



Basic Education

KwaZulu-Natal Department of Basic Education
REPUBLIC OF SOUTH AFRICA

MATHEMATICAL LITERACY P2

COMMON TEST

JUNE 2018

**NATIONAL
SENIOR CERTIFICATE**

GRADE 12

MARKS: 100

TIME: 2 hours

This question paper consists of 10 pages, 2 Answer Sheets and an Addendum with 5 Annexures (6 pages).

INSTRUCTIONS AND INFORMATION

1. This question paper consists of **FOUR** questions. Answer **ALL** the questions.
2.
 - 2.1 Use the ANNEXURES in the ADDENDUM to answer the following questions.
 - ANNEXURE A for QUESTION 1.1
 - ANNEXURE B for QUESTION 1.2
 - ANNEXURE C for QUESTION 2.1
 - ANNEXURE D for QUESTION 3.3
 - ANNEXURE E for QUESTION 4.2
 - 2.2 Answer QUESTION 2.1.3 on ANSWER SHEET 1 and 2.2.3 on ANSWER SHEET 2, write your surname and name in the spaces on the ANSWER SHEET and hand in the ANSWER SHEETS with your ANSWER BOOK.
3. Number the answers correctly according to the numbering system used in this question paper.
4. Start EACH question on a NEW page.
5. You may use an approved calculator (non-programmable and non-graphical), unless stated otherwise.
6. Show ALL calculations clearly.
7. Round off ALL final answers appropriately according to the given context, unless stated otherwise.
8. Indicate units of measurement, where applicable.
9. Write neatly and legibly.

QUESTION 1

1.1

John bought a site in 2009 to build his new home in Vooslorus (Gauteng).

Refer to the top view of John's house plan in ANNEXURE A and answer the following questions.

1.1.1 Mention the name of room that gets the sun light in the afternoon. (2)

1.1.2 Write the ratio of the width of the interior trench to the exterior trench in the simplest form. (2)

1.1.3 If the depth of the trench is 600 mm, determine the volume of concrete in m^3 needed for bedroom 3.

You may use this formula:

Volume of rectangular prism = Length \times Breadth \times Depth (4)

1.1.4 To prevent water from affecting the walls of this house, a concrete apron must be laid around the house. It must be 1000 mm wide. The total area covered by apron is 38.07m^2

(a) The bricklayer was unable to calculate the area of apron of the northern wall labelled (A2, C2 and C3). Show that the area in this wall is $10,9\text{m}^2$.

You may use this formula:

Area of rectangle = Length \times Breadth (3)

(b) The bricklayer charged R2 264,09 for laying the concrete apron. Show that the bricklayer charges R59 per m^2 . (3)

1.2

John borrowed a sum of R100 000 to complete his house. He received the schedule showing how the loan decreases after each payment. This is called amortization schedule.

Study the extract from his loan amortization schedule in ANNEXURE B and answer the questions that follow.

- 1.2.1 Express the interest charged as a percentage of the first payment. (2)
- 1.2.2 Provide a possible reason why the interest decreases every month. (2)
- 1.2.3 The loan information in the schedule shows that Peter was supposed to pay an interest rate of 7%, compounding monthly. Show that the interest of R571.09 (in the 6th month) was correctly calculated. (4)
- 1.2.4 John was advised to make additional payments where possible to reduce the interests paid. Compare the difference of interests paid on the second and the third month with the 4th and the 5th month where an additional R500 was paid. (5)

[27]

QUESTION 2

2.1

In July 2017 Statistics South Africa published a mid-year population statistics of South Africa. ANNEXURE C shows tables about population statistics (Table 1) and the ten leading causes of death in South Africa (Table 2).

Study Table 1 in ANNEXURE C and answer the following questions.

- 2.1.1 The mean of the number of deaths in 2015 was 21 593. Use the mean of 2015 deaths to determine the value of A. (4)
- 2.1.2 Comment about the trend shown by HIV deaths during these years. (2)
- 2.1.3 Use ANSWER SHEET 1 to draw a histogram to compare the percentage of deaths caused by Tuberculosis (TB), Diabetes mellitus (DM) and other forms of heart disease (OFH). (6)

2.2

The government is encouraging people to eat more vegetables to stay healthy. Mr Mdletshe a part time farmer of vegetable products in Port Shepstone has also decided to increase his production. However, his farming field is rectangular in shape and is limited to 24 hectares (ha).

TABLE 3: Distribution ratio of production area.

Production area of Cabbage (in ha)	2	4	6	8	A
Production area of Butter nuts (in ha)	12	6	4	3	1.846

- 2.2.1 Determine the formula used to calculate the production area for cabbages or butter nuts. (2)
- 2.2.2 Use the formula suggested in 2.2.1 to calculate the value of A. Show your workings. (2)
- 2.2.3 Use ANSWER SHEET 2 and Table 3 to draw a fully labelled graph showing the relationship between production area of cabbages and butter nuts. (5)
- 2.2.4 The new fence must be erected around the whole production area which is 24 hectares (ha). Show that the minimum perimeter of the fence needed for this farm can be 20 000 m long.

