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

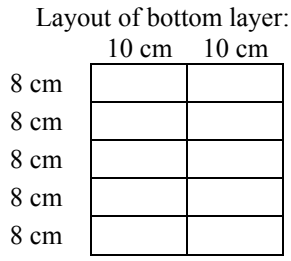
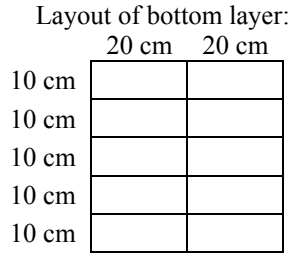
This memorandum consists of 15 pages.

QUESTION 1 [26]

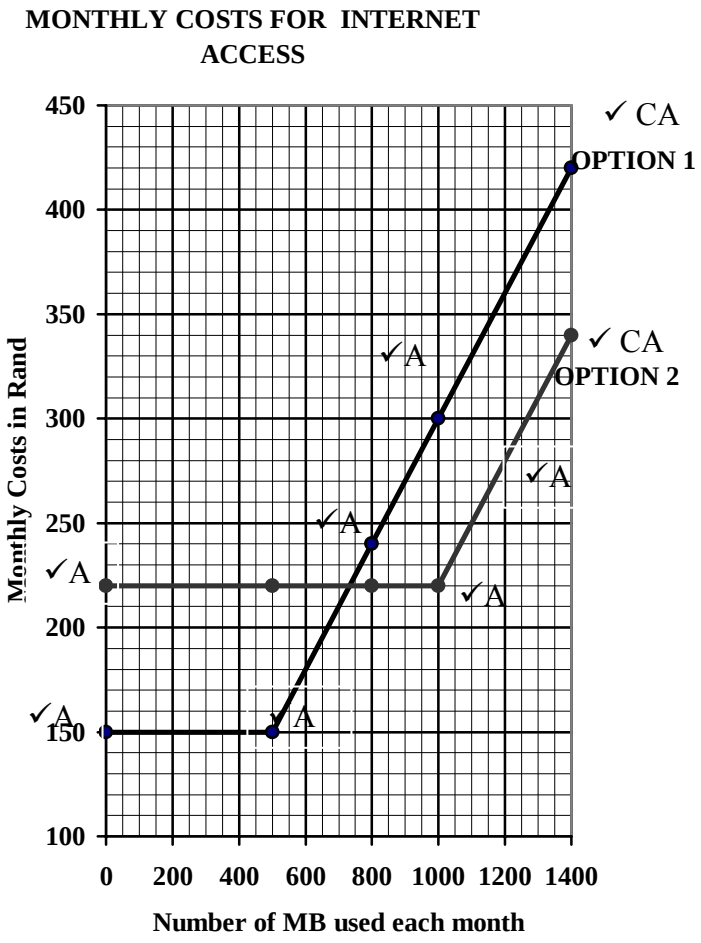
Ques	Solution	Explanation	AS
1.1	See table below	See table below	12.1.1 12.1.3 12.2.1

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

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

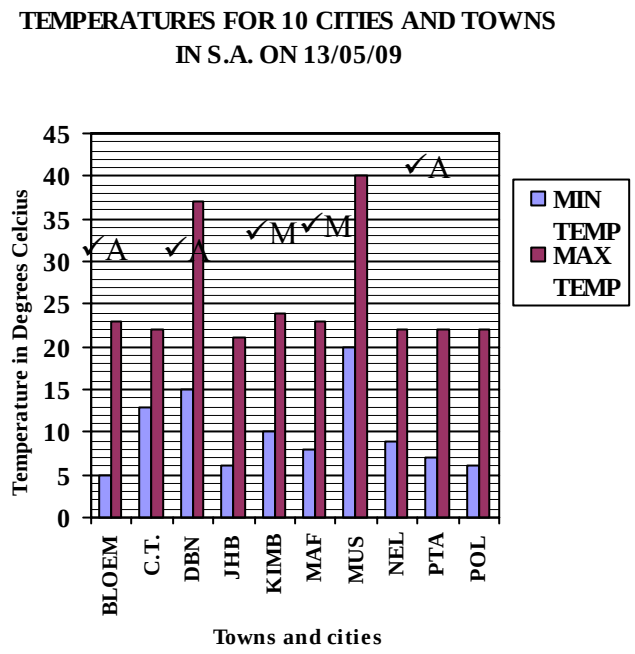
Ques	Solution	Explanation	AS
OPTION 1			12.3.1
1.4.1	✓A 10 boxes are packed in the first layer in the box,  	1A Ten boxes in each layer 2A Correct diagram (3)	
1.4.2	✓CA Length of the container = 5 × 8 cm = 40 cm ✓CA Breadth of the container = 2 × 10 cm = 20 cm The height of the container must be 4 × height of one box. ✓CA Height of the container = 4 × 20 = 80 cm	1CA Length of container 1CA Breadth of container 1CA Height of the container (3)	
OPTION 2			
1.4.1	✓A 10 boxes are packed in the first layer in the box,  	1A Ten boxes in each layer 2A Correct diagram (3)	
1.4.2	Length of the container = 5 × 10 cm ✓CA = 50 cm Breadth of the container = 2 × 20 cm ✓CA = 40 cm The height of the container must be 4 × height of one box. Height of the container = 4 × 8 ✓CA = 32 cm **OTHER OPTIONS ARE POSSIBLE**	1CA Length of container 1CA Breadth of container 1CA Height of the container (3)	

