



# basic education

Department:  
Basic Education  
**REPUBLIC OF SOUTH AFRICA**

## **NATIONAL SENIOR CERTIFICATE**

**GRADE 12**

**MATHEMATICAL LITERACY P2**

**NOVEMBER 2015**

**MEMORANDUM**

**MARKS: 150**

<b>Symbol</b>	<b>Explanation</b>
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.**

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

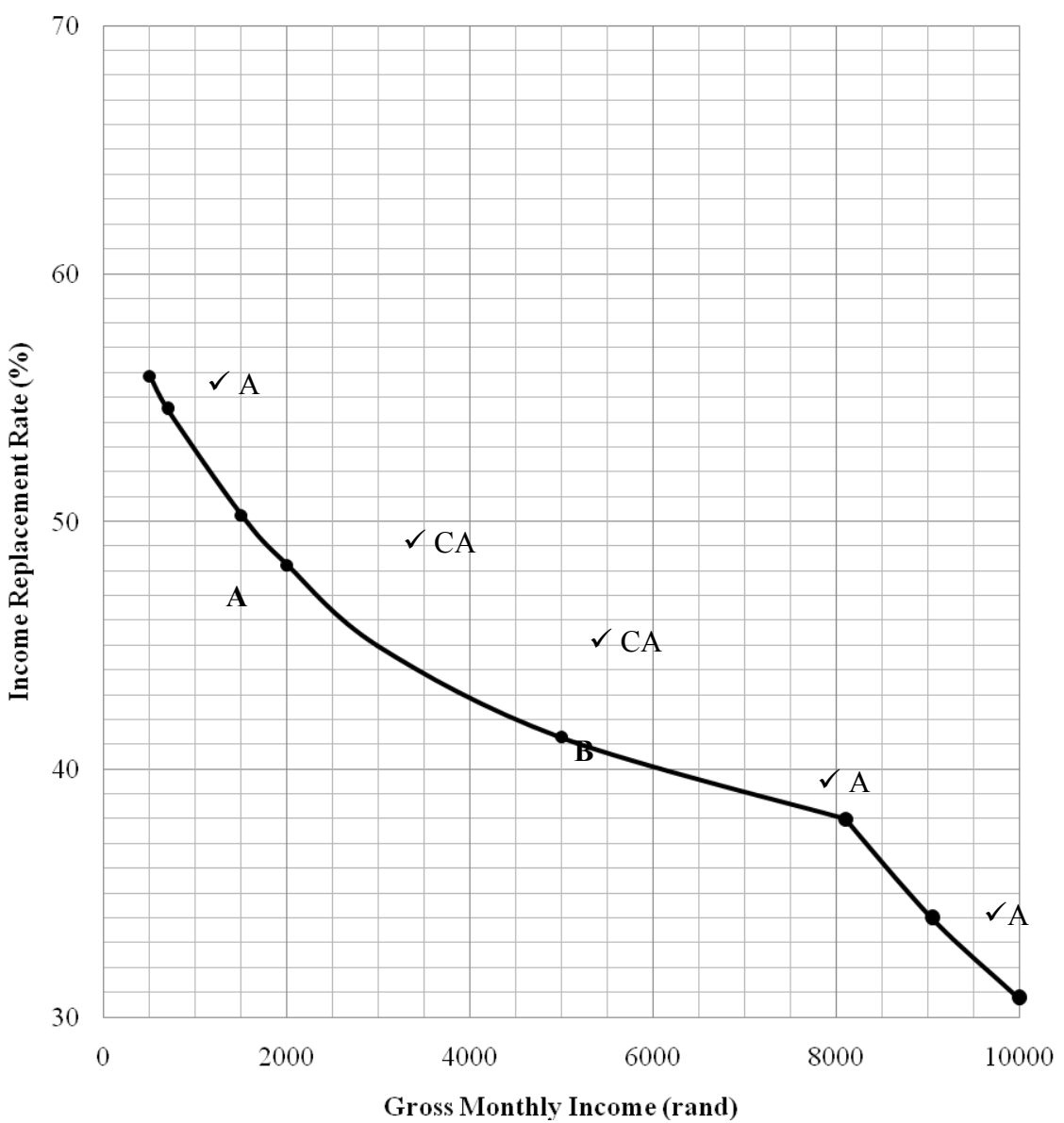
Ques	Solution	Explanation	Level
	$\begin{aligned} \text{Salary of one cleaner} &= 8 \times 20 \times R18,66 \\ &= R2\,985,60 \quad \checkmark CA \\ \text{Salary of one supervisor} &= R2\,985,60 + R230,00 \\ &= R3\,215,60 \quad \checkmark CA \\ \text{Total UIF payable:} & \\ \text{For 11 handymen} &=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