NOTE: $1\text{km}^2 = 100$ hectares
 $1\text{km} = 1000\text{m}$

You may use this formula:

Perimeter of a Rectangle = 2 Length + 2 Breadth (5)

[26]

QUESTION 3

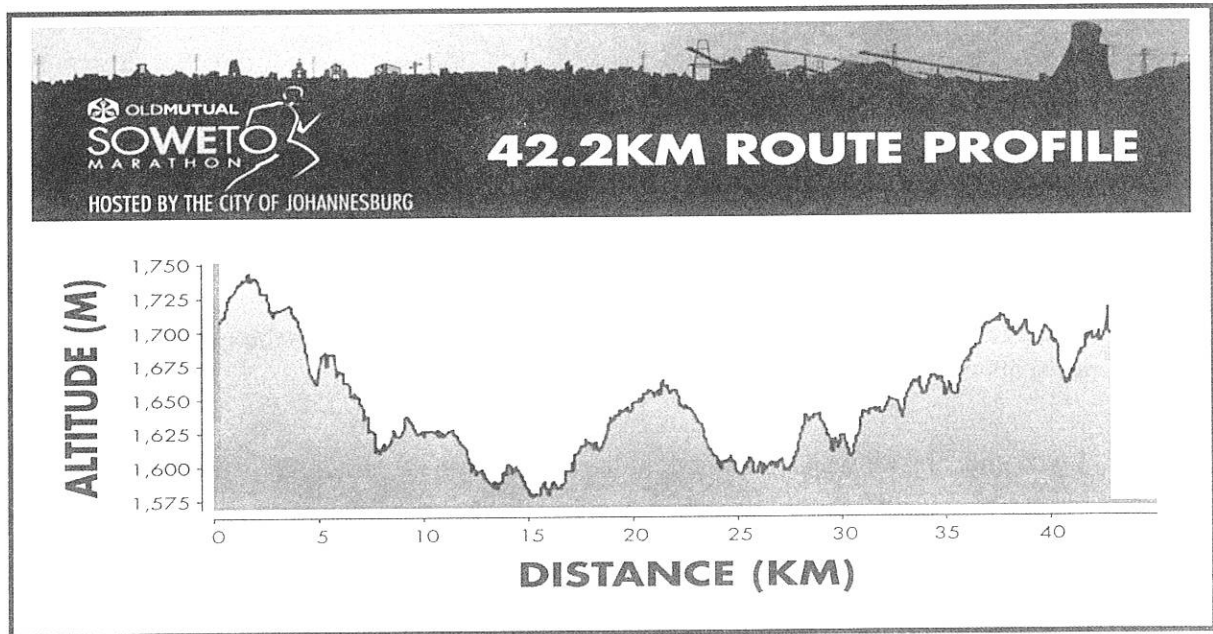
3.1

Darren Ganga is a marathon runner. His doctor has advised him against running all marathons in 2018. Therefore he has to choose between Two Oceans (56km) and Comrades Marathon (89km). He compared the following figures of prizes to be won by the top ten finishers of these two marathons.

Statistical Measure	TWO OCEANS	COMRADES MARATHON
Mean	R 56 400	R 108 000
Median	R 20 000	R 50 500
Maximum Value	R 250 000	R 425 000
Lower Quartile (Q_1)	R 65 000	R 16 000
Upper Quartile (Q_3)	R 13 000	R 28 000

- 3.1.1 Calculate the difference in prizes won by the first athlete per km in these two marathons. (5)
- 3.1.2 Determine how many prizes are between Q_1 and Q_3 in the top 10. Show all your calculations. (3)
- 3.1.3 The Comrades Marathon got new sponsors to give prize money to position 11 up to 15. Provide any statistical measure that will change due to this addition. Justify your answer. (3)

- 3.2 The following is the elevation profile of Soweto Marathon which was run by Darren in order to qualify for Comrades Marathon.



- 3.2.1 Determine the minimum number of down hills after the 35th km. (2)
- 3.2.2 Looking at the elevation profile, Darren concluded that there is only one most level section of the route. After how many kilometres from the start is the most level section of this route and how long is this section. (3)
- 3.2.3 Determine the scale factor of this elevation map.

Note: The actual distance of the scale should be rounded off to the nearest 10 units. (2)

3.3

A fundraising dinner for Soweto Marathon was hosted in the conference centre. Study ANNEXURE D and answer the questions that follow.

HINT:

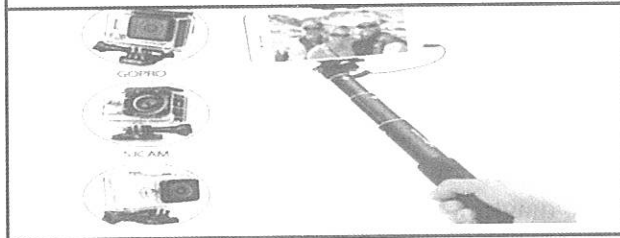
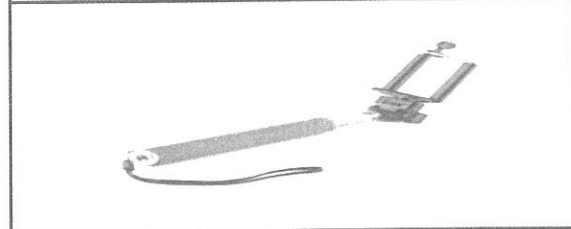
- Round Tables labels start with **R** e.g. **R3** and Rectangular tables start **Q** e.g. **Q1**.
- All labels of tables from entrance 1 or left of the buffet table have odd numbers whereas those on the right of the buffet table have even numbers.

