44 \text{ m}$.
 • The area of a front window is $1,44 \times 1,92 \approx 2,8 \text{ m}^2$. ✓
 • The area of a large back window is $(0,6 \times 1,6) \times (0,9 \times 1,6) \approx 1,4 \text{ m}^2$.
 • The area of a small back window is $(0,5 \times 1,6) \times (0,4 \times 1,6) \approx 0,5 \text{ m}^2$. ✓
 So the area of the inside walls is:
 $97 + 15,6 + 23 + 6,6 - 5(2,3) - 2(2,8) - 2(1,4) - 0,5 = 121,8 \text{ m}^2$ ✓✓ (8)

- 2.3 a) The interior paint is clearly cheaper than the exterior paint, so he should use the interior paint for the inside walls. ✓

Amount of paint he needs for the interior is $\frac{121,8}{6} \approx 20,3$ litres. ✓

Cost per litre of the interior paint:

2 litres: $35 \div 2 = R17,50$ per litre

5 litres: $59,20 \div 5 = R11,84$ per litre

10 litres: $74 \div 10 = R7,40$ per litre ✓✓

The cheapest interior paint is the one that comes in the 10-litre tin.

He should get two 10-litre tins of paint and one 2-litre tin. This would cost him $R74 + R74 + R35 = R183$. ✓

(5)

- b) Amount of paint needed for the exterior is $\frac{97}{6} \approx 16,2$ litres. ✓

Cost per litre of the exterior paint:

2 litres: $38 \div 2 = R19$ per litre

5 litres: $86 \div 5 = R17,20$ per litre

10 litres: $175 \div 10 = R17,50$ per litre ✓✓

So, the cheapest exterior paint is the one that comes in the 5-litre tin.

He could use three 5-litre tins and one 2-litre tin, which would cost him $3 \times R86 + R38 = R296$. ✓✓✓

(6)

[25]

QUESTION 3

$$3.1 \quad \text{Volume of the cone} = \frac{\pi r^2 h}{3} = \frac{\pi \times 2,5^2 \times 11}{3} \checkmark \approx 72 \text{ cm}^3 \checkmark \quad (2)$$

$$3.2 \quad \text{Volume of the ice-cream} = \frac{1}{2} \times \frac{4}{3} \times \pi \times r^3 \checkmark = \frac{1}{2} \times \frac{4}{3} \times \pi \times 2,5^3 \approx 33 \text{ cm}^3 \checkmark \quad (2)$$

$$3.3 \quad \begin{aligned} \text{Amount of jelly} &= 72 \times 35 = 2\,520 \text{ cm}^3 \checkmark \\ \text{Amount of ice-cream} &= 33 \times 35 = 1\,155 \text{ cm}^3 \checkmark \end{aligned} \quad (2)$$

$$3.4 \quad \begin{aligned} 1 \text{ litre} &= 1 \text{ decimetre cubed} = (10)^3 \text{ centimetres cubed} \\ 1 \text{ litre} &= 1\,000 \text{ cm}^3 \checkmark \\ 1\,155 \text{ cm}^3 &= \frac{1\,155}{1\,000} = 1,155 \text{ litres of ice-cream} \checkmark \\ 2\,520 \text{ cm}^3 &= \frac{2\,520}{1\,000} = 2,520 \text{ litres of jelly} \checkmark \end{aligned} \quad (3)$$

$$3.5 \quad \text{Two containers of ice-cream} \checkmark \quad (1)$$

[10]

[TOTAL: 60 marks]

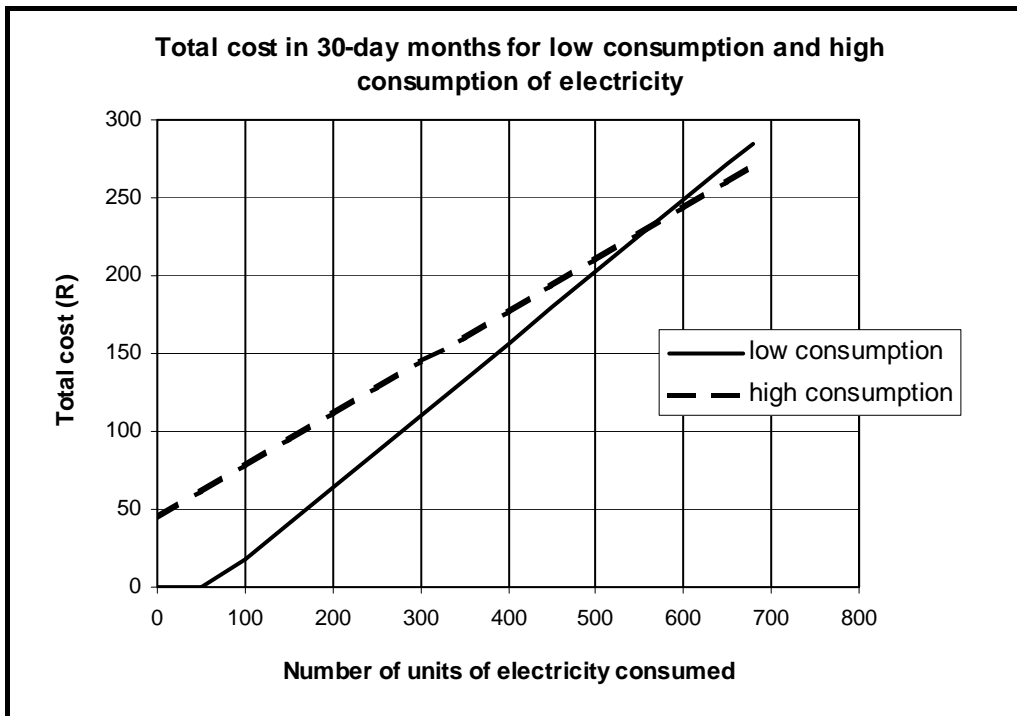
Grade 12

MATHEMATICAL LITERACY
TEST FOUR MEMO

QUESTION 1

- 1.1 a) Low consumption: $P = (N - 60) \checkmark \checkmark \times 0,4599 \checkmark$
 b) High consumption: $P = (30 \times 1,48) \checkmark \checkmark + (N \times 0,33277) \checkmark$ (6)

1.2



- Title suitable ✓
 - Vertical axis scale and label ✓
 - Horizontal axis scale and label ✓
 - Low consumption graph ✓✓
 - High consumption graph. ✓✓
- (7)

1.3 About 570 units ✓ (or where the two graphs cross). (1)

1.4 Solve: $(N - 60) \times 0,4599 = (30 \times 1,48) + (N \times 0,33277) \checkmark$
 $\therefore 0,4599N - (60 \times 0,4599) = 44,4 + 0,33277N$
 $\therefore 0,4599N - 27,594 = 44,4 + 0,33277N$
 $\therefore 0,4599N - 0,33277N = 44,4 + 27,594 \checkmark \checkmark$
 $\therefore 0,12713N = 71,994$
 $\therefore N = \frac{71,994}{0,12713} \checkmark \approx 566,3 \text{ units} \checkmark$ (5)

1.5 You are a high consumer if you use more than 566,3 units in a 30-day month. ✓ (1)

1.6 A: Bought 14 Oct, lasted until 8 Nov
 \therefore Total number of days = $(31 - 14) + 8 = 25 \checkmark$

B: Bought 20 Sep, lasted until 14 Oct
 \therefore Total number of days = $(30 - 20) + 14 = 24 \checkmark$ (2)

- 1.7 It is not known because it is not shown on which date the units bought on 5 Jan were used up. ✓ (1)
- 1.8 She is a high consumer ✓ because she uses more than 566 units per month. She buys electricity once every month and it is always more than 566 units. ✓ (2)
[25]

QUESTION 2

Note: Different printer settings will cause the scale diagrams to print differently. The final answer in each case should remain the same, but workings may vary. The solutions provided are intended as a guide regarding method and mark allocation.

- 2.1 Block C2 ✓ (1)
- 2.2 a) North-west (½)
b) South/South east (½) (1)
- 2.3 From the scale bar, 4 cm on the map represents 500 m. So, 1 cm = 125 m. ✓
The distance from the main office to Inkonka Camp along the road is ± 33 cm on the map. ✓
So, the distance is approximately: $33 \times 125 \text{ m} = 4\,125 \text{ m} = 4,125 \text{ km}$. ✓ (3)
- 2.4 Each block has an area of $3 \text{ cm} \times 3 \text{ cm}$ on the map. ✓
This is $(3 \times 125) \text{ m} \times (3 \times 125) \text{ m} \approx 140\,625 \text{ m}^2$ on the ground. ✓ (3)
- 2.5 There are approximately 11 squares. ✓ (1)
- 2.6 The 11 squares represent an area of $(11 \times 140\,625) \text{ m}^2 \approx 1\,546\,875 \text{ m}^2$. ✓ (1)
[10]