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

Ques	Solution	Explanation	Level
1.1.3	<p>Mean salary = <math>\frac{R934\,197,03}{306}</math> ✓MA</p> <p>= R3 052,93 ✓CA</p> <p>% difference =</p> $\frac{\text{Mean salary} - \text{cleaner's salary}}{\text{mean salary}} \times 100\%$ <p>✓M</p> $= \frac{R3\,052,93 - R2\,985,60}{R3\,052,93} \times 100\% \quad \checkmark CA$ <p>= 2,2054...%</p> <p>≈ 2,2% ✓CA</p> <p>The statement is <b>VALID</b>. ✓O</p> <p style="text-align: center;"><b>OR</b></p> <p>Mean salary = <math>\frac{R934\,197,03}{306}</math> ✓MA</p> <p>= R3 052,93 ✓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% ✓M</p> <p>≈ 2,2% ✓CA</p> <p>The statement is <b>VALID</b>. ✓O</p> <p style="text-align: center;"><b>OR</b></p> <p>Mean UIF payable = <math>\frac{R18\,683,93}{306}</math> ✓MA = 61,05859... ✓CA</p> <p>% difference = <math>\frac{\text{Mean UIF} - \text{Cleaners UIF}}{\text{Mean UIF}} \times 100\%</math></p> <p>✓M ✓M</p> $= \frac{61,05859... - 59,711985...}{61,05859...} \times 100\%$ <p>= 2,2054...%</p> <p>≈ 2,2% ✓CA</p> <p>The statement is <b>VALID</b>. ✓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;"><b>OR</b></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;"><b>OR</b></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 <math>11 + 12 + 272 + 11 = 306</math> ✓A</p> <p>Number of female cleaners = <math>\frac{3}{4} \times 272</math> = 204 ✓A</p> <p>Probability of selecting a female cleaner = <math>\frac{204}{306}</math> ✓CA = 0,66666.. <math>\approx 0,667</math> ✓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><b>Answer only full marks</b></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;"><b>OR</b></p> <p>The fraction for the male supervisors is smaller <math>\left(\frac{3}{306} = 0,0098039\right)</math> ✓✓O</p>	<p>2O explanation</p> <p style="text-align: right;">(2)</p>	<p>L2</p>
<p>1.3.1</p>	<p><math>A = \frac{R964,87}{R2\ 000} \times 100\%</math> ✓ RT ✓ M = 48,24 % ✓ A</p> <p><math>B = \frac{R2\ 065,49}{41,31\%}</math> ✓ M = R4 999,98 ✓ A</p> <p style="text-align: center;"><b>OR</b></p> <p>Last income <math>\times 41,31\% = R2\ 065,49</math> ✓ M <math>\therefore B = R2\ 065,49 \div 41,31\%</math> = 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;"><b>OR</b></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><b>NP - rounding</b></p> </div> <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;"> <p><b>Answer only full marks</b></p> </div> <p style="text-align: right;">(5)</p>	<p>L2</p>

Ques	Solution Explanation	Level
1.3.2	<p style="text-align: center;"><b>THE RELATIONSHIP BETWEEN THE GROSS MONTHLY INCOME AND THE INCOME REPLACEMENT RATE (IRR)</b></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)
		<b>[34]</b>

<b>QUESTION 2 [30 MARKS]</b>			
<b>Ques</b>	<b>Solution</b>	<b>Explanation</b>	<b>Level</b>
2.1.1	$P_{(\text{weight loss more than 20kg})} = \frac{\sqrt{A} \cdot 8}{12 \cdot \sqrt{A}} \times 100\%$ $\approx 66,67\% \quad \checkmark CA$	1A numerator 1A denominator  1CA probability as % <b>NP - rounding</b>  <b>Answer only full marks</b>	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 = $\frac{\sqrt{CA} \cdot 23,70 + 24,95}{2} \checkmark M$ $= 24,325$  $\approx 24,33\text{kg}$ $\checkmark CA$  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  <b>Max 4 marks if using SA males only</b>  <b>Max 3 marks if conversions are omitted</b>	L4
		(7)	
2.1.3	$\text{IQR for males (in kg)} = 34,63 - 16,52 = 18,11 \checkmark M \checkmark A$ $\text{IQR for females (in kg)} = 64,87 - 27,97 = 36,9 \checkmark A$ <p>The female IQR is more than the male IQR. <math>\checkmark\checkmark R</math></p>	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><b><u>Working with 365days:</u></b></p> <p>Mass in one can is <math>8,75 \times 4g = 35g</math> ✓MA</p> <p>Mass for a year is <math>=35g \times 365</math> ✓MA  <math>= 12\ 775g</math> ✓CA</p> <p>For 2 cans <math>= 2 \times 12\ 775g</math>  <math>= 25\ 550g</math> ✓CA</p> <p style="text-align: center;"><b>OR</b></p> <p>Mass in one can <math>= 8,75 \times 4 g = 35 g</math> ✓MA  Mass in TWO cans <math>= 35g \times 2 = 70 g</math> ✓MA</p> <p>Mass for a year <math>= 70 g \times 365</math> ✓M  <math>= 25\ 550 g</math> ✓CA</p> <p style="text-align: center;"><b>OR</b></p> <p>In 1 can <math>\rightarrow 8,75</math> teaspoons  2 cans <math>\rightarrow 17,5</math> teaspoons ✓A  Mass per day <math>= 17,5 \times 4 = 70 g</math> ✓MA  ✓M  Mass for the year <math>= 70 g \times 365 = 25\ 550 g</math> ✓CA</p> <p style="text-align: center;"><b>OR</b></p> <p><b><u>Working with 366 days:</u></b></p> <p>Mass in one can : <math>8,75 \times 4 g = 35g</math> ✓MA</p> <p>Mass of sugar for 1 can for one year  <math>= 35g \times 366 = 12810g</math> ✓M ✓CA  Mass of sugar in 2 cans for one year  <math>= 2 \times 12\ 810g = 25\ 620g</math> ✓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;"><b>OR</b></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;"><b>OR</b></p> <p>1A number of teaspoons 1MA mass per day 1M multiplying by 365 1CA simplification</p> <p style="text-align: center;"><b>OR</b></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 = <math>124 \times 2 + 116 + 168</math>                      = 532 calories <span style="float:right">✓A</span></p> <p>Calories after changing = <math>\left(\frac{500 \times 52}{240}\right) \times 2 + 32 + 0</math> <span style="float:right">✓M</span>                      = 248,67 calories <span style="float:right">✓CA</span></p> <p>Difference = 532 calories – 248,673 calories                      = 283,33 calories <span style="float:right">✓CA</span></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><b>NP - rounding</b></p> </div> <p style="text-align: right;">(5)</p>	L3									
2.2.3	<p><b>Sugar intake before diet:</b></p> <p>= <math>7,75 \times 2 + 7,25 + 10,5</math> <span style="float:right">✓MA</span></p> <p>= 33,25 tsp. OR 133grams <span style="float:right">✓CA</span></p> <p><b>Sugar intake after diet:</b></p> <p>= <math>2 \times \left(\frac{500 \times 3,25}{240}\right) + 2 + 0</math>  <span style="float:right">✓A</span></p> <p>= <math>2 \times 6,77 + 2 + 0,00</math></p> <p>= 15,54 tsp. OR 62,16 grams <span style="float:right">✓CA</span></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><math>= \frac{15,54}{33,25} \times 100\%</math></td> <td style="text-align: center;"><b>OR</b></td> <td><math>= \frac{62,16}{133} \times 100\%</math></td> </tr> <tr> <td><math>\approx 46,74\%</math> <span style="float:right">✓MA</span></td> <td></td> <td><math>\approx 46,74\%</math> <span style="float:right">✓MA</span></td> </tr> </tbody> </table> <p><b>NOT VALID</b> ✓O</p> <p style="text-align: center;"><b>OR</b></p> <p><b>Using Calories from Q 2.2.2</b></p> <p><math>\% \text{ Calories} = \frac{248,67}{532} \times 100\% = 46,7\%</math> <span style="float:right">✓CA</span>  <span style="float:right">✓M ✓CA ✓M</span></p> <p><b>NOT VALID</b> ✓O</p>	(using teaspoons)		(usings grams)	$= \frac{15,54}{33,25} \times 100\%$	<b>OR</b>	$= \frac{62,16}{133} \times 100\%$	$\approx 46,74\%$ <span style="float:right">✓MA</span>		$\approx 46,74\%$ <span style="float:right">✓MA</span>	<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;"><b>OR</b></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)										
$= \frac{15,54}{33,25} \times 100\%$	<b>OR</b>	$= \frac{62,16}{133} \times 100\%$										
$\approx 46,74\%$ <span style="float:right">✓MA</span>		$\approx 46,74\%$ <span style="float:right">✓MA</span>										
		<b>[30]</b>										



Ques	Solution	Explanation	
	<p><b>Area of northern wall</b>            = Area of wall – area of door ✓M            = <math>(3,3 \text{ m} \times 2,650 \text{ m}) - (2,082 \text{ m} \times 0,750 \text{ m})</math>            = <math>8,745 \text{ m}^2 - 1,5615 \text{ m}^2</math>            = <math>7,1835 \text{ m}^2</math> ✓CA</p> <p><b>Area of eastern wall</b>            = Area of wall – area of door ✓M            = <math>(3,3 \text{ m} \times 2,650 \text{ m}) - (2,032 \text{ m} \times 0,750 \text{ m})</math>            = <math>8,745 \text{ m}^2 - 1,524 \text{ m}^2</math>            = <math>7,221 \text{ m}^2</math> ✓CA</p> <p><b>Area of southern wall</b>            = Area of wall – area of door – area of window ✓M ✓A            = <math>(3,3 \text{ m} \times 2,650 \text{ m}) - (2,032 \text{ m} \times 0,750 \text{ m}) - (1,511 \text{ m} \times 0,949 \text{ m})</math>            = <math>8,745 \text{ m}^2 - 1,524 \text{ m}^2 - 1,434 \text{ m}^2</math>            = <math>5,787 \text{ m}^2</math> ✓CA</p> <p><b>Area of western wall</b>            = <math>(3,3 \text{ m} \times 2,650 \text{ m})</math>            = <math>8,745 \text{ m}^2</math> ✓CA</p> <p><b>Area to cover</b> ✓M            = <math>7,1835 \text{ m}^2 + 7,221 \text{ m}^2 + 5,787 \text{ m}^2 + 8,745 \text{ m}^2</math>            = <math>28,9365 \text{ m}^2</math> ✓CA  <math>\approx 29 \text{ m}^2</math> ✓R</p> <p style="text-align: center;"><b>OR</b></p> <p><b>Area of wall including door and window openings</b>            = perimeter of floor <math>\times</math> height            = <math>2 \times (\text{width} + \text{width}) \times \text{height}</math>            = <math>2 \times (3,3 \text{ m} + 3,3 \text{ m}) \times 2,650 \text{ m}</math> ✓M            = <math>34,98 \text{ m}^2</math> ✓CA</p> <p><b>Area of window 1 opening</b>            = length <math>\times</math> breadth ✓M            = <math>1,511 \text{ m} \times 0,949 \text{ m}</math>            = <math>1,433939 \text{ m}^2</math> ✓CA</p> <p><b>Area of 2 door openings</b>      <b>Area of opening to passage</b>            = <math>2 \times \text{length} \times \text{width}</math>      = length <math>\times</math> width            = <math>2 \times 2,032 \text{ m} \times 0,750 \text{ m}</math> ✓M      = <math>2,082 \text{ m} \times 0,75 \text{ m}</math> ✓M            = <math>3,048 \text{ m}^2 - 1,5615 \text{ m}^2</math> ✓CA      ✓CA</p> <p><b>Area to cover</b> ✓M            = <math>34,98 \text{ m}^2 - 1,433939 \text{ m}^2 - 3,048 \text{ m}^2 - 1,5615 \text{ m}^2</math>            = <math>28,936561 \text{ m}^2</math> ✓CA  <math>\approx 29 \text{ m}^2</math> ✓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;"><b>OR</b></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 = <math>2 \text{ m} \times 0,15 \text{ m}</math>  <math>= 0,3 \text{ m}^2</math> ✓A</p> <p>Number of panels needed = <math>\frac{29 \text{ m}^2}{0,3 \text{ m}^2}</math>  <math>= 96,666... \approx 97</math> ✓CA</p> <p>Total panels needed to be purchased  <math>= 97 \times 104,5\%</math> <b>OR</b> <math>97 \times 4,5\% = 4,365</math>  <math>= 101,365</math> ✓CA <math>\approx 5</math>  <math>\approx 102</math> <math>97 + 5 = 102</math> ✓CA</p> <p>Volume of 102 panels = <math>102 \times 0,0125 \text{ m} \times 0,3 \text{ m}^2</math> ✓R ✓C ✓SF  <math>= 0,3825 \text{ m}^3</math> ✓CA</p> <p>Cost of panels excluding VAT <b>OR</b> Price of wood including VAT  <math>= 0,3825 \times \text{R}5\,000,00</math> <math>= \text{R}5\,000 \text{ per m}^3 \times 114\%</math>  <math>= \text{R}1\,912,50</math> ✓CA <math>= \text{R}5\,700 \text{ per m}^3</math> ✓CA</p> <p>Cost of the panels including VAT Cost of the panels including VAT  <math>= 1,14 \times \text{R}1\,912,50</math> <math>= \text{R}5\,700 \times 0,3825</math>  <math>= \text{R}2\,180,25</math> ✓CA <math>= \text{R}2\,180,25</math> ✓CA</p> <p>Labour cost = <math>29 \times \text{R}125,00</math>  <math>= \text{R}3\,625,00</math> ✓CA</p> <p>Total cost = <math>\text{R}2\,180,25 + \text{R}3\,625,00</math>  <math>= \text{R}5\,805,25</math> ✓CA</p> <p>Budget is <b>ENOUGH</b> ✓O</p> <p style="text-align: center;"><b>OR</b></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 <math>\text{m}^3</math></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;"><b>OR</b></p>	L4