- 3.3.1 The average entry ticket was sold at R450 per seat. Determine the income if all seats were sold. (3)
- 3.3.2 Joyce and Thandi want to book a table closer to the DJ table. Give the label of the table if they were given a table south of the DJ's table. (2)
- 3.3.3 Pat was seated at Q3 facing entrance 2. He decided to change his seat so that he faces the DJ. He exited the hall and entered from entrance 1 and passed 2 tables along the wall. Give the label of the new table and the relative direction from the male toilets he ended up sitting. (3)
- 3.3.4 During the function the DJ randomly chose 4 spectators from the round tables to dance with him on the stage. Determine the probability that the chosen spectators were not seated in the 4 tables closer to DJ's. (2)
- [28]

QUESTION 4

4.1

The increase of VAT from 14% to 15% affected many businesses. Mr Mokoena who sells cell phone accessories, for instance, selfie sticks at Comrade Marathon Exhibition centre is one of the businesses people who were hard hit by this increase.

TYPE A Selfie Stick**Wholesale Price R150.95 VAT inclusive****TYPE B Selfie Stick****Wholesale Price R129.95 VAT**

Mr Mokoena bought from the wholesaler 120 type A and 150 type B selfie sticks to sell during 2018 Comrades Marathon. In 2017 he sold the same quantity and got a profit of R8 250.

4.1.1 Determine the selling price of Type A (rounded to the nearest R5,00) if a mark-up of 18,5% was added to wholesale price. (3)

4.1.2 Mr Mokoena sold the same quantity as in 2017 and complained that his profit of 2018 was R1 006,50 less than the profit of 2017. Verify the correctness of Mr Mokoena's complain by calculating the total profit made in 2018. Show all your calculations.

You may use this formula:

$$\text{Profit} = \text{Income} - \text{Expenditure} \quad (6)$$

4.1.3 Calculate the VAT paid by Mr Mokoena to SARS for selling all selfie sticks in 2017.

NB: VAT was 14% in 2017 (3)

4.2

Sylvia, Mr Mokoena's daughter is an intern clerk at Government mortuary in Durban. She drew the following tree diagram to predict the number of deceased people registered whose cause of death was natural. Her aim was to check the reliability of Statistics SA's report.

Study the tree diagram in **ANNEXURE E** and answer the following questions.

4.2.1 Complete the value of 4.2.1 (a) and 4.2.1 (b). (4)

4.2.2 Sylvia concluded that it is most likely to register a person died through "Other illnesses" than TB or HIV. Is Sylvia's conclusion correct? Justify your answer by referring to the tree diagram. (3)
[19]