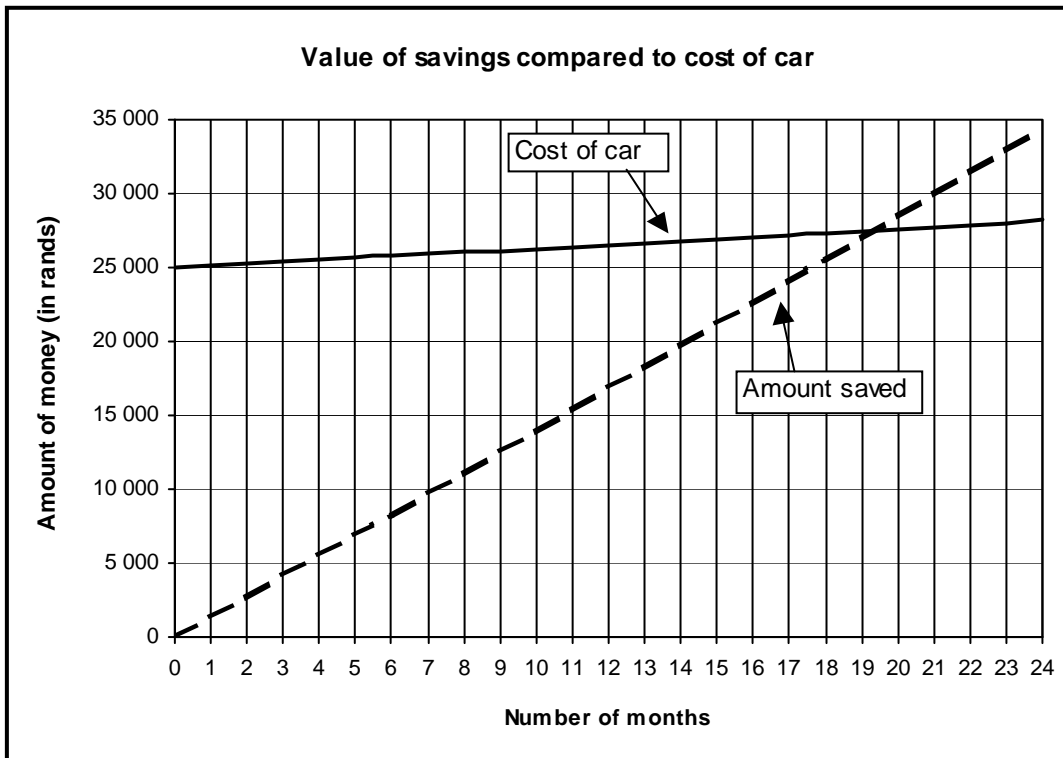
QUESTION 3

- 3.1 $0,5\% \text{ of R}25\,000 = 0,005 \times \text{R}25\,000 \checkmark = \text{R}125 \checkmark$ (2)
- 3.2 The monthly repayment would be $\text{R}1\,236 + \text{R}125 + \text{R}9,50 = \text{R}1\,370,50$. ✓
So, the total repaid would be $\text{R}1\,370,50 \times 24 = \text{R}32\,892$. ✓ (2)
- 3.3 The monthly repayment would be $\text{R}621 + \text{R}125 + \text{R}9,50 = \text{R}755,50$. ✓
So, the total repaid would be $\text{R}755,50 \times 60 = \text{R}45\,330$. ✓ (2)
- 3.4 Firstly, if you take the loan over 60 months you pay the insurance premium and administration fee for longer. These total R134,50 for 60 months rather than for just 24 months. ✓
Secondly, if you take the loan over 60 months you borrow money for a longer period of time. This means you will pay more interest. ✓ (Plus ✓ for explaining ideas clearly.) (3)
- 3.5
$$F = \frac{1\,370,50[(1 + \frac{0,05}{12})^{24} - 1]}{\frac{0,05}{12}} = \text{R}34\,517,30 \checkmark\checkmark\checkmark\checkmark$$
 (4)

3.6

Months	Price of car	Money saved
	$25\,000(1 + 0,005)^n$	$F = \frac{1370,50[(1 + \frac{0,05}{12})^n - 1]}{\frac{0,05}{12}}$
0	R25 000,00	R0
5	R25 631,28	R6 909,84
10	R26 278,50	R13 964,84
15	R26 942,07	R21 168,06
20	R27 622,39	R28 522,59
24	R28 178,99	R34 517,30

Five marks for completing the table. Note that the learner need not use these points but may use six-month periods, etc. The marks are for using at least four points ✓ using the two correct formulae ✓✓ and correct calculations. ✓✓



- Marks allocated for axes and graphs labelled correctly ✓✓
- Plotted points correctly and curve joining them ✓✓
- From the graph, it can be seen that he will take just over 19 months to save enough money to buy the car. ✓

(10)

3.7

From the table, we can see that the price of the car after 24 months would be R28 179,99 and you could afford it then, so you would save about $R34\,517,30 - 28\,178,99 = R6\,338,31$. ✓

(2)
[25]

[TOTAL: 60 marks]

Platinum Mathematical Literacy Grade 12
Control Test Book

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