



education

Department:
Education
REPUBLIC OF SOUTH AFRICA

NATIONAL SENIOR CERTIFICATE

GRADE 12

MATHEMATICAL LITERACY P2

FEBRUARY/MARCH 2010

MEMORANDUM

MARKS: 150

TIME: 3 hours

SYMBOL	EXPLANATION
A	Accuracy
CA	Consistent accuracy
C	Conversion
J	Justification (Reason/Opinion)
M	Method
MA	Method with accuracy
P	Penalty, e.g. for no units, incorrect rounding off etc.
R	Rounding off
RT/RG	Reading from a table/Reading from a graph
S	Simplification
SF	Substitution in a formula

This memorandum consists of 15 pages.

QUESTION 1 [26]						
Ques	Solution			Explanation	AS	
1.1	Column 1		Column 2	Column 3	1A No. of boxes 1M Multiplying 1CA Solution 1A % as decimal 1CA Solution 1CA Addition 1A % as decimal 1CA Solution 1CA Addition 1M Calculating % 1CA Solution 1CA Final answer (12)	12.1.1
	Item		Working details	Cost in rand		12.1.3
	Cost of manufacturing the required number of boxes of gloves	A	\checkmark^A $400 \times R98,00$	\checkmark^M $R39\ 200,00$		12.2.1
	Profit of 25% on the cost price	B	$0,25 \times R39\ 200,00$	\checkmark^M $R9\ 800,00$		
	Sub-total	C=A+B	$R39\ 200 + R9\ 800$	\checkmark^M $R49\ 000,00$		
	20% of the sub-total for transport and administration costs	D	\checkmark^A $0,2 \times R49\ 000,00$	\checkmark^M $R9\ 800,00$		
	Sub-total	E=C+D	$R49\ 000 + R9\ 800$	\checkmark^M $R58\ 800,00$		
	14% VAT (Value Added Tax)	F	$0,14 \times R58\ 800,00$	\checkmark^M $R8\ 232,00$		
TOTAL SELLING PRICE OF THE GLOVES (also called Pt, the value of the tender under consideration)	G=E+F	$R58\ 800 + R8\ 232$	\checkmark^M $R67\ 032,00$			

Ques	Solution	Explanation	AS
1.2	$P_s = 80 \left(1 - \frac{P_t - P_{\min}}{P_{\min}} \right) + 2,5$ $= 80 \left(1 - \frac{67\,032 - 56\,000}{56\,000} \right) + 2,5 \quad \checkmark \text{SF}$ $= 80(0,803) + 2,5 \quad \checkmark \text{S}$ $= 66,74 \quad \checkmark \text{CA}$	<p>1SF Correct substitution into formula</p> <p>1S Simplifying inside brackets</p> <p>1CA Points scored</p> <p>(3)</p>	12.2.1
1.3	$P_s = 80 \left(1 - \frac{P_t - P_{\min}}{P_{\min}} \right)$ $= 80 \left(1 - \frac{66\,000 - 56\,000}{56\,000} \right) \quad \checkmark \text{SF}$ $= 80(0,8214\dots)$ $= 65,71 \quad \checkmark \text{CA} \quad \checkmark \text{S}$ <p>High Five would get the bid because they have a higher score of 66,74. $\checkmark \checkmark \text{CA}$</p>	<p>1SF Substitution into formula</p> <p>1S Simplifying inside brackets</p> <p>1CA Points scored</p> <p>2CA Conclusion</p> <p>(5)</p>	12.2.1 11.2.3



Ques	Solution	Explanation	AS																		
<p><u>OPTION 1</u></p> <p>1.4.1</p>	<p>✓A</p> <p>10 boxes are packed in the first layer in the box,</p> <p>Layout of bottom layer:</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td></td> <td style="text-align: center;">10 cm</td> <td style="text-align: center;">10 cm</td> </tr> <tr> <td style="text-align: right;">8 cm</td> <td style="width: 20px; height: 15px;"></td> <td style="width: 20px; height: 15px;"></td> </tr> <tr> <td style="text-align: right;">8 cm</td> <td style="width: 20px; height: 15px;"></td> <td style="width: 20px; height: 15px;"></td> </tr> <tr> <td style="text-align: right;">8 cm</td> <td style="width: 20px; height: 15px;"></td> <td style="width: 20px; height: 15px;"></td> </tr> <tr> <td style="text-align: right;">8 cm</td> <td style="width: 20px; height: 15px;"></td> <td style="width: 20px; height: 15px;"></td> </tr> <tr> <td style="text-align: right;">8 cm</td> <td style="width: 20px; height: 15px;"></td> <td style="width: 20px; height: 15px;"></td> </tr> </table>		10 cm	10 cm	8 cm			8 cm			8 cm			8 cm			8 cm			<p>1A Ten boxes in each layer</p> <p>2A Correct diagram</p> <p style="text-align: right;">(3)</p>	<p>12.3.1</p>
	10 cm	10 cm																			
8 cm																					
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<p>1.4.2</p>	<p style="text-align: right;">✓CA</p> <p>Length of the container = $5 \times 8 \text{ cm} = 40 \text{ cm}$</p> <p style="text-align: right;">✓CA</p> <p>Breadth of the container = $2 \times 10 \text{ cm} = 20 \text{ cm}$</p> <p>The height of the container must be $4 \times$ height of one box.</p> <p style="text-align: right;">✓CA</p> <p>Height of the container = $4 \times 20 = 80 \text{ cm}$</p>	<p>1CA Length of container</p> <p>1CA Breadth of container</p> <p>1CA Height of the container</p> <p style="text-align: right;">(3)</p>																			
<p><u>OPTION 2</u></p> <p>1.4.1</p>	<p>✓A</p> <p>10 boxes are packed in the first layer in the box,</p> <p>Layout of bottom layer:</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td></td> <td style="text-align: center;">20 cm</td> <td style="text-align: center;">20 cm</td> </tr> <tr> <td style="text-align: right;">10 cm</td> <td style="width: 20px; height: 15px;"></td> <td style="width: 20px; height: 15px;"></td> </tr> <tr> <td style="text-align: right;">10 cm</td> <td style="width: 20px; height: 15px;"></td> <td style="width: 20px; height: 15px;"></td> </tr> <tr> <td style="text-align: right;">10 cm</td> <td style="width: 20px; height: 15px;"></td> <td style="width: 20px; height: 15px;"></td> </tr> <tr> <td style="text-align: right;">10 cm</td> <td style="width: 20px; height: 15px;"></td> <td style="width: 20px; height: 15px;"></td> </tr> <tr> <td style="text-align: right;">10 cm</td> <td style="width: 20px; height: 15px;"></td> <td style="width: 20px; height: 15px;"></td> </tr> </table>		20 cm	20 cm	10 cm			10 cm			10 cm			10 cm			10 cm			<p>1A Ten boxes in each layer</p> <p>2A Correct diagram</p> <p style="text-align: right;">(3)</p>	
	20 cm	20 cm																			
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<p>1.4.2</p>	<p>Length of the container = $5 \times 10 \text{ cm} = 50 \text{ cm}$ ✓CA</p> <p>Breadth of the container = $2 \times 20 \text{ cm} = 40 \text{ cm}$ ✓CA</p> <p>The height of the container must be $4 \times$ height of one box.</p> <p>Height of the container = $4 \times 8 = 32 \text{ cm}$ ✓CA</p> <p><u>OTHER OPTIONS ARE POSSIBLE</u></p>	<p>1CA Length of container</p> <p>1CA Breadth of container</p> <p>1CA Height of the container</p> <p style="text-align: right;">(3)</p>																			

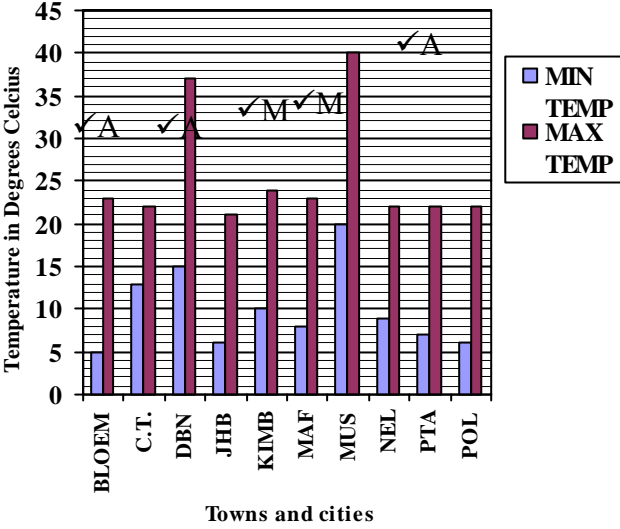
QUESTION 2 [36]			
Ques	Solution	Explanation	AS
2.1.1	Other ingredients like salt, water are also in the chips. These make up the missing grams. ✓J ✓J OR Any other plausible explanation	2J Justification (2)	12.2.3 12.4.4
2.1.2 (a)	Child should be eating $44,5 \times 0,8 \text{ g}$ ✓M $= 35,6 \text{ g protein}$ ✓A	1M Multiplying 1A Solution (2)	12.1.1 12.4.4
2.1.2 (b)	Energy provided by chips $= \frac{2\,110}{9\,572} \times 100\%$ ✓M $= 22,0434\dots\%$ ✓CA $\approx 22,04\%$ ✓R	1M Calculating % 1M Denominator 1CA Percentage 1R Rounding off (4)	12.1.1 12.4.4
2.1.3	1g of fat $\approx 38 \text{ kJ}$ ✓RT 36,0 g of fat $\approx 36,0 \times 38 \text{ kJ}$ $= 1\,368 \text{ kJ}$ ✓A	1RT Identifying mass of fat from the cheese and onion chips 1M Multiplying 1A Amount of energy (3)	12.1.1 12.4.4
2.1.4	<u>100g Salt and vinegar chips</u> Carbohydrate and protein content $= 54,3 \text{ g} + 5,2 \text{ g} = 59,5 \text{ g}$ ✓RT Fat content = 28,6g ✓RT <u>100g Cheese and onion chips</u> Carbohydrate and protein content $= 48,7 \text{ g} + 6,8 \text{ g} = 55,5 \text{ g}$ Fat content = 36,0 g ✓RT The salt and vinegar chips satisfy these conditions as they contains more protein and carbohydrates and less fat than the cheese and onion chips ✓✓O	2RT Reading from table 1RT Reading from table 2O Own opinion (5)	12.1.1 12.2.3 12.4.4

Ques	Solution	Explanation	AS
2.2.1	$\begin{aligned} \text{Cost in rand} &= R150 + 0,3 \times (800 - 500) \checkmark M \\ &= R150 + R90 \\ &\quad \checkmark A \\ &= R240 \end{aligned}$	1M Substitution 1A Simplification (2)	12.2.1
2.2.2 (a)	$\begin{aligned} \text{Cost in rand} \\ \checkmark A \quad \checkmark M \\ = R220 + 0,3 \times (\text{number of megabytes used} - 1\ 000) \checkmark A \end{aligned}$	1A Constant value 1M Addition 1A Final equation (3)	12.2.1
2.2.2 (b)	$\begin{aligned} A &= R\ 220,00 + R\ 0,30 \times 100 \checkmark M \\ &= R\ 250 \quad \checkmark CA \end{aligned}$	1M Substitution 1CA Value of A (2)	12.2.1
2.2.3	<p style="text-align: center;">MONTHLY COSTS FOR INTERNET ACCESS</p>	<p>Option 1 1A For (0 ; 150) 1A For line from 0 to 500 2A Any other two point 1CA label</p> <p>Option 2 1A For (0 ; 220) 1A For line from 0 to 1 000 1A Any other point 1CA Label</p> <p style="text-align: right;">(9)</p>	12.2.2

Ques	Solution	Explanation	AS
2.2.4	<p>Option 1 will give her 1 000 MB for R 300 ✓RG</p> <p>Option 2 will give her approximately 1 270 MB for R 300 ✓RG (actually = 1 266,6 MB)</p> <p>She should choose Option 2. Option 2 gives her the larger number of MB for her money. ✓J ✓J</p>	<p>1RG Number of MBs for 1GB</p> <p>1RG Number of MBs for 500 MB</p> <p>2J Advice</p> <p>(4)</p>	12.2.3