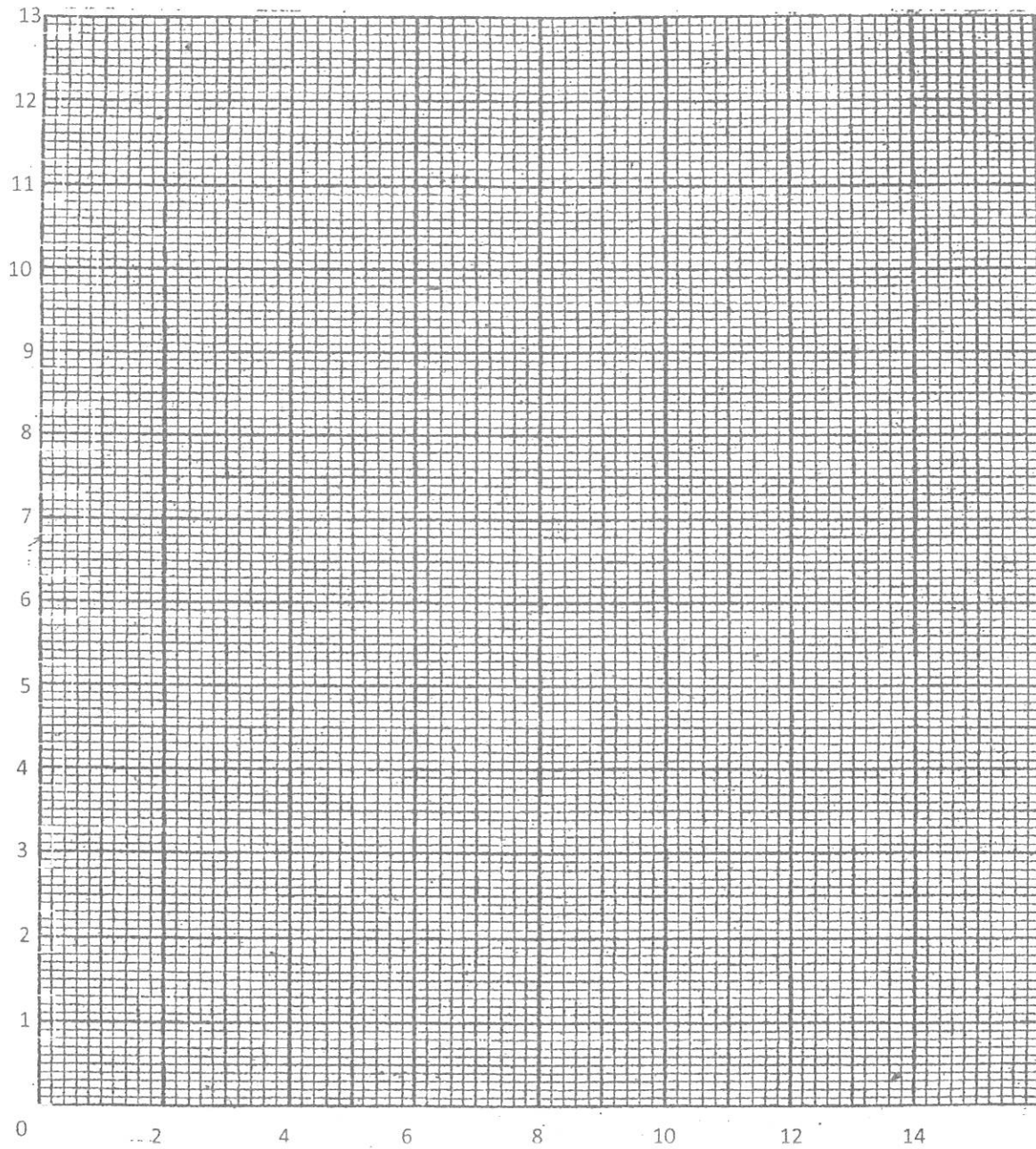
TOTAL: 100

ANSWER SHEET 2

QUESTION 2.2.3

NAME: _____

CLASS: _____





Education

KwaZulu-Natal Department of Education
REPUBLIC OF SOUTH AFRICA

MATHEMATICAL LITERACY P2

COMMON TEST

ADDENDUM

JUNE 2018

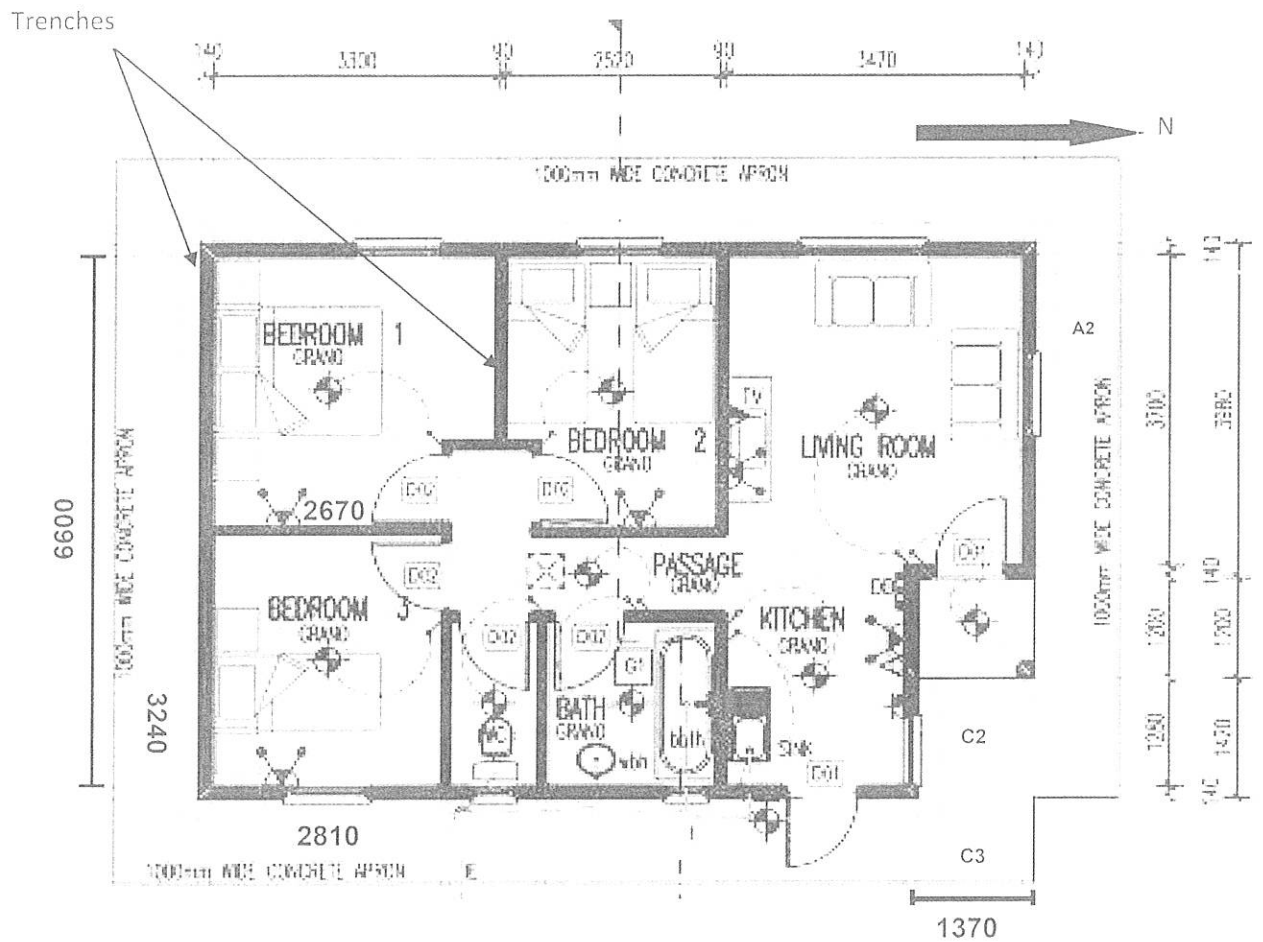
**NATIONAL
SENIOR CERTIFICATE**

GRADE 12

This Addendum consists of 6 pages with 5 Annexures.