Ques	Solution	Explanation	
	<p>Surface area of wood = <math>29 \text{ m}^2</math> ✓CA</p> <p>Volume of wood = <math>29\text{m}^2 \times 0,0125 \text{ m}</math> ✓A  <math>= 0,3625 \text{ m}^3</math> ✓CA</p> <p>Total volume of wood = <math>0,3625 \times 104,5\%</math> ✓M  <math>= 0,3788125 \text{ m}^3</math> ✓CA  <math>= 0,38 \text{ m}^3</math> ✓CA</p> <p>Cost of panels excluding VAT  <math>= 0,38 \times \text{R}5\,000,00</math>  <math>= \text{R}1\,900,00</math> ✓CA</p> <p><b>OR</b></p> <p>Price of wood including VAT  <math>= \text{R}5\,000 \text{ per m}^3 \times 114\%</math>  <math>= \text{R}5\,700 \text{ per m}^3</math> ✓CA</p> <p>Cost of the panels including VAT  <math>= 1,14 \times \text{R}1\,900,00</math>  <math>= \text{R}2\,166,00</math> ✓CA</p> <p>Cost of the panels including VAT  <math>= \text{R}5\,700 \times 0,38</math>  <math>= \text{R}2\,166,00</math> ✓CA</p> <p>Labour cost = <math>29 \times \text{R}125,00</math>  <math>= \text{R}3\,625,00</math> ✓CA</p> <p>Total cost = <math>\text{R}2\,166,00 + \text{R}3\,625,00</math>  <math>= \text{R}5\,791,00</math> ✓CA</p> <p>Budget is <b>ENOUGH</b> ✓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;"> <p><b>NP - rounding</b></p> </div>	<p>(12)</p>
			<p><b>[31]</b></p>

<b>QUESTION 4 [31 MARKS]</b>			
<b>Ques</b>	<b>Solution</b>	<b>Explanation</b>	
4.1.1	- Course modules have different costs ✓✓O <p style="text-align: center;"><b>OR</b></p> - Course levels makes a difference. ✓✓O	2O relevant reason <p style="text-align: center;"><b>OR</b></p> 2O relevant reason (2)	L4
4.1.2	<p><b>Single rooms:</b> ✓✓O</p> - Have more privacy and is more convenient; no disturbance. <p style="text-align: center;"><b>OR</b></p> - Better facilities. ✓✓O <p style="text-align: center;"><b>OR</b> ✓✓O</p> <p><b>Double rooms:</b></p> - Are not private and not convenient. ✓✓O <p style="text-align: center;"><b>OR</b></p> - Students share costs ✓✓O	2O relevant reason (2)	L4
4.1.3	<p><b>Total fees for first year</b></p> = Tuition fees + hostel fees + non-SA citizen fee $= R28\ 470 + R18\ 928 + R2\ 000 \quad \checkmark M$ $= R49\ 398 \quad \checkmark CA$	1A all the values 1M adding fees 1CA total <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;"> <b>No penalty if deposit added</b> </div> (3)	L2
4.1.4	<p><b>Minimum payment on registration:</b></p> Cost = appl. fee + 30% of tuition + non-SA additional + accommodation dep. + monthly residence fee $= R0,00 + 30\% \times R28\ 470 + R2000 + R1\ 220,00 + \frac{R\ 18\ 928,00}{11}$ $= R8\ 541 + R2\ 000 + R1\ 220 + R1\ 720,73$ $= R13\ 481,73 \quad \checkmark CA$	1A using correct amounts 1M adding amounts 1S tuition fee 1S accommodation fee 1CA minimum payment <div style="border: 1px solid black; padding: 5px; width: fit-content; margin: 10px auto;"> <b>No penalty if deposit subtracted</b> </div> (5)	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><math>\Rightarrow</math> LO will be allocated 4 APS <math>\checkmark\text{A}</math></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;"><math>\checkmark\text{CA}</math></p> <p>She qualifies for <b>50% bursary.</b></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 = <math>\frac{\text{Total distance}}{\text{Average speed}}</math></p> $= \frac{1\ 602 \text{ km}}{108 \text{ km/h}} \quad \checkmark\text{SF}$ $= 14,8333 \text{ hrs } \text{OR} \approx 14 \text{ hours } 50 \text{ minutes} \quad \checkmark\text{CA}$ <p style="text-align: center;"><b>OR</b></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 = <math>\frac{\text{Total distance}}{\text{Average speed}}</math></p> $= \frac{1\ 602 \text{ km}}{108 \text{ km/h}} \quad \checkmark\text{SF}$ $= 14,8333 \text{ hrs } \text{OR} \approx 14 \text{ hours } 50 \text{ minutes} \quad \checkmark\text{CA}$	<p>1MA adding extra kilometres 1MA return on Gabarone 1CA total distance 1SF substitution 1CA Total time</p> <p style="text-align: center;"><b>OR</b></p> <p>2MA for adding the distances to travel 1CA total distance 1SFsubstitution 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 = <math>\frac{2\,690,064}{0,998}</math> NAD = 2 695,45491NAD ✓CA ≈ 2 695,45NAD</p> <p>Her estimation is <b>NOT VALID.</b> ✓O</p> <p style="text-align: center;"><b>OR</b></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 <b>NOT VALID.</b> ✓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;"><b>OR</b></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><b>NP - rounding</b></p> </div> <p>(6)</p>	L4
		<b>[31]</b>	