QUESTION 3 [31]			
Ques	Solution	Explanation	AS
3.1	Bloemfontein; Johannesburg; Kimberley; Mafikeng; Nelspruit; Pretoria and Polokwane	All 7 correct 3 marks Only 5 correct 2 marks Only 3 correct 1 mark (3)	12.4.3
3.2.1	Mean $25,6 = \frac{23 + 22 + A + 21 + 24 + 23 + 40 + 22 + 22 + 22}{10} \quad \checkmark A$ $256 = A + 219 \quad \checkmark M$ $A = 37 \quad \checkmark CA$	1M Understanding mean 1A Number of scores 1M Simplification 1CA Value of A (4)	12.4.3
3.2.2	21; 22; 22; 22; 22; 23; 23; 24; 37; 40 $\checkmark CA$ Median = $\frac{22 + 23}{2} \quad \checkmark M$ = 22,5 °C $\checkmark CA$	1CA Arranging in order (using value calculated in 3.1.1) 1M Finding median 1CA Median (3)	12.4.3
3.2.3	50 % of the cities and towns have temperatures greater than the median. $\checkmark J \quad \checkmark J$	2A Correct interpretation (2)	12.4.3
3.3	The mean is affected by the two high temperatures. (Durban 37°C and Musina 40°C). Eight of the ten towns and cities have maximum temperatures less than the mean. $\checkmark CA$ The median represents the maximum temperatures best. $\checkmark J$	2CA Rejecting the mean 1J Conclusion for best representation (3)	12.4.4

Ques	Solution	Explanation	AS																																	
3.4.1	<p style="text-align: center;">TEMPERATURES FOR 10 CITIES AND TOWNS IN S.A. ON 13/05/09</p>  <table border="1" style="margin-left: auto; margin-right: auto;"> <caption>Data from Temperature Chart</caption> <thead> <tr> <th>Town/City</th> <th>MIN TEMP (°C)</th> <th>MAX TEMP (°C)</th> </tr> </thead> <tbody> <tr><td>BLOEM</td><td>5</td><td>23</td></tr> <tr><td>C.T.</td><td>13</td><td>22</td></tr> <tr><td>DEN</td><td>15</td><td>37</td></tr> <tr><td>JHB</td><td>6</td><td>21</td></tr> <tr><td>KIMB</td><td>10</td><td>24</td></tr> <tr><td>MAF</td><td>8</td><td>23</td></tr> <tr><td>MUS</td><td>20</td><td>40</td></tr> <tr><td>NEL</td><td>9</td><td>22</td></tr> <tr><td>PTA</td><td>7</td><td>22</td></tr> <tr><td>POL</td><td>6</td><td>22</td></tr> </tbody> </table>	Town/City	MIN TEMP (°C)	MAX TEMP (°C)	BLOEM	5	23	C.T.	13	22	DEN	15	37	JHB	6	21	KIMB	10	24	MAF	8	23	MUS	20	40	NEL	9	22	PTA	7	22	POL	6	22	<p>2A Any two cities plotted correctly 1M Using bars 1M Bars drawn adjacent 1A correct graph</p> <p style="text-align: right;">(5)</p>	12.4.2
Town/City	MIN TEMP (°C)	MAX TEMP (°C)																																		
BLOEM	5	23																																		
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PTA	7	22																																		
POL	6	22																																		
3.4.2	<p>Difference in temperature of a town/city = Maximum temp – minimum temp ✓ M</p> <p>Durban: $37^{\circ}\text{C} - 15^{\circ}\text{C} = 22^{\circ}\text{C}$ ✓ A</p> <p>Musina: $40^{\circ}\text{C} - 20^{\circ}\text{C} = 20^{\circ}\text{C}$ ✓ A</p> <p>Durban has the greatest difference of 22°C. ✓ CA</p>	<p>1M Concept 2A Substitutions 1CA City with greatest difference</p> <p style="text-align: right;">(4)</p>	12.1.1 12.4.4																																	
3.5.1	<p>Area of living room = $4\text{ m} \times 5,25\text{ m}$ ✓ M</p> <p style="padding-left: 40px;">$= 21\text{ m}^2$. ✓ A</p> <p>Output capacity = $21 \times 125\text{ W}$ ✓ M</p> <p style="padding-left: 40px;">$= 2\,625\text{ W}$</p> <p style="padding-left: 40px;">$= 2,625\text{ kW}$ ✓ CA</p>	<p>1M Calculating area 1A Area of living room 1M Calculating capacity 1CA Solution</p> <p style="text-align: right;">(4)</p>	12.3.1 12.3.2																																	
3.5.2	<p>$2\text{ kW} = 2\,000\text{ W}$ ✓ C</p> <p>Size of room = $\frac{2\,000\text{ W}}{125\text{ W per m}^2}$ ✓ M</p> <p style="padding-left: 40px;">$= 16\text{ m}^2$ ✓ A</p>	<p>1C Converting 1M Dividing 1A Area</p> <p style="text-align: right;">(3)</p>	12.3.2																																	

Ques	Solution	Explanation	AS
4.2.1	$\text{Deposit} = 10\% \text{ of R } 25\,000,00 \quad \checkmark M$ $= R\,2\,500,00 \quad \checkmark A$	1M Calculating 10% 1A Value of deposit (2)	12.1.1
4.2.2	$P = \text{Balance} = R\,25\,000,00 - R\,2\,500,00$ $= R\,22\,500,00 \quad \checkmark CA$ $i = 33\% \text{ per annum}$ $= 0,33 \text{ per annum}$ $= \frac{0,33}{12} \text{ per month}$ $= 0,0275 \text{ per month} \quad \checkmark A$ $n = 24 \text{ months} \quad \checkmark A$ Amount owing = $A = P(I + i \times n)$ $= R\,22\,500(1 + 0,0275 \times 24) \quad \checkmark SF$ $= R\,37\,350,00 \quad \checkmark CA$ OR $n = 24 \text{ months} = 2 \text{ years} \quad \checkmark C$ Amount owing = $A = P(I + i \times n)$ $= R\,22\,500(1 + 0,33 \times 2) \quad \checkmark SF$ $= R\,37\,350,00 \quad \checkmark CA$ $\text{Monthly repayment} = \frac{R\,37\,350}{24} \quad \checkmark M$ $= R\,1\,556,25 \quad \checkmark CA$	1CA Balance after deposit 1A Value of i 1A Value of n 1SF Substituting value of P 1CA Amount to be paid 1C Converting 24 months to 2 yrs and 33% as 0,33 1SF Substitution into formula 1CA Amount to be paid 1M Finding monthly repayment 1CA Monthly repayment (5)	12.1.3
4.2.3	$\text{Total cost} = R\,2\,500,00 + R\,37\,350,00 \quad \checkmark M$ $= R\,39\,850,00 \quad \checkmark CA$	1M Adding 1CA Total to be paid (2)	12.1.1

Ques	Solution	Explanation	AS
4.3	<p>The total amount re-paid using the loan option is R 40 008,00.</p> <p>The total amount repaid using the hire purchase option is R 39 850</p> <p style="text-align: center;">✓CA</p> <p>Mosima should take the hire purchase option because she would pay R 158 less than the loan option. ✓✓J</p> <p style="text-align: center;">OR</p> <p style="text-align: center;">✓CA</p> <p>Mosima would take the loan option because, although monthly repayments are higher, the initiation fee of R 1 140 is lower than the deposit of R 2 500. ✓✓J</p>	<p>1CA Most economical option</p> <p>2J Justification of option</p> <p>1CA Most economical option</p> <p>2J Justification of option</p> <p style="text-align: right;">(3)</p>	12.2.1
4.4	<p>Length of box = 60 cm + 1 cm = 61 cm ✓M</p> <p>Height of box = 2 cm + 5 cm + 45 cm + 1 cm</p> <p style="text-align: center;">= 53 cm ✓A</p> <p>Width of box = 20 cm + 1 cm = 21 cm ✓A</p> <p>Volume of box = 61 cm × 53 cm × 21 cm ✓M</p> <p style="text-align: center;">= 67 893 cm³ ✓CA</p>	<p>1M Finding dimensions</p> <p>1A Correct dimensions</p> <p>1A Correct dimensions</p> <p>1M Substitution</p> <p>1CA Volume</p> <p style="text-align: right;">(5)</p>	12.3.1