ANNEXURE A

QUESTION 1.1



ANNEXURE B**QUESTION 1.2**

Loan Amortization Schedule			
Loan Information		Summary	
Loan Amount (R)	100 000	Rate (per period)	0,583%
Annual Interest Rate	7,00%	Number of payments	172
Term of Loan in Years	15	Total Payments(R)	157 184,43
First Payment Date	01/01/2009	Total interest(R)	57 184,43
Payment Frequency	Monthly	Est. Interest Savings(R)	4 604,66
Compound Period	Monthly		

Monthly Payment R898,83

NO	Due Date	Payment (R)	Additional Payment (R)	Interest (R)	Principal	Balance (R)
						100 000,00
1.	01/01/2009	898,83		583,33	334,68	99 684,50
2.	02/01/2009	898,83		581,43	317,34	99 367,16
3.	03/01/2009	898,83		579,84	319,19	99 047,97
4.	04/01/2009	898,83	500,00	577,78	821,05	98 226,92
5.	05/01/2009	898,83		572,99	325,84	97 901,08
6.	06/01/2009	898,83		571,09	327,74	97 573,34
7.	07/01/2009	898,83	200,00	569,18	529,85	97 043,63
8.	08/01/2009	898,83		566,09	332,74	96 710,95
9.	09/01/2009	898,83		564,15	334,68	96 376,27
10.	10/01/2009	898,83	200,00	562,19	536,64	95 839,63
11.	11/01/2009	898,83		559,06	339,77	95 499,86
12.	12/01/2009	898,83		557,08	341,75	95 158,11
13.	01/01/2010	898,83		555,09	343,74	94 814,37
14.	02/01/2010	898,83		553,08	345,75	94 468,62
15.	03/01/2010	898,83		551,07	347,76	94 120,86
16.	04/01/2010	898,83	2000,00	549,04	2 349,79	91 771,07
17.	05/01/2010	898,83		535,33	363,50	91 407,57
18.	06/01/2010	898,83		533,08	365,62	91 041,95
19.	07/01/2010	898,83		531,08	367,75	90 674,20
20.	08/01/2010	898,83		528,93	369,90	90 304,30
21.	09/01/2010	898,83		526,78	372,05	89 932,25

ANNEXURE C

QUESTION 2.1

TABLE 1:

Mid-year population estimates for South Africa by population group and sex, 2017

Population group	Male		Female		Total	
	Number	% distribution of males	Number	% distribution of females	Number	% distribution of total
Black African	22 311 400	80,8	23 345 000	80,8	45 656 400	80,8
Coloured	2 403 400	8,7	2 559 500	8,9	4 962 900	8,8
Indian/Asian	719 300	2,6	689 800	2,4	1 409 100	2,5
White	2 186 500	7,9	2 307 100	8,0	4 493 500	8,0
Total	27 620 600	100,0	28 901 400	100,0	56 521 900	100,0

TABLE 2:

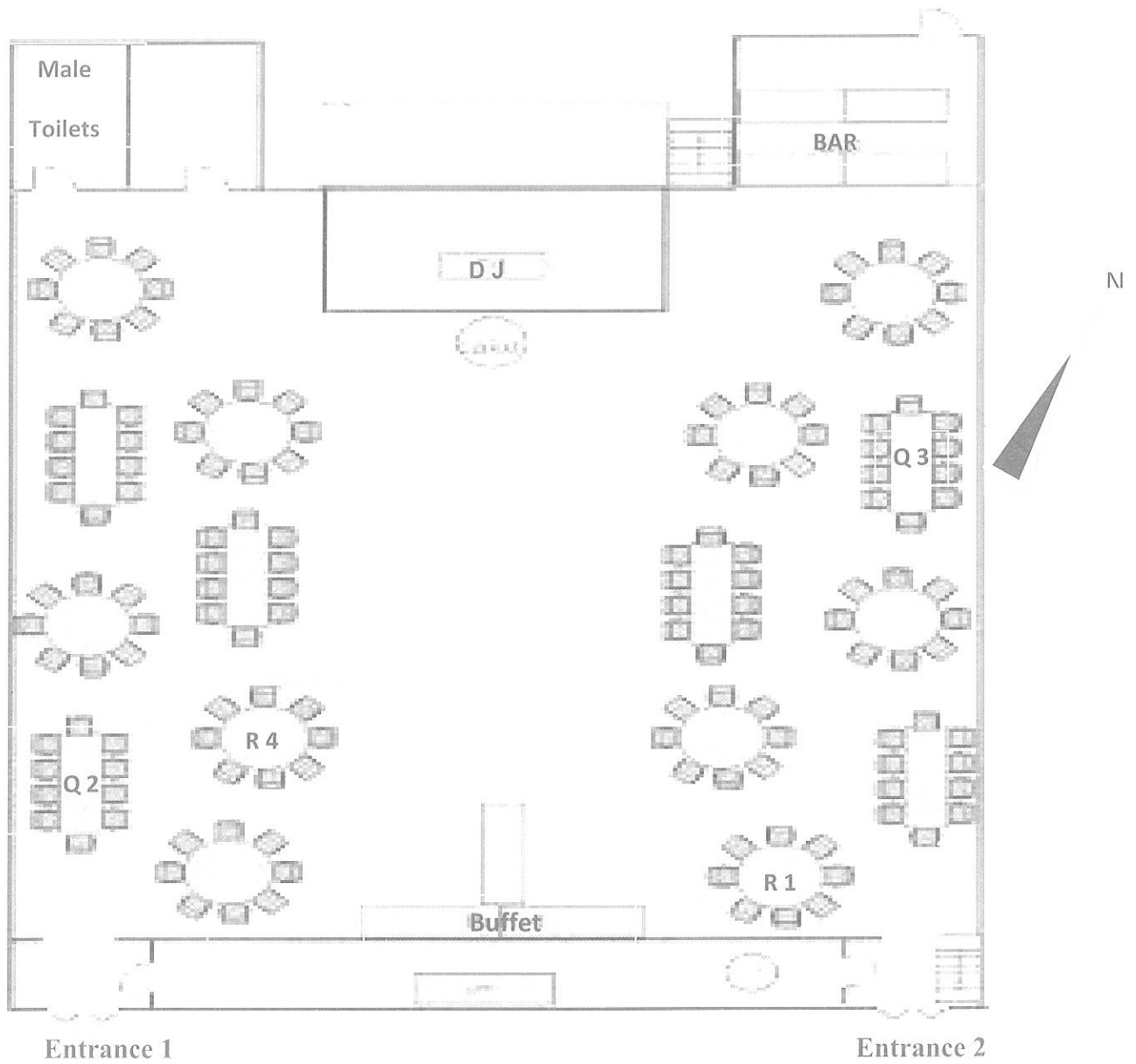
The ten leading underlying causes natural of deaths, 2014 to 2016

