



# education

Department:  
Education  
**REPUBLIC OF SOUTH AFRICA**

## **NATIONAL SENIOR CERTIFICATE**

### **GRADE 12**

### **MATHEMATICAL LITERACY P2**

### **FEBRUARY/MARCH 2010**

### **MEMORANDUM**

**MARKS: 150**

**TIME: 3 hours**

<b>SYMBOL</b>	<b>EXPLANATION</b>
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.**

<b>QUESTION 1 [26]</b>						
<b>Ques</b>	<b>Solution</b>			<b>Explanation</b>	<b>AS</b>	
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	
	<b>Item</b>	<b>Working details</b>	<b>Cost in rand</b>		12.1.3	
	Cost of manufacturing the required number of boxes of gloves	<b>A</b> $\checkmark^A$ $400 \times R98,00$	$\checkmark^M$ $R39\,200,00$		$\checkmark^{CA}$ $R39\,200,00$	12.2.1
	Profit of 25% on the cost price	<b>B</b> $0,25 \times R39\,200,00$	$\checkmark^A$ $R9\,800,00$		$\checkmark^{CA}$ $R9\,800,00$	
	Sub-total	<b>C=A+B</b> $R39\,200 + R9\,800$	$\checkmark^{CA}$ $R49\,000,00$			
	20% of the sub-total for transport and administration costs	<b>D</b> $0,2 \times R49\,000,00$	$\checkmark^A$ $R9\,800,00$		$\checkmark^{CA}$ $R9\,800,00$	
	Sub-total	<b>E=C+D</b> $R49\,000 + R9\,800$	$\checkmark^{CA}$ $R58\,800,00$			
	14% VAT (Value Added Tax)	<b>F</b> $0,14 \times R58\,800,00$	$\checkmark^M$ $R8\,232,00$		$\checkmark^{CA}$ $R8\,232,00$	
<b>TOTAL SELLING PRICE OF THE GLOVES</b> (also called Pt, the value of the tender under consideration)	<b>G=E+F</b> $R58\,800 + R8\,232$	$\checkmark^{CA}$ $R67\,032,00$				

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 style="text-align: right;">(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. <math>\checkmark \checkmark \text{CA}</math></p>	<p>1SF Substitution into formula</p> <p>1S Simplifying inside brackets</p> <p>1CA Points scored</p> <p>2CA Conclusion</p> <p style="text-align: right;">(5)</p>	12.2.1 11.2.3

Ques	Solution	Explanation	AS																		
<p><b><u>OPTION 1</u></b></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 = <math>5 \times 8 \text{ cm} = 40 \text{ cm}</math></p> <p style="text-align: right;">✓CA</p> <p>Breadth of the container = <math>2 \times 10 \text{ cm} = 20 \text{ cm}</math></p> <p>The height of the container must be <math>4 \times</math> height of one box.</p> <p style="text-align: right;">✓CA</p> <p>Height of the container = <math>4 \times 20 = 80 \text{ cm}</math></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><b><u>OPTION 2</u></b></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 = <math>5 \times 10 \text{ cm} = 50 \text{ cm}</math> ✓CA</p> <p>Breadth of the container = <math>2 \times 20 \text{ cm} = 40 \text{ cm}</math> ✓CA</p> <p>The height of the container must be <math>4 \times</math> height of one box.</p> <p>Height of the container = <math>4 \times 8 = 32 \text{ cm}</math> ✓CA</p> <p><b><u>OTHER OPTIONS ARE POSSIBLE</u></b></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>																			

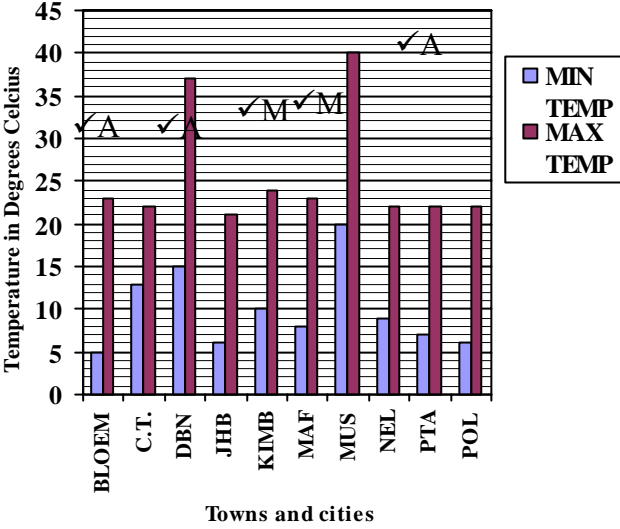
<b>QUESTION 2 [36]</b>			
<b>Ques</b>	<b>Solution</b>	<b>Explanation</b>	<b>AS</b>
2.1.1	Other ingredients like salt, water are also in the chips. These make up the missing grams. ✓J ✓J <b>OR</b> Any other plausible explanation	2J Justification  (2)	12.2.3 12.4.4
2.1.2 (a)	Child should be eating $44,5 \times 0,8 \text{ g}$ ✓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	$1 \text{ g of fat} \approx 38 \text{ kJ}$ ✓RT  $36,0 \text{ g of fat} \approx 36,0 \times 38 \text{ kJ}$ ✓M  $= 1\,368 \text{ kJ}$ ✓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 = $28,6 \text{ g}$ ✓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 = $36,0 \text{ g}$ ✓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;"><b>MONTHLY COSTS FOR INTERNET ACCESS</b></p> <p>The graph displays two linear functions representing different internet access options. Option 1 starts at a fixed cost of R150 for 0 MB and increases at a rate of R0,30 per MB. Option 2 starts at a fixed cost of R220 for 0 MB and increases at a rate of R0,25 per MB. The lines intersect at 500 MB used, where the cost is R220.</p>	<p><b>Option 1</b>                      1A For (0 ; 150)                       1A For line from 0 to 500                       2A Any other two point                       1CA label</p> <p><b>Option 2</b>                      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