Ques	Solution	Explanation	
5.2.2	<p>North America's difference  <math>\approx 1\,010</math> million tons <math>- 410</math> million tons  <math>= 600</math> million tons ✓CA</p> <p>Asia's difference <math>\approx 1\,080</math> million tons <math>- 380</math> million tons  <math>= 700</math> million tons ✓CA</p> <p>Asia has a higher difference of crude oil than North America ✓J</p> <p style="text-align: center;"><b>OR</b></p> <p>Asia consumes much more crude oil than North America.</p>	<p>1CA for calculating North American difference                      [Accept values in range of <math>\pm 10</math> 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><b>Penalise with one mark if millions omitted</b></p> </div> <p style="text-align: right;">(3)</p>	<p>L2 L4</p>
5.2.3	<p>They both have vibrant economies, therefore these regions need a lot more energy. ✓✓O  <b>OR</b>                      Both regions have more industries. ✓✓O  <b>OR</b>                      The regions have large populations. ✓✓O  <b>OR</b>                      They use large volumes of oil because they have outdated ✓✓O technology.  <b>OR</b>                      First world regions ✓✓O  <b>OR</b>                      Developed regions ✓✓O</p>	<p>2O reason</p> <p style="text-align: right;">(2)</p>	<p>L4</p>
5.3.1	<p>Distance in km <math>= 33 \text{ mm} \div 25 \text{ mm} \times 5\,000 \text{ km}</math> ✓M  <math>= 6\,600 \text{ km}</math> ✓CA</p> <p>Distance in miles <math>= 6\,600 \text{ km} \div 1,609344</math>  <math>= 4\,101,049869 \text{ miles}</math> ✓CA  <math>\approx 4\,101,05 \text{ miles}</math></p> <div style="border: 1px solid black; padding: 10px; margin: 10px auto; width: 80%;"> <p><b>Accept measured distance from 27 to 29 mm and bar scale from 22 to 24 mm</b></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>	<p>L3</p>

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;"><b>OR</b></p> <p>30 % ~ 15 million barrels                      30 % ~ 15 million barrels ✓RD                      30 % ~ 15 million barrels ✓M                      10 % ~ <math>\frac{15}{3}</math> 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;"><b>OR</b></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><b>No penalty if millions omitted</b></p> </div> <p style="text-align: right;">(3)</p>	L2
5.3.3	<p>It is not the shortest route ✓✓O  <b>OR</b></p> <p>It will take longer to transport the oil ✓✓O</p> <p style="text-align: center;"><b>OR</b></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
		<b>[24]</b>	
		<b>TOTAL:150</b>	