Causes of Death (based on ICD- 10)	2014			2015			2016		
	Rank	Number	%	Rank	Number	%	Rank	Number	%
Tuberculosis (A 15 – A 19)	1	30 495	8.3	1	33 063	6.3	3	29 513	6.5
Ill-defined and unknown causes of mortality (R 95 – R 99)							1	34 096	7.5
Diabetes mellitus (A10 – A 14)	3	23 966	5.0	2	25 070	5.4	4	25 255	5.5
Other forms of heart disease (E10 – R14)	4	22 928	4.8	4	22 215	4.8	5	23 515	5.2
Cerebrovascular diseases (I 60 –I 69)	2	24 131	5.1	3	A	5.0	6	23 137	5.1
Human immunodeficiency virus disease	6	22 729	4.6	5	21 926	4.8	7	21 830	4.8
Hypertensive diseases (J10 – J15)	7	18 719	3.9	6	20 570	4.6	8	19 960	4.4
Influenza and pneumonia (J09 J19)	5	18 319	3.9	7	19 443	4.2	9	19 638	4.3
Other viral diseases (J40 – J47)	9	14 508	3.1	8	16 907	3.5	10	16 577	3.6
Chronic lower respiratory disease (J40)	10	12 384	2.6	10	12 260	2.7	2	12 659	2.8

Adapted: www.statsa.gov.za

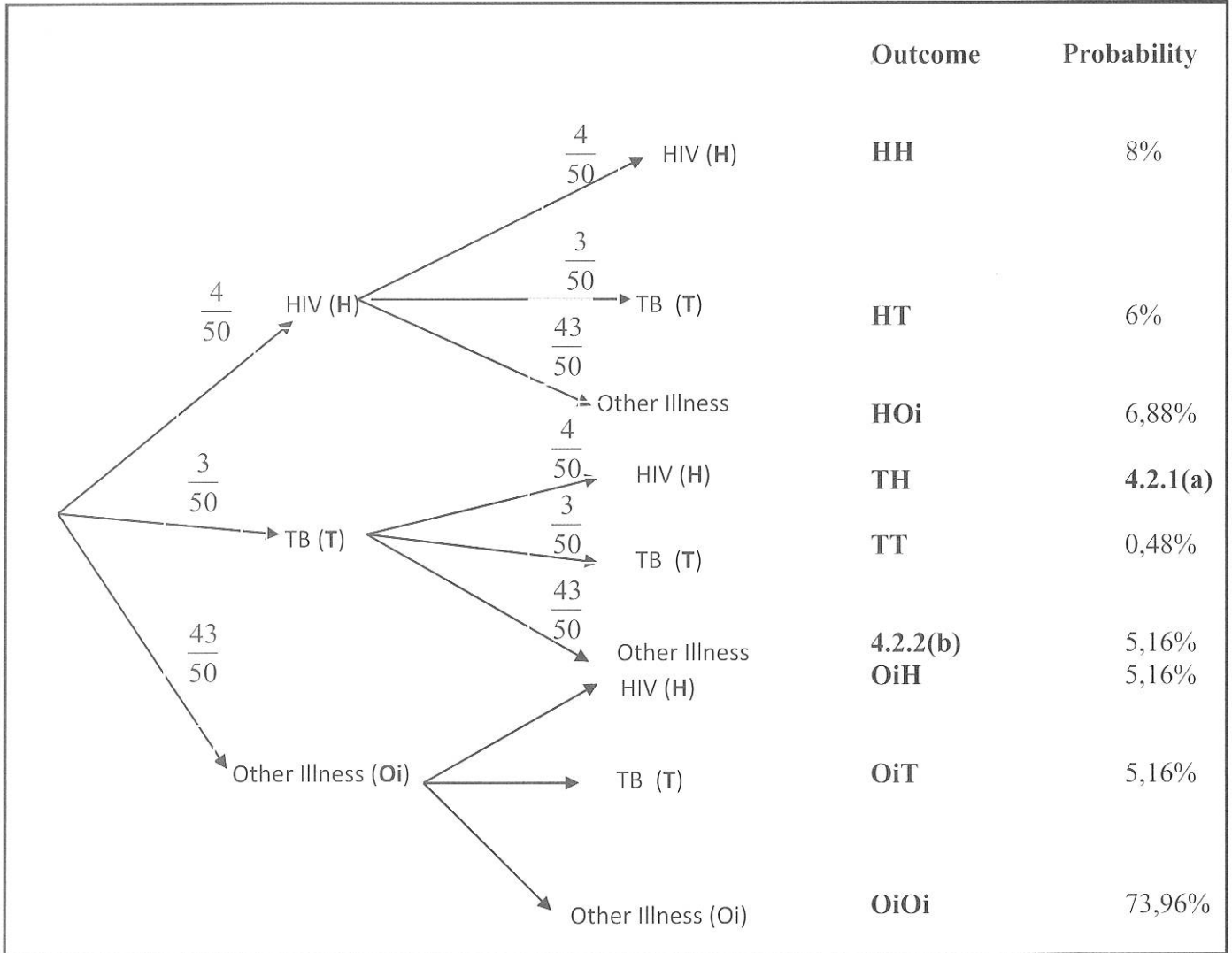
ANNEXURE D

QUESTION 3.3



ANNEXURE E

QUESTION 4.2



1.2.1	Interest % = $\frac{R583,33}{898,83} \times 100\% \checkmark M$ = 64,89% ✓ A	1MA Concept of % 1A Percentage (2) 2E Explanation (2)	F L2
1.2.2	It is because the loan balance is decreasing ✓✓E OR It is because the interest is compounding monthly		F L4
1.2.3	Interest = $\frac{7\%}{12} \times R97\,901,08 \checkmark MA$ = 571,089 ✓ S = 571,09 ∴ It was correctly calculated ✓ C	1MA Dividing 7% by 12 1M Multiplying by R97 901,08 1S Simplification 1C Conclusion (4)	F L4
1.2.4	Difference (2 nd and 3 rd month) = R581,43 – R579,84 ✓ MA = R1,59 ✓ S Difference (4 th and 5 th month) = R577,78 – R572,99 = R4,79 ✓ CA There is a big drop in interest from the 4 th month to the 5 th than from 2 nd to the 3 rd month. ✓ ✓ C	1MA Subtracting 3 rd from 2 nd month 1S Simplification 1CA Difference of 5 th and 6 th Month 2C Conclusion (5)	F L4
			[27]

QUESTION 2 [26 MARKS]			
2.1.1	Mean = $\frac{\text{Sum of values}}{\text{number of values}}$ ✓ M $21\,593 = \frac{173\,763 + A}{9}$ ✓ MA $21\,593 \times 9 = 173\,763 + A$ ✓ M $A = 194\,337 - 173\,763$ $A = 20574$ ✓ A	1M Concept of the mean IMA Dividing sum of values and A by 9 1M Making A subject of the formula 1A Value of A (4) 2O Opinion (2)	DH L2
2.1.3	The number of deaths related to HIV is stable in 2015 and 2016 because it is 4,8% in both years. ✓ ✓ O OR The ranking fluctuates from between position 5 and 7 OR HIV related deaths are decreasing from 22 729 to 21830		DH L4

2.1.4	<p>Deaths Related to TB, Diabetes and Other heart diseases</p> <p>1A Histogram 1A Key/ Legend 1A Any 2 correct bar for Tuberculosis 1A Any 2 correct bar for Diabetes Mellitus 1A Any 2 correct bar for Other forms of heart diseases 1CA correct intervals of percentage axis</p>	<p>M L2</p> <p>2.2.1 Production area (Butter nuts) = $\frac{24 \checkmark F}{\text{Production area (ha) of cabbages}}$</p> <p>1F Numerator is 24 1F Dividing by Hectares</p> <p>OR</p> <p>1F Numerator is 24 1F Dividing by Hectares</p> <p>2.2.2 Production area (Cabbages) = $\frac{24 \checkmark F}{1.846}$</p> <p>1SF Correct Substitution CA Hectares (2)</p>
-------	---	---

2.2.3	<p>Production Area of Butter nuts (in Ha)</p> <p>1CA Smooth curve 1A Labeling the graph 1A Starting point (2 ; 12) 1A Plotting (8 ; 3) 1A Labeling the axis</p>	<p>M L3</p> <p>2.2.4 Production area (km²) 24 ha = km² 100 ha = 1km² $= \frac{24}{100} \checkmark C$ $= 0,24 \text{ km}^2$</p> <p>∴ Perimeter (m) $= 2 \cdot (600\text{m} + 2 \cdot (400\text{m}))$ $= 1\,200\text{m} + 800\text{m} \checkmark S$ $= 20\,000 \text{ m}$ Yes, perimeter needed is 20 000m $\checkmark C$</p> <p>1C Converting hectares to km 1C Converting km to m 1SF Correct substitution 1S Simplification 1C Conclusion (5)</p>
-------	--	---