QUESTION 5 [26]			
Ques	Solution	Explanation	AS
5.1.1	Number of houses surveyed $= 723 + 219 + 534 + 427 + 298 + 291 \quad \checkmark A$ $= 2\,492 \quad \checkmark CA$	1A Addition 1CA Solution (2)	12.1.1
5.1.2 (a)	P(2 or fewer people) $= \frac{\text{number of houses occupied by 2 or fewer people}}{\text{number of houses surveyed}}$ $= \frac{723 + 219 + 534}{2492} \quad \checkmark S$ $= \frac{1476}{2492} \quad \checkmark A = \frac{369}{623} \quad \checkmark A$	1S Substitution 1A Addition 1A Denominator (3)	12.4.5
5.1.2 (b)	$P(\text{more than 2 people}) = 1 - \frac{1\,476}{2\,492} \quad \checkmark M$ $= \frac{1\,016}{2\,492} = \frac{254}{623} \quad \checkmark S$ $P(2 \text{ or fewer people}) > P(\text{more than 2 people}) \quad \checkmark CA$ So, a greater probability is of choosing a house with 2 or fewer staying in it $\checkmark J$ OR $P(\text{more than 2 people}) = \frac{427 + 298 + 291}{2\,492} \quad \checkmark M$ $= \frac{1\,016}{2\,492} \quad \checkmark A = \frac{254}{623}$ $P(2 \text{ or fewer people}) > P(\text{more than 2 people}) \quad \checkmark CA$ So, a greater probability is of choosing a house with 2 or fewer staying in it $\checkmark J$	1 M Method 1S Simplifying fraction 1CA Explanation 1J Justification OR 1 M Method 1A Addition 1CA Explanation 1J Justification (4)	12.4.5

Ques	Solution	Explanation	AS
5.2.1	<p>Length of patio = $7 \text{ m} - (1,5 \text{ m} + 3 \text{ m}) = 2,5 \text{ m}$ ✓A</p> <p>Breath of patio = $6 \text{ m} - 4 \text{ m} = 2 \text{ m}$ ✓A</p> <p>Area of patio = length \times breadth</p> $= 2,5 \text{ m} \times 2 \text{ m}$ $= 5 \text{ m}^2 \quad \checkmark \text{CA}$ <p>Volume of rectangular prism = area of base \times height</p> $0,375 \text{ m}^3 = 5 \text{ m}^2 \times \text{thickness} \quad \checkmark \text{SF}$ $\text{thickness} = \frac{0,375 \text{ m}^3}{5 \text{ m}^2}$ $= 0,075 \text{ m} \quad \checkmark \text{A}$ $= 75 \text{ mm} \quad \checkmark \text{C}$	<p>1A Length of patio</p> <p>1A Breadth of patio</p> <p>1CA Solution</p> <p>1SF Substitution in the formula</p> <p>1A Thickness</p> <p>1C Conversion to mm</p> <p>(6)</p>	12.3.1



Ques	Solution	Explanation	AS
5.2.2	<p>Length of part of kitchen containing the L-shaped cupboard</p> $= 1,5 \text{ m} \quad \checkmark A$ <p>Area of kitchen containing the L-shaped cupboard</p> $= (1,5 \text{ m} - 0,45 \text{ m}) \times (2 \text{ m} - 0,45 \text{ m})$ $= 1,05 \text{ m} \times 1,55 \text{ m}$ $= 1,6275 \text{ m}^2 \quad \checkmark CA$ <p>Length of part of the kitchen containing the stove and sink</p> $= 1,5 \text{ m} \quad \checkmark A$ <p>Area of kitchen containing the stove and sink</p> $= (2 \text{ m} \times 1,5 \text{ m}) - 0,45 \text{ m}^2 - (0,45 \text{ m} \times 1 \text{ m})$ $= 3 \text{ m}^2 - 0,45 \text{ m}^2 - 0,45 \text{ m}^2$ $= 2,1 \text{ m}^2 \quad \checkmark CA$ <p>Area to be tiled</p> $= (4 \text{ m} \times 4 \text{ m}) + 1,6275 \text{ m}^2 + 2,1 \text{ m}^2$ $= 16 \text{ m}^2 + 1,6275 \text{ m}^2 + 2,1 \text{ m}^2$ $= 19,7275 \text{ m}^2$ $\approx 19,73 \text{ m}^2$	<p>1A Length of first part of kitchen</p> <p>1A Length to be tiled</p> <p>1A Breadth to be tiled</p> <p>1CA Area</p> <p>1A Length of second party of kitchen</p> <p>1M Area of kitchen containing the stove and sink</p> <p>1M Area of sink</p> <p>1CA Area</p> <p>1A Area of living room</p> <p>1CA Area</p> <p>1R Rounding off</p>	<p>12.3.1</p> <p>(11)</p>

TOTAL: 150