<b>QUESTION 3 [31]</b>			
<b>Ques</b>	<b>Solution</b>	<b>Explanation</b>	<b>AS</b>
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 $25,6 = \frac{23 + 22 + A + 21 + 24 + 23 + 40 + 22 + 22 + 22}{10} \quad \checkmark M \quad \checkmark A$ $256 = A + 219 \quad \checkmark M$ $A = 37 \quad \checkmark CA$	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. $\checkmark CA$ (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;"><b>TEMPERATURES FOR 10 CITIES AND TOWNS IN S.A. ON 13/05/09</b></p>  <p style="text-align: center;">Temperature in Degrees Celcius</p> <p style="text-align: center;">Towns and cities</p>	<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
3.4.2	<p>Difference in temperature of a town/city = Maximum temp – minimum temp ✓M</p> <p>Durban: <math>37^{\circ}\text{C} - 15^{\circ}\text{C} = 22^{\circ}\text{C}</math> ✓A Musina: <math>40^{\circ}\text{C} - 20^{\circ}\text{C} = 20^{\circ}\text{C}</math> ✓A</p> <p>Durban has the greatest difference of <math>22^{\circ}\text{C}</math>. ✓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 = <math>4\text{ m} \times 5,25\text{ m}</math> ✓M <math>= 21\text{ m}^2</math>. ✓A</p> <p>Output capacity = <math>21 \times 125\text{ W}</math> ✓M <math>= 2\,625\text{ W}</math> <math>= 2,625\text{ kW}</math> ✓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><math>2\text{ kW} = 2\,000\text{ W}</math> ✓C</p> <p>Size of room = <math>\frac{2\,000\text{ W}}{125\text{ W per m}^2}</math> ✓M <math>= 16\text{ m}^2</math> ✓A</p>	<p>1C Converting 1M Dividing 1A Area</p> <p style="text-align: right;">(3)</p>	12.3.2

<b>QUESTION 4 [31]</b>			
<b>Ques</b>	<b>Solution</b>	<b>Explanation</b>	<b>AS</b>
4.1.1	$48\,534,06 = 1\,140,00 + 42 \times (B + 57,00) \quad \checkmark\text{RT}$ $47\,394,06 = 42 \times (B + 57,00) \quad \checkmark\text{CA}$ $1\,128,43 = A + 57,00 \quad \checkmark\text{M}$ $1071,43 = A \quad \checkmark\text{CA}$	1RT Total amount paid 1RT Number of instalments 1CA Subtracting 1 140,00  1M Dividing by 42  1CA Value of B  (5)	12.2.1
4.1.2	Loan cost her R 48 534,06 – R 25 000 $\checkmark\text{RT}$  $= \text{R } 23\,534,06 \quad \checkmark\text{CA}$	1RT Reading from table  1CA Cost of loan  (2)	12.1.3 12.2.1
4.1.3	$A = \text{R}1\,562,50 \times 24 = \text{R}37\,500 \quad \checkmark\text{A}$ $P = \text{R}25\,000$ $i = \dots$ $n = 24$  $1 + i = 24\sqrt[24]{\frac{37\,500}{25\,000}} \quad \checkmark\text{M}$ $1 + i = \sqrt[24]{1,5} \quad \checkmark\text{A}$ $1 + i = 1,017 \dots \quad \checkmark\text{A}$  $i = 0,017 \dots \text{ per month } \checkmark\text{CA}$  $\therefore i = 0,017 \dots \times 12 \text{ per annum}$  $= 0,204 \dots \text{ per annum } \checkmark\text{CA}$  $= 0,204 \dots \times 100\%$  $= 20,445 \dots \%$  $\approx 20,45\% \quad \checkmark\text{CA}$	1A Value of A    1M Substitution  1A Simplification  1A Simplification  1CA Value of $i$ per month   1CA Value of $i$ per month   1CA %  (7)	12.1.3



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 cm<sup>3</sup> ✓CA</p>	<p>1M Finding dimensions</p> <p>1 A 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

<b>QUESTION 5 [26]</b>			
<b>Ques</b>	<b>Solution</b>	<b>Explanation</b>	<b>AS</b>
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 $\checkmark J$ <b>OR</b> $P(\text{more than 2 people}) = \frac{427 + 298 + 291}{2\,492} \quad \checkmark M$ $= \frac{1\,016}{2\,492} \quad \checkmark A = \frac{254}{623}$ $P(2 \text{ or fewer people}) > P(\text{more than 2 people}) \quad \checkmark CA$ 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 <b>OR</b> 1 M Method 1A Addition 1CA Explanation 1J Justification (4)	12.4.5

Ques	Solution	Explanation	AS
5.2.1	<p>Length of patio = <math>7 \text{ m} - (1,5 \text{ m} + 3 \text{ m}) = 2,5 \text{ m}</math> ✓A</p> <p>Breath of patio = <math>6 \text{ m} - 4 \text{ m} = 2 \text{ m}</math> ✓A</p> <p>Area of patio = length <math>\times</math> 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 <math>\times</math> 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>(11)</p>	12.3.1

**TOTAL: 150**