QUESTION 3 [28 MARKS]		Explanation	T&L
Ques	Solution		
3.1.1	Prize money (Two Oceans) = $\frac{R250\,000}{56} \checkmark$ MA = R4 464,29 \checkmark CA	IMA Dividing R250 000 by 56 ICA Prize per km	DH L3
	Prize money (Comrades Marathon) = $\frac{R425\,000}{89} \checkmark$ MA = R4 775,28 \checkmark CA Difference = R4 777,28 – R4 464,69 = R310,99 \checkmark CA	IMA Dividing R425 000 by 89 ICA Prize per km ICA Difference (5)	
3.1.2	Prizes between (Q ₁ and Q ₂) = $\frac{\checkmark}{50} \times 10$ = 5 prizes \checkmark CA	IMA Concept of quartiles IM Multiplying 50% by 10 ICA Prizes (3)	DH L2
3.1.3	\checkmark A Mean, because the number of values and the sum of values will change \checkmark A Median, the middle value will now be in position 7 & 8 not position 5 & 6 \checkmark A Lower quartile and Upper quartile because the Q ₁ will be the 4 th value and Q ₂ be the 12 th value.	IA Mean 2J Justification IA Median 2J Justification 2A Number of downhill (2)	DH L4
3.2.1	4 \checkmark A		MP L2
3.2.2	\checkmark A 9 km, it is approximately 2 km long	IA km 2A Length (3)	MP L4
3.2.3	116mm : 42.2km 116mm : 42 200mm \checkmark A 1 : 360	2A Correct Scale Accept: 115 to 117mm (2)	MP L3

3.3.1	\checkmark M \checkmark A Income = R450 × 140 = R63 000 \checkmark CA	1A Total seats 1M Multiplying by R450 1CA Total income (3)	F L2
3.3.2	R 8 \checkmark A	2A Correct Seat label (2)	MP L2
3.3.3	\checkmark A \checkmark RD Q6, South East	IRD Seat number 1A Direction (2)	P L4
3.3.4	P(Not seated in first 4 tables) = $\frac{6}{10} \checkmark$ A = $\frac{3}{5}$ OR 0,6 OR 60% \checkmark CA OR P(Not seated in first 4 tables) = $\frac{6}{10} \checkmark$ A = $\frac{48}{80}$ OR $\frac{12}{20}$ OR 60% \checkmark CA	1A Numerator 1A Denominator 1CA Probability (3) AO	P L2
			[28]

QUESTION 4 [19 MARKS]			T & L
Ques	Solution	Explanation	F
4.1.1	$\begin{aligned} \text{Selling price (Type A)} &= R150,95 + (18,5\% \times R150,95) \\ &= R178,875 \checkmark A \\ &= R180,00 \checkmark R \end{aligned}$ <p style="text-align: center;">OR</p> $\begin{aligned} \text{Selling price (Type A)} &= \frac{118,5}{100} \times R150,95 \\ &= R178,875 \checkmark A \\ &= R180,00 \checkmark R \end{aligned}$	IMA Concept of % increase IA New price IR Nearest R5 <p style="text-align: center;">OR</p> IMA Concept of % increase IA New price IR Nearest R5 (3)	F L3
4.1.2	$\begin{aligned} \text{Profit} &= \text{Income} - \text{expenditure} \\ &= (R180,00 \times 120 + R155,00 \times 150) - (R150,95 \times 120) \\ &\quad + 129,95 \times 150 \\ &= (R21\,600 + R23\,250) - (R18\,114 + R19\,492,50) \\ &= R44\,850 - R37\,605,50 \\ &= R7\,244,50 \checkmark S \\ \text{Difference (2018 \& 2017)} &= R8\,250 - R7\,244,50 \\ &= R1\,005,20 \end{aligned}$ <p>Yes, he is correct the difference is less than R1 006,50 \checkmark C</p>	ISF Correct substitution ICA Total income of Type A ICA Total Expenditure IS Simplification 2C Conclusion (6)	F L4
4.1.3	$\begin{aligned} \text{VAT (SARS)} &= \frac{14}{114} \times R7\,244,50 \checkmark M \\ &= R889,68 \checkmark CA \end{aligned}$ <p style="text-align: center;">OR</p> $\begin{aligned} \text{VAT (SARS)} &= 0,122807 \times R7\,244,50 \checkmark M \\ &= R889,68 \checkmark CA \end{aligned}$	IMA Multiplying profit by 14 divided by 114 IM Multiplying VAT by the profit ICA VAT to SARS <p style="text-align: center;">OR</p> IMA Multiplying profit 0,122807 IM Multiplying VAT by the profit ICA VAT to SARS (3)	F L2

4.2.1	(a) 0.48% \checkmark A (b) T O: \checkmark A TB Other illness \checkmark A	2A Probability Outcome 2A	P L3
4.2.2	\checkmark A Yes, because its probability is above 73% \checkmark J	1A Yes 2A Justification (3)	P L4
TOTAL: 100			[19]