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 $44,5 \times 0,8$ g ✓M $= 35,6$ 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 ✓M $= 22,0434\ldots\%$ ✓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 kJ ✓RT ✓M 36,0 g of fat $\approx 36,0 \times 38$ kJ $= 1\,368$ 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 $= 54,3$ g + 5,2g = 59,5g ✓RT Fat content = 28,6g ✓RT <u>100g Cheese and onion chips</u> Carbohydrate and protein content $= 48,7$ g + 6,8g = 55,5 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	Cost in rand = R150 + 0,3 × (800 – 500)✓M = R150 + R90 ✓A = R240	1M Substitution 1A Simplification (2)	12.2.1
2.2.2 (a)	Cost in rand ✓A ✓M ✓A = R220 + 0,3 × (number of megabytes used – 1 000)	1A Constant value 1M Addition 1A Final equation (3)	12.2.1
2.2.2 (b)	A = R 220,00 + R 0,30 × 100 ✓M = R 250 ✓CA	1M Substitution 1CA Value of A (2)	12.2.1
2.2.3		**Option 1** 1A For (0 ; 150) 1A For line from 0 to 500 2A Any other two point 1CA label **Option 2** 1A For (0 ; 220) 1A For line from 0 to 1 000 1A Any other point 1CA Label (9)	12.2.2

Ques	Solution	Explanation	AS
2.2.4	Option 1 will give her 1 000 MB for R 300 ✓RG ✓RG Option 2 will give her approximately 1 270 MB for R 300 (actually = 1 266,$\dot{6}$ MB) She should choose Option 2. Option 2 gives her the larger number of MB for her money. ✓J ✓J	1RG Number of MBs for 1GB 1RG Number of MBs for 500 MB 2J Advice (4)	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 $25{,}6 = \frac{23+22+A+21+24+23+40+22+22+22}{10}$ ✓M ✓A $256 = A + 219$ ✓M $A = 37$ ✓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 ✓CA Median $= \frac{22+23}{2}$ ✓M $= 22{,}5$ °C ✓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. ✓J ✓J	2A Correct interpretation (2)	12.4.3
3.3	The mean is affected by the two high temperatures. ✓CA (Durban 37ºC and Musina 40ºC). Eight of the ten towns and cities have maximum temperatures less than the mean. ✓CA The median represents the maximum temperatures best. ✓J	2CA Rejecting the mean 1J Conclusion for best representation (3)	12.4.4

Ques	Solution	Explanation	AS
3.4.1		2A Any two cities plotted correctly 1M Using bars 1M Bars drawn adjacent 1A correct graph (5)	12.4.2
3.4.2	Difference in temperature of a town/city = Maximum temp – minimum temp ✓ M Durban: $37\,^{o}C - 15\,^{o}C = 22\,^{o}C$ ✓A Musina: $40\,^{o}C - 20\,^{o}C = 20\,^{o}C$ ✓ A Durban has the greatest difference of $22\,^{o}C$. ✓ CA	1M Concept 2A Substitutions 1CA City with greatest difference (4)	12.1.1 12.4.4
3.5.1	Area of living room = 4 m × 5,25 m ✓M $= 21\ m^2$. ✓A Output capacity = 21 × 125 W ✓M = 2 625 W = 2,625 kW ✓CA	1M Calculating area 1A Area of living room 1M Calculating capacity 1CