



basic education

Department:
Basic Education
REPUBLIC OF SOUTH AFRICA

NATIONAL SENIOR CERTIFICATE

GRADE 12

MATHEMATICAL LITERACY P2

NOVEMBER 2015


MEMORANDUM


MARKS: 150



Symbol	Explanation
M	Method
MA	Method with accuracy
CA	Consistent accuracy
A	Accuracy
C	Conversion
S	Simplification
RD	Reading from a table/graph/diagram/map
SF	Correct substitution in a formula
O	Opinion/Example Reason / Explanation /Deduction /Comment / Interpretation
P	Penalty, e.g. for no units, incorrect rounding off, etc.
R	Rounding off/Reasoning
NP	No penalty for rounding off/units

This memorandum consists of 20pages.


QUESTION 1 [34 MARKS]			
Ques	Solution	Explanation	Level
1.1.1	Gross monthly salary of one driver $\checkmark A \quad \checkmark MA$ $= R734,53 \times 52 \div 12$ $= R3\ 182,96$ OR Weekly salary of one driver $\checkmark A \quad \checkmark MA$ $= R3\ 182,96 \times 12 \div 52$ $= R734,53$	1A using the correct value 1MA dividing by 12 and multiplying by 52 OR 1A using the correct value 1MA dividing by 52 and multiplying by 12 (2)	L2
1.1.2	$\checkmark M$ Salary of one cleaner = $8 \times 20 \times R18,66 = R2\ 985,60$ $\checkmark CA$ $\checkmark CA$ Salary of one supervisor = $R2\ 985,60 + R230,00 = R3\ 215,60$ Salaries: Handymen $= 11 \times R4\ 410,37 = R48\ 514,07$ $\checkmark A$  Cleaners $= 272 \times R2\ 985,60 = R812\ 083,20$ $\checkmark CA$ Supervisors $= 12 \times R3\ 215,60 = R38\ 587,20$ $\checkmark CA$ Drivers $= 11 \times R3\ 182,96 = R35\ 012,56$ $\checkmark CA$ Total salaries $= R48\ 514,07 + R812\ 083,20 + R38\ 587,20 + R35\ 012,56$ $= R934\ 197,03$ $\checkmark CA$ $\checkmark A$ Total UIF payable = $2\% \times R934\ 197,03$ $= R18\ 683,94$ $\checkmark CA$ OR	1M multiplying hours, days and rate 1CA salary of 1 cleaner 1CA salary of 1 supervisor 1A salaries Handymen 1CA salaries Cleaners 1CA salaries supervisors 1CA salaries drivers 1CA Total salaries 1A 2% contribution 1CA total contribution OR	L3

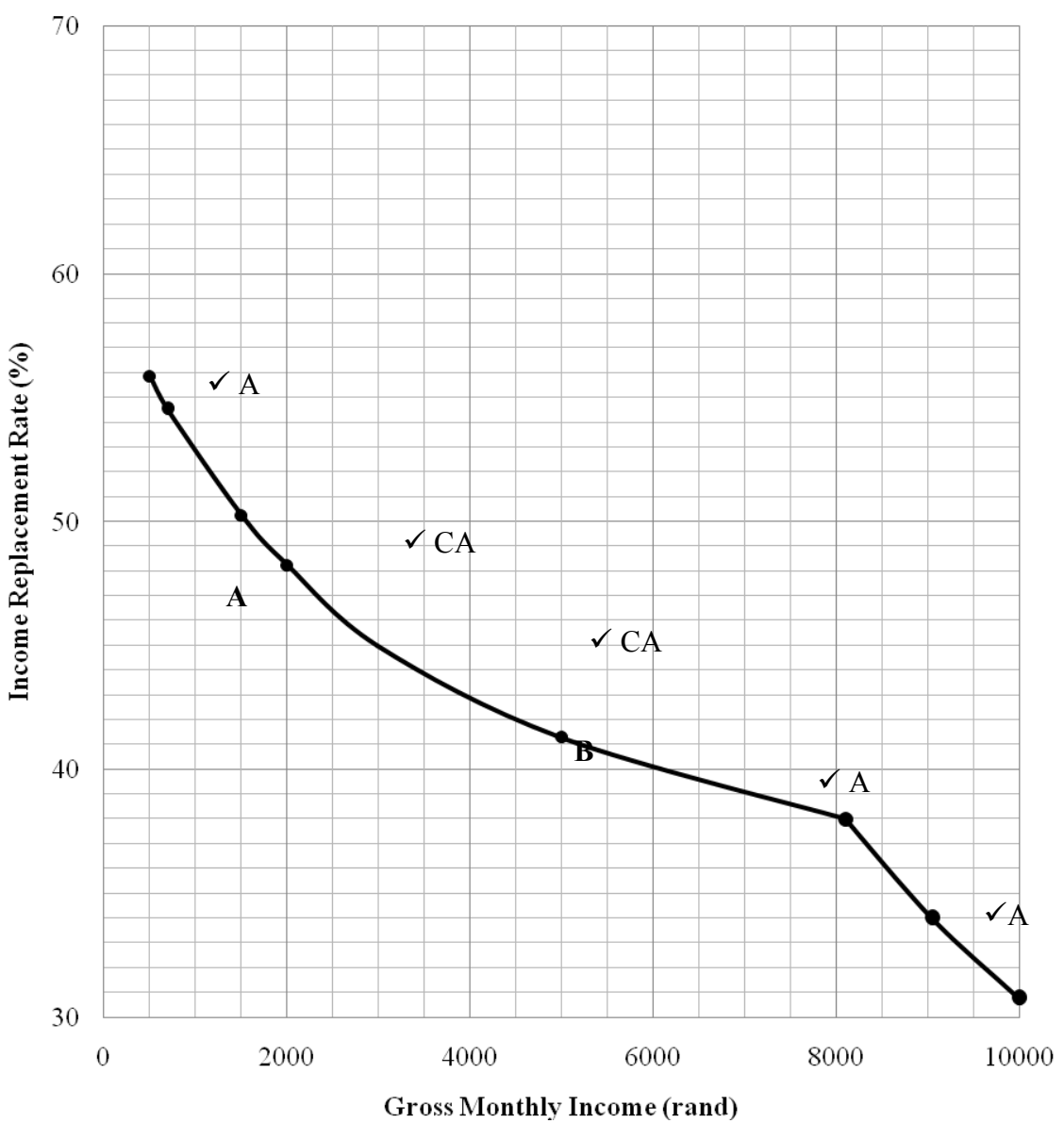
Ques	Solution	Explanation	Level
	$\begin{aligned} \text{Salary of one cleaner} &= 8 \times 20 \times R18,66 \quad \checkmark MA \\ &= R2\,985,60 \quad \checkmark CA \\ \text{Salary of one supervisor} &= R2\,985,60 + R230,00 \\ &= R3\,215,60 \quad \checkmark CA \\ \text{Total UIF payable:} & \\ \text{For 11 handymen} &= 11 \times R4\,410,37 \times 2\% = R970,28 \quad \checkmark A \\ \text{For 272 cleaners} &= 272 \times R2\,985,60 \times 2\% = R16\,241,66 \quad \checkmark CA \\ \text{For 12 supervisors} &= 12 \times R3\,215,60 \times 2\% = R771,74 \quad \checkmark CA \\ \text{For 11 drivers} &= R35\,012,56 \times 2\% = R700,25 \quad \checkmark CA \\ \text{Total UIF payable} & \\ &= R970,28 + R16\,241,66 + R771,74 + R700,25 \quad \checkmark CA \\ &= R18\,683,93 \quad \checkmark CA \end{aligned}$	<p>1MA multiplying hours, days and rate 1CA salary of 1 cleaner</p> <p>1CA salary of 1 supervisor</p> <p>1A 2% contribution 1A UIF handymen 1CA UIF cleaners</p> <p>1CA UIF supervisors 1CA UIF drivers</p> <p>1CA adding 1CA total contribution</p>	
	<p style="text-align: center;">OR</p> <p style="text-align: center;"></p> <p>Total monthly salary</p> $\begin{aligned} &= 11 \times R4\,410,37 + 272 \times 8 \times 20 \times R18,66 \quad \checkmark MA \quad \checkmark M \quad \checkmark A \\ &+ 12 \times (8 \times 20 \times R18,66 + R230,00) + 11 \times R3\,182,96 \quad \checkmark A \quad \checkmark CA \quad \checkmark CA \quad \checkmark CA \\ &= R48\,514,07 + R812\,083,20 + R38\,587,20 + R35\,012,56 \\ &= R934\,197,03 \quad \checkmark CA \\ \text{Total UIF payable} &= 2\% \times R934\,197,03 \quad \checkmark A \\ &= R18\,683,94 \quad \checkmark CA \end{aligned}$	<p style="text-align: center;">OR</p> <p>1MA adding 1A multiplying numbers 1M multiplying hours, days and rate 1A salary of handymen 1CA salary of cleaners 1CA salary supervisors 1CA salary drivers 1CA total salary</p> <p>1A 2% contribution 1CA total contribution</p> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;"> <p>NP – rounding</p> </div>	
			(10)

Ques	Solution	Explanation	Level
1.1.3	<p>Mean salary = $\frac{R934\,197,03}{306}$ ✓MA = R3 052,93 ✓CA</p> <p>% difference = $\frac{\text{Mean salary} - \text{cleaner's salary}}{\text{cleaner's salary}} \times 100\%$ = $\frac{R3\,052,93 - R2\,985,60}{R2\,985,60} \times 100\%$ ✓CA = 2,255158092% ≈ 2,3% ✓CA</p> <p>The statement is VALID. ✓O</p> <p style="text-align: center;">OR</p> <p>Mean salary = $\frac{R934\,197,03}{306}$ ✓MA = R3 052,93 ✓CA</p> <p>Mean as a percentage of the lowest salary $\frac{R3\,052,93}{R2\,985,60} \times 100\% = 102,255\dots\%$ ✓M % difference = $102,255\dots\% - 100\%$ ✓M ≈ 2,3% ✓CA</p> <p>The statement is VALID ✓O</p> <p style="text-align: center;">OR</p> <p>Mean UIF payable = $\frac{R18\,683,93}{306}$ ✓MA = 61,05859... ✓CA</p> <p>% difference = $\frac{\text{Mean UIF} - \text{Cleaners UIF}}{\text{Cleaners UIF}} \times 100\%$ = $\frac{61,05859\dots - 59,711985\dots}{59,711985\dots} \times 100\%$ ✓M ✓M = 2,255...% ≈ 2,3% ✓CA</p> <p>The statement is VALID. ✓O OR</p>	<p>1MA dividing total salary from Q1.1.2 by number of employees 1CA simplification</p> <p>1M difference 1CA percentage calculation</p> <p>1CA percentage</p> <p>1O conclusion</p> <p style="text-align: center;">OR</p> <p>1MA dividing total salary from Q1.1.2 by number of employees 1CA simplification</p> <p>1M percentage</p> <p>1M subtracting 100% 1CA percentage</p> <p>1O conclusion</p> <p style="text-align: center;">OR</p> <p>1MA dividing total UIF from Q1.1.2 by number of employees 1CA simplification</p> <p>1M subtracting 1M percentage</p> <p>1CA simplification</p> <p>1O conclusion OR</p>	L4

Ques	Solution	Explanation	Level
1.1.3	<p>Mean salary = $\frac{R934\,197,03}{306} \checkmark MA$</p> <p>= R3 052,93 $\checkmark CA$</p> <p>% difference =</p> $\frac{\text{Mean salary} - \text{cleaner's salary}}{\text{mean salary}} \times 100\%$ <p>= $\frac{R3\,052,93 - R2\,985,60}{R3\,052,93} \times 100\% \quad \checkmark CA$</p> <p>= 2,2054...%</p> <p>≈ 2,2% $\checkmark CA$</p> <p>The statement is VALID. $\checkmark O$</p> <p style="text-align: center;">OR</p> <p>Mean salary = $\frac{R934\,197,03}{306} \checkmark MA$</p> <p>= R3 052,93 $\checkmark CA$</p> <p>Lowest salary as a percentage of the mean</p> $\frac{R2\,985,60}{R3\,052,93} \times 100\% = 97,7945\% \quad \checkmark M$ <p>% difference = $100\% - 97,7945\% \quad \checkmark M$</p> <p>≈ 2,2% $\checkmark CA$</p> <p>The statement is VALID. $\checkmark O$</p> <p style="text-align: center;">OR</p> <p>Mean UIF payable = $\frac{R18\,683,93}{306} \checkmark MA \quad \checkmark CA$ = 61,05859...</p> <p>% difference = $\frac{\text{Mean UIF} - \text{Cleaners UIF}}{\text{Mean UIF}} \times 100\%$</p> $= \frac{61,05859... - 59,711985...}{61,05859...} \times 100\%$ <p>= 2,2054...%</p> <p>≈ 2,2% $\checkmark CA$</p> <p>The statement is VALID. $\checkmark O$</p>	<p>1MA dividing total salary from Q1.1.2 by number of employees 1CA simplification</p> <p>1M difference 1CA percentage calculation</p> <p>1CA percentage 1O conclusion</p> <p style="text-align: center;">OR</p> <p>1MA dividing total salary from Q1.1.2 by number of employees 1CA simplification</p> <p>1M percentage</p> <p>1M subtracting from 100% 1CA percentage</p> <p>1O conclusion</p> <p style="text-align: center;">OR</p> <p>1MA dividing total UIF from Q1.1.2 by number of employees 1CA simplification</p> <p>1M subtracting 1M percentage</p> <p>1CA simplification</p> <p>1O conclusion</p>	L4

(6)


<p>1.2.1</p>	<p>Number of additional employees is $11 + 12 + 272 + 11 = 306$ ✓A</p> <p>Number of female cleaners = $\frac{3}{4} \times 272$ = 204 ✓A</p> <p>Probability of selecting a female cleaner = $\frac{204}{306}$ ✓CA = 0,66666.. ≈ 0,667 ✓R</p>	<p>1A addition</p> <p>1A proportion</p> <p>1CA probability</p> <p>1R rounding correctly</p> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;"> <p>Answer only full marks</p> </div> <p style="text-align: right;">(4)</p>	<p>L2</p>
<p>1.2.2</p>	<p>Most unlikely, because the male supervisors are the smallest number of additional employees. ✓✓O</p> <p style="text-align: center;">OR</p> <p>The fraction for the male supervisors is smaller $\left(\frac{3}{306} = 0,0098039\right)$ ✓✓O</p> 	<p>2O explanation</p> <p style="text-align: right;">(2)</p>	<p>L2</p>
<p>1.3.1</p>	<p>$A = \frac{R964,87}{R2\ 000} \times 100\%$ ✓ RT ✓ M = 48,24 % ✓ A</p> <p>$B = \frac{R2\ 065,49}{41,31\%}$ ✓ M = R4 999,98 ✓ A</p> <p style="text-align: center;">OR</p> <p>Last income $\times 41,31\% = R2\ 065,49$ ✓ M $\therefore B = R2\ 065,49 \div 41,31\%$ = R4 999,98 ✓ A</p>	<p>1RT reading from table 1M finding %</p> <p>1A value of A</p> <p>1M dividing</p> <p>1A value of B</p> <p style="text-align: center;">OR</p> <p>1M dividing</p> <p>1A value of B Accept R5 000</p> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;"> <p>NP - rounding</p> </div> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;"> <p>Answer only full marks</p> </div> <p style="text-align: right;">(5)</p>	<p>L2</p>

Ques	Solution Explanation	Level
1.3.2	<p style="text-align: center;">THE RELATIONSHIP BETWEEN THE GROSS MONTHLY INCOME AND THE INCOME REPLACEMENT RATE (IRR)</p>  <p>1A for first 3 points plotted correctly 1CA for plotting points A and B 1A for plotting last 3 points 1CA joining the points up to R8 099 with a curve 1CA the line from R8 099 to R10 000</p>	L2
(5)		[34]

QUESTION 2 [30 MARKS]			
Ques	Solution	Explanation	Level
2.1.1	$P_{(\text{weight loss more than 20kg})} = \frac{\checkmark A}{12} \times 100\%$ $\approx 66,67\% \quad \checkmark CA$	1A numerator 1A denominator 1CA probability as % NP - rounding Answer only full marks	L2
		(3)	
2.1.2	102 pounds = $102 \times 0,453592 \approx 46,27$ kg 55 pounds = $55 \times 0,453592 \approx 24,95$ kg $\checkmark\checkmark C$ 36 pounds = $36 \times 0,453592 \approx 16,33$ kg Arranged weight loss for males: $13,2 ; 13,2 ; 16,33 ; 16,7 ; 18,8 ; \mathbf{23,7} ; \mathbf{24,95} ; 25,6 ; 31,6 ; 37,65 ; 43,36 ; 46,27.$ $\checkmark CA$ Median weight loss of males = $\frac{23,70 + 24,95}{2}$ $\checkmark CA$ $= 24,325$ $\checkmark M$ $\approx 24,33$ kg $\checkmark CA$ Her statement is NOT correct. $\checkmark O$	1C converting one 1C converting other two 1CA arranging weights 1CA identifying middle values 1M median concept 1CA simplification 1O conclusion Max 4 marks if using SA males only Max 3 marks if conversions are omitted	L4
		(7)	
2.1.3	IQR for males (in kg) = $34,63 - 16,52 = 18,11$ $\checkmark M$ $\checkmark A$ IQR for females (in kg) = $64,87 - 27,97 = 36,9$ $\checkmark A$ The female IQR is more than the male IQR. $\checkmark\checkmark R$	1M IQR concept 1A males IQR 1A females IQR 2Rcomment relating to the IQR values	L2 L4
		(5)	


Ques	Solution	Explanation	
2.2.1	<p><u>Working with 365days:</u></p> <p>Mass in one can is $8,75 \times 4g = 35g$ ✓MA</p> <p>Mass for a year is $=35g \times 365$ ✓MA $= 12\ 775g$ ✓CA</p> <p>For 2 cans $= 2 \times 12\ 775g$ $= 25\ 550g$ ✓CA</p> <p style="text-align: center;">OR</p> <p>Mass in one can $= 8,75 \times 4 g = 35 g$ ✓MA Mass in TWO cans $= 35g \times 2 = 70 g$ ✓MA</p> <p>Mass for a year $= 70 g \times 365$ ✓M $= 25\ 550 g$ ✓CA</p> <p style="text-align: center;">OR</p> <p>In 1 can $\rightarrow 8,75$ teaspoons 2 cans $\rightarrow 17,5$ teaspoons ✓A</p> <p>Mass per day $= 17,5 \times 4 = 70 g$ ✓MA $\checkmark M$ Mass for the year $= 70 g \times 365 = 25\ 550 g$ ✓CA</p> <p style="text-align: center;">OR</p> <p><u>Working with 366 days:</u></p> <p>Mass in one can : $8,75 \times 4 g = 35g$ ✓MA</p> <p>Mass of sugar for 1 can for one year $= 35g \times 366 = 12810g$ ✓M ✓CA</p> <p>Mass of sugar in 2 cans for one year $= 2 \times 12\ 810g = 25\ 620g$ ✓CA</p>	<p>1MA mass in 1 can</p> <p>1MA multiply by 365 1CA simplification</p> <p>1CA annual mass intake</p> <p style="text-align: center;">OR</p> <p>1MA mass in 1 can 1MA mass for 2 cans</p> <p>1M multiply by 365 1CA simplification</p> <p style="text-align: center;">OR</p> <p>1A number of teaspoons 1MA mass per day 1M multiplying by 365 1CA simplification</p> <p style="text-align: center;">OR</p> <p>1MA mass of sugar in 1 can</p> <p>1M multiply by 366 1CA simplification 1CA mass for two cans</p> <p style="text-align: right;">(4)</p>	L3

Ques	Solution	Explanation										
2.2.2	<p>Calories before = $124 \times 2 + 116 + 168$ = 532 calories ✓A</p> <p>Calories after changing = $\left(\frac{500 \times 52}{240}\right) \times 2 + 32 + 0$ ✓M = 248,67 calories ✓CA</p> <p>Difference = 532 calories – 248,673 calories = 283,33 calories ✓CA</p>	<p>1A calculating calories</p> <p>1M ratio 1M addition 1CA calculating calories</p> <p>1CA difference</p> <div style="border: 1px solid black; padding: 2px; width: fit-content; margin: 5px auto;"> <p>NP - rounding</p> </div> <p style="text-align: right;">(5)</p>	L3									
2.2.3	<p>Sugar intake before diet:</p> <p>= $7,75 \times 2 + 7,25 + 10,5$ ✓MA</p> <p>= 33,25 tsp. OR 133grams ✓CA</p> <p>Sugar intake after diet:</p> <p>= $2 \times \left(\frac{500 \times 3,25}{240}\right) + 2 + 0$ ✓A</p> <p>= $2 \times 6,77 + 2 + 0,00$</p> <p>= 15,54 tsp. OR 62,16 grams ✓CA</p> <p>% Reduction of sugar</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 50%;">(using teaspoons)</th> <th style="width: 10%;"></th> <th style="width: 40%;">(usings grams)</th> </tr> </thead> <tbody> <tr> <td>$= \frac{15,54}{33,25} \times 100\%$</td> <td style="text-align: center;">OR</td> <td>$= \frac{62,16}{133} \times 100\%$</td> </tr> <tr> <td>$\approx 46,74\%$ ✓MA</td> <td></td> <td>$\approx 46,74\%$ ✓MA</td> </tr> </tbody> </table> <p>NOT VALID ✓O</p> <p style="text-align: center;">OR</p> <p>Using Calories from Q 2.2.2</p> <p>$\% \text{ Calories} = \frac{248,67}{532} \times 100\% = 46,7\%$ ✓CA</p> <p>NOT VALID ✓O</p>	(using teaspoons)		(usings grams)	$= \frac{15,54}{33,25} \times 100\%$	OR	$= \frac{62,16}{133} \times 100\%$	$\approx 46,74\%$ ✓MA		$\approx 46,74\%$ ✓MA	<p>1MA adding correct values 1CA simplification</p> <p>1A sugar in vitamin water</p> <p>1CA simplification</p> <p>1MA percentage</p> <p>1O opinion Accept VALID as opinion only if an explanation provided</p> <p style="text-align: center;">OR</p> <p>1CA total calories after 1M percentage 1M multiply by 100 1 CA simplification 1A total calories before 1O opinion</p> <p style="text-align: right;">(6)</p>	L4
(using teaspoons)		(usings grams)										
$= \frac{15,54}{33,25} \times 100\%$	OR	$= \frac{62,16}{133} \times 100\%$										
$\approx 46,74\%$ ✓MA		$\approx 46,74\%$ ✓MA										
		[30]										

QUESTION 3 [31 MARKS]			
Ques	Solution	Explanation	
3.1	$\checkmark\checkmark\text{O}$ For easy access OR to save on costs OR no privacy required OR aesthetic value OR ease of movement between rooms OR ventilation purposes	2O explanation (2)	L4
3.2	$\checkmark\text{A}$ Living room, bathroom and bedroom 2. $\checkmark\checkmark\text{O}$ No direct sunlight into the room. OR The sun's position is on the northern side of the house. $\checkmark\checkmark\text{O}$	1A identified at least two rooms 2O reason (3)	L2 L4
3.3.1	The living room floor side OR $\checkmark\text{MA}$ $= 3,550 \text{ m} - (3,550 \text{ m} \times 7,04\%)$ $= 3,3008 \text{ m}$ $\approx 3,3 \text{ m}$ $\therefore 3,3 \text{ m} \times 3,3 \text{ m}$ $100\% - 7,04\% = 92,96\%$ $\text{Side } \checkmark\text{C} \quad \checkmark\text{M}$ $= 3,550 \text{ m} \times 92,96\%$ $= 3,3008 \text{ m}$ $\therefore 3,3 \text{ m} \times 3,3 \text{ m}$	1C conversion 1MA for subtracting 1M multiplication (3)	L2
3.3.2	 <p>Area of 4 walls</p> $= 4 \times (3,3 \text{ m} \times 2,650 \text{ m})$ $= 34,98 \text{ m}^2 \quad \checkmark\text{CA}$ <p>Area of 2 door openings</p> $= 2 \times \text{length} \times \text{width}$ $= 2 \times 2,032 \text{ m} \times 0,750 \text{ m} \quad \checkmark\text{M}$ $= 3,048 \text{ m}^2 \quad \checkmark\text{CA}$ <p>Area of window</p> $= 1,511 \text{ m} \times 0,949 \text{ m} \quad \checkmark\text{M}$ $= 1,434 \text{ m}^2 \quad \checkmark\text{CA}$ <p>Area to cover with panelling</p> $= (34,98 - 3,048 - 1,5615 - 1,434) \text{ m}^2 \quad \checkmark\text{M}$ $= 28,9365 \text{ m}^2 \quad \checkmark\text{CA}$ $\approx 29 \text{ m}^2 \quad \checkmark\text{R}$ <p>Area of opening to passage</p> $= \text{length} \times \text{width}$ $= 2,082 \text{ m} \times 0,75 \text{ m} \quad \checkmark\text{M}$ $= 1,5615 \text{ m}^2 \quad \checkmark\text{CA}$ <p>OR</p>	1SF area wall dimensions 1CA area of 4 walls 2M door opening dimensions 1CA area of opening to passage 1CA 2 door openings 1M window dimensions 1CA area of window 1M subtracting 1CA area 1R rounding OR	L3

Ques	Solution	Explanation	
	<p>Area of northern wall = Area of wall – area of door ✓M = (3,3 m × 2,650 m) – (2,082 m × 0,750 m) = 8,745 m² – 1,5615 m² = 7,1835 m² ✓CA</p> <p>Area of eastern wall = Area of wall – area of door ✓M = (3,3 m × 2,650 m) – (2,032 m × 0,750 m) = 8,745 m² – 1,524 m² = 7,221 m² ✓CA</p> <p>Area of southern wall = Area of wall – area of door – area of window ✓M ✓A = (3,3 m × 2,650 m) – (2,032 m × 0,750 m) – (1,511 m × 0,949 m) = 8,745 m² – 1,524 m² – 1,434 m² = 5,787 m² ✓CA</p> <p>Area of western wall = (3,3 m × 2,650 m) = 8,745 m² ✓CA</p> <p>Area to cover ✓M = 7,1835 m² + 7,221 m² + 5,787 m² + 8,745 m² = 28,9365 m² ✓CA ≈ 29 m² ✓R</p> <p style="text-align: center;">OR</p> <p>Area of wall including door and window openings = perimeter of floor × height = 2 × (width + width) × height = 2 × (3,3 m + 3,3 m) × 2,650 m ✓M = 34,98 m² ✓CA</p> <p>Area of window 1 opening = length × breadth ✓M = 1,511 m × 0,949 m = 1,433939 m² ✓CA</p> <p>Area of 2 door openings Area of opening to passage = 2 × length × width = length × width = 2 × 2,032 m × 0,750 m ✓M = 2,082 m × 0,75 m ✓M = 3,048 m² ✓CA = 1,5615 m² ✓CA</p> <p>Area to cover ✓M = 34,98 m² – 1,433939 m² – 3,048 m² – 1,5615 m² = 28,936561 m² ✓CA ≈ 29 m² ✓R</p>	<p>1M subtracting areas</p> <p>1CA for calculating area of northern wall</p> <p>1M subtracting areas</p> <p>1CA for calculating area of eastern wall</p> <p>1M subtracting areas 1A subtracting 1CA for calculating area of southern wall</p> <p>1CA for calculating area of western wall</p> <p>1M for adding 4 walls</p> <p>1CA simplification 1R rounding</p> <p style="text-align: center;">OR</p> <p>1M multiplying 1CA calculating total area of walls</p> <p>1M area formula 1CA calculating area of window</p> <p>2M area formula 2CA calculating area of door openings</p> <p>1M for subtracting 1CA simplification 1R for rounding</p>	(11)

Ques	Solution	Explanation	
3.4	<p>Surface area of one panel = $2 \text{ m} \times 0,15 \text{ m}$ $= 0,3 \text{ m}^2$ ✓A</p> <p>Number of panels needed = $\frac{29 \text{ m}^2}{0,3 \text{ m}^2}$ $= 96,666... \approx 97$ ✓CA</p> <p>Total panels needed to be purchased $= 97 \times 104,5\%$ OR $97 \times 4,5\% = 4,365$ $= 101,365$ ✓CA ≈ 5 ≈ 102 $97 + 5 = 102$ ✓CA</p> <p>Volume of 102 panels = $102 \times 0,0125 \text{ m} \times 0,3 \text{ m}^2$ ✓R ✓C ✓SF $= 0,3825 \text{ m}^3$ ✓CA</p> <p>Cost of panels excluding VAT OR Price of wood including VAT $= 0,3825 \times \text{R}5\,000,00$ $= \text{R}5\,000 \text{ per m}^3 \times 114\%$ $= \text{R}1\,912,50$ ✓CA $= \text{R}5\,700 \text{ per m}^3$ ✓CA</p> <p>Cost of the panels including VAT OR Cost of the panels including VAT $= 1,14 \times \text{R}1\,912,50$ $= \text{R}5\,700 \times 0,3825$ $= \text{R}2\,180,25$ ✓CA $= \text{R}2\,180,25$ ✓CA</p> <p>Labour cost = $29 \times \text{R}125,00$ $= \text{R}3\,625,00$ ✓CA</p> <p>Total cost = $\text{R}2\,180,25 + \text{R}3\,625,00$ $= \text{R}5\,805,25$ ✓CA</p> <p>Budget is ENOUGH ✓O</p> <p style="text-align: center;">OR</p>	<p>1A area</p> <p>1CA from Q3.3.2 simplification</p> <p>1CA number of panels 1R rounding</p> <p>1C convert to metre 1SF finding volume 1CA volume in m^3</p> <p>1CA cost excluding VAT</p> <p>1CA cost incl. VAT</p> <p>1CA labour cost (CA area from 3.3.2)</p> <p>1CA total cost</p> <p>1O conclusion</p> <p style="text-align: center;">OR</p>	L4

Ques	Solution	Explanation	
	<p>Surface area of wood = 29 m^2 ✓CA</p> <p>Volume of wood = $29 \text{ m}^2 \times 0,0125 \text{ m}$ ✓A</p> <p style="padding-left: 40px;">$= 0,3625 \text{ m}^3$ ✓CA</p> <p>Total volume of wood = $0,3625 \times 104,5\%$ ✓M</p> <p style="padding-left: 40px;">$= 0,3788125 \text{ m}^3$ ✓CA</p> <p style="padding-left: 40px;">$= 0,38 \text{ m}^3$ ✓CA</p> <p>Cost of panels excluding VAT $= 0,38 \times \text{R}5\,000,00$ $= \text{R}1\,900,00$ ✓CA</p> <p style="padding-left: 40px;">OR</p> <p>Price of wood including VAT $= \text{R}5\,000 \text{ per m}^3 \times 114\%$ $= \text{R}5\,700 \text{ per m}^3$ ✓CA</p> <p>Cost of the panels including VAT $= 1,14 \times \text{R}1\,900,00$ $= \text{R}2\,166,00$ ✓CA</p> <p style="padding-left: 40px;">Cost of the panels including VAT $= \text{R}5\,700 \times 0,38$ $= \text{R}2\,166,00$ ✓CA</p> <p style="text-align: center;"></p> <p>Labour cost = $29 \times \text{R}125,00$ $= \text{R}3\,625,00$ ✓CA</p> <p>Total cost = $\text{R}2\,166,00 + \text{R}3\,625,00$ $= \text{R}5\,791,00$ ✓CA</p> <p>Budget is ENOUGH ✓O</p>	<p>1CA from 3.3.2 1 M calculating volume 1A correct thickness</p> <p>1CA simplification</p> <p>1M % increase 1CA simplification 1CA rounding</p> <p>1CA cost excluding VAT</p> <p>1CA cost incl. VAT</p> <p>1CA labour cost (CA area from 3.3.2)</p> <p>1CA total cost</p> <p>1O conclusion</p> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;">NP - rounding</div>	<p style="text-align: right;">(12)</p>
			[31]


QUESTION 4 [31 MARKS]			
Ques	Solution	Explanation	
4.1.1	<p>- Course modules have different costs ✓✓O</p> <p style="text-align: center;">OR</p> <p>- Course levels makes a difference. ✓✓O</p>	<p>2O relevant reason</p> <p style="text-align: center;">OR</p> <p>2O relevant reason</p> <p style="text-align: right;">(2)</p>	L4
4.1.2	<p>Single rooms: ✓✓O</p> <p>- Have more privacy and is more convenient; no disturbance.</p> <p style="text-align: center;">OR</p> <p>- Better facilities. ✓✓O</p> <p style="text-align: center;">OR ✓✓O</p> <p>Double rooms:</p> <p>- Are not private and not convenient. ✓✓O</p> <p style="text-align: center;">OR</p> <p>- Students share costs ✓✓O</p>	<p>2O relevant reason</p> <p style="text-align: right;">(2)</p>	L4
4.1.3	<p>Total fees for first year</p> <p>= Tuition fees + hostel fees + non-SA citizen fee</p> <p style="text-align: center;">✓A</p> <p>= R28 470 + R18 928 + R2 000 ✓M</p> <p>= R49 398 ✓CA</p>	<p>1A all the values</p> <p>1M adding fees</p> <p>1CA total</p> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;"> <p>No penalty if deposit added</p> </div> <p style="text-align: right;">(3)</p>	L2
4.1.4	<p>Minimum payment on registration:</p> <p>Cost = appl. fee + 30% of tuition + non-SA additional + accommodation dep. + monthly residence fee</p> <p style="text-align: center;">✓A</p> <p style="text-align: center;">✓M</p> $= R0,00 + 30\% \times R28\,470 + R2000 + R1\,220,00 + \frac{R\,18\,928,00}{11}$ <p style="text-align: center;">✓S</p> <p style="text-align: center;">✓S</p> $= R8\,541 + R2\,000 + R1\,220 + R1\,720,73$ <p>= R13 481,73 ✓CA</p>	<p>1A using correct amounts</p> <p>1M adding amounts</p> <p>1S tuition fee</p> <p>1S accommodation fee</p> <p>1CA minimum payment</p> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;"> <p>No penalty if deposit subtracted</p> </div> <p style="text-align: right;">(5)</p>	L3

Ques	Solution	Explanation	
4.2	<p>Afrikaans Home Language is excluded because it is the lowest:</p> $\text{LO APS} = \frac{92}{2} \checkmark\text{MA}$ $= 46\% \text{ rounded up to } 50\% \quad \checkmark\text{R}$ <p>\Rightarrow LO will be allocated 4 APS $\checkmark\text{A}$</p> <p>Total APS based on final results:</p> $= 6 + 5 + 4 + 6 + 7 + 7 + 7$ $= 42 \quad \checkmark\text{CA}$ <p style="text-align: right;">$\checkmark\text{CA}$</p> <p>She qualifies for 50% bursary.</p>	<p>1MA calculating % of LO 1R rounding up 1A LO APS 1CA adding scores 1CA total 1CA identifying bursary %</p> <p style="text-align: right;">(6)</p>	L3
4.3.1	<p>Distance from Okahandja to Johannesburg = Windhoek to Pretoria + Okahandja to Windhoek + Pretoria to Johannesburg + 2 × Gabarone</p> $= (1\ 386 + 68 + 58 + 2 \times 45) \text{ km}$ $= 1\ 602 \text{ km} \quad \checkmark\text{CA}$ <p>Driving time = $\frac{\text{Total distance}}{\text{Average speed}}$</p> $= \frac{1\ 602 \text{ km}}{108 \text{ km/h}} \quad \checkmark\text{SF}$ $= 14,8333 \text{ hrs} \quad \text{OR} \approx 14 \text{ hours } 50 \text{ minutes} \quad \checkmark\text{CA}$ <p style="text-align: center;">OR</p> <p>Distance from Okahandja to Johannesburg</p> $= [68 + 1107 + 2(45) + 279 + 58] \text{ km}$ $= 1\ 602 \text{ km} \quad \checkmark\text{CA}$ <p>Driving time = $\frac{\text{Total distance}}{\text{Average speed}}$</p> $= \frac{1\ 602 \text{ km}}{108 \text{ km/h}} \quad \checkmark\text{SF}$ $= 14,8333 \text{ hrs} \quad \text{OR} \approx 14 \text{ hours } 50 \text{ minutes} \quad \checkmark\text{CA}$	<p>1MA adding extra kilometres 1MA return on Gabarone 1CA total distance 1SF substitution 1CA Total time</p> <p style="text-align: center;">OR</p> <p>2MA for adding the distances to travel 1CA total distance 1SF substitution 1CA total time</p> <p style="text-align: right;">(5)</p>	L2

Ques	Solution	Explanation	
4.3.2	Strip charts are not drawn to scale. ✓✓O	2O for any valid explanation (2)	L4
4.3.3	<p>Total cost = P680 × 3 + P50 + P50 + P20 ✓A = P2 160 ✓CA</p> <p>∴ 2 160BWP = 2 160 × 1,2454ZAR ✓M = 2 690,064ZAR ✓CA</p> <p>∴ 2 690,064ZAR = $\frac{2\,690,064}{0,998}$ NAD = 2 695,45491NAD ✓CA ≈ 2 695,45NAD</p> <p>Her estimation is NOT VALID. ✓O</p> <p style="text-align: center;">OR</p> <p>NAD 2160 = 2 160 × 0,998 Rand ✓M = R2 155,68 ✓CA</p> <p>Total cost in Pula = 680 × 3 + 50 + 50 + 20 = P2 160 ✓CA</p> <p>Total cost in Rand = 2 160 × 1,2454 = 2 690,06 ✓CA</p> <p>Her estimation is NOT VALID. ✓O</p>	<p>1A adding values 1CA total</p> <p>1M converting P to R 1CA amount</p> <p>1CA amount</p> <p>1O conclusion</p> <p style="text-align: center;">OR</p> <p>1M converting NAD to Rand 1CA amount in Rand 1A adding values 1CA total</p> <p>1CA cost amount</p> <p>1O conclusion</p> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 0 auto;"> <p>NP - rounding</p> </div> <p>(6)</p>	L4
		[31]	

QUESTION 5 [24 MARKS]			
Ques	Solution	Explanation	
5.1.1	<p style="text-align: right;">✓✓J</p> <p>More Chinese migrate to other countries.</p>	<p>2J interpretation</p> <p style="text-align: right;">(2)</p>	L4
5.1.2	<p><u>China's projected population</u></p> <p style="text-align: right;">✓MA</p> <p>1 356 million × 0,44% = 5,9664 million</p> <p>1 356 million + 5,9664 million = 1 361,966 4 million ✓A</p> <p><u>USA's projected population</u></p> <p style="text-align: right;">✓MA</p> <p>319 million × 0,77% = 2,4563 million</p> <p>319 million + 2,4563 million = 321,4563 million ✓A</p> <p>Difference = 1 361,966 4 million – 321,4563 million</p> <p style="text-align: right;">= 1 040,5101 million ✓CA</p> <p style="text-align: center;">OR</p> <p><u>China's projected population</u></p> <p style="text-align: right;">✓MA ✓A</p> <p>= 1 356 million × 1,0044% = 1 361 966 400</p> <p><u>USA's projected population</u></p> <p style="text-align: right;">✓MA</p> <p>= 319 million × 1,0077% = 321 456 300 ✓A</p> <p>Difference = 1 040 510 100 ✓CA</p>	<p>1MA calc. projected population growth</p> <p>1A population in millions</p> <p>1MA calc. projected population growth</p> <p>1A USA population in million</p> <p>1CA the difference</p> <p>(Accept 1041 million)</p> <p style="text-align: center;">OR</p> <p>1MA calc. projected population</p> <p>1A population in millions</p> <p>1MA calc. projected population</p> <p>1A USA population in million</p> <p>1CA the difference</p> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;"> <p>Max of 4 if rounded</p> <p>Max of 3 if millions omitted</p> </div> <p style="text-align: right;">(5)</p>	L3
5.2.1	<p>Middle East ✓✓RD</p>	<p>2RD region</p> <p style="text-align: right;">(2)</p>	L2

Ques	Solution	Explanation	
5.2.2	<p>North America's difference $\approx 1\,010$ million tons $- 410$ million tons $= 600$ million tons ✓CA</p> <p>Asia's difference $\approx 1\,080$ million tons $- 380$ million tons $= 700$ million tons ✓CA</p> <p>Asia has a higher difference of crude oil than North America ✓J</p> <p style="text-align: center;">OR</p> <p>Asia consumes much more crude oil than North America.</p>	<p>1CA for calculating North American difference [Accept values in range of ± 10 million tons.] 1CA for calculating Asia's difference 1J comment</p> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;"> <p>Penalise with one mark if millions omitted</p> </div> <p style="text-align: right;">(3)</p>	L2 L4
5.2.3	<p>They both have vibrant economies, therefore these regions need a lot more energy. ✓✓O</p> <p style="text-align: center;">OR</p> <p>Both regions have more industries. ✓✓O</p> <p style="text-align: center;">OR</p> <p>The regions have large populations. ✓✓O</p> <p style="text-align: center;">OR</p> <p>They use large volumes of oil because they have outdated technology. ✓✓O</p> <p style="text-align: center;">OR</p> <p>First world regions ✓✓O</p> <p style="text-align: center;">OR</p> <p>Developed regions ✓✓O</p>	<p>2O reason</p> <p style="text-align: right;">(2)</p>	L4
5.3.1	<p>Distance in km $= 33 \text{ mm} \div 25 \text{ mm} \times 5\,000 \text{ km}$ $= 6\,600 \text{ km}$ ✓M ✓CA</p> <p>Distance in miles $= 6\,600 \text{ km} \div 1,609344$ $= 4\,101,049869 \text{ miles}$ ✓CA</p> <p>$\approx 4\,101,05 \text{ miles}$</p> <div style="border: 1px solid black; padding: 10px; margin: 10px auto; width: fit-content;"> <p>Accept measured distance from 27 to 29 mm and bar scale from 22 to 24 mm</p> </div>	<p>1M for using the line scale 1CA for calculating distance 1CA for distance in miles</p> <p style="text-align: right;">(3)</p>	L3

Ques	Solution	Explanation	
5.3.2	<p>Total amount of oil transported daily</p> $= 15 \text{ million barrels} \times \frac{100\%}{30\%}$ <p style="text-align: right;">✓MA</p> $= 50 \text{ million barrels per day}$ <p style="text-align: center;">OR</p> <p>30 % ~ 15 million barrels 30 % ~ 15 million barrels ✓RD 30 % ~ 15 million barrels ✓M 10 % ~ $\frac{15}{3}$ million barrels = 5 million barrels</p> <p>Therefore 100 % ~ (15 + 15 + 15 + 5) million barrels = 50 million barrels ✓CA</p>	<p>1RD reading 15 million barrels 1MA dividing by 30% 1CA simplification</p> <p style="text-align: center;">OR</p> <p>1RD reading 15 million barrels 1M calculating 10% 1CA simplification</p> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;"> <p>No penalty if millions omitted</p> </div> <p style="text-align: right;">(3)</p>	L2
5.3.3	<p>It is not the shortest route ✓✓O </p> <p style="text-align: center;">OR</p> <p>It will take longer to transport the oil ✓✓O</p> <p style="text-align: center;">OR</p> <p>It will cost more to transport the oil. ✓✓O</p>	<p>2O relevant (time or distance related reason)</p> <p>2O relevant cost related reason</p> <p style="text-align: right;">(4)</p>	L4
		[24]	
		TOTAL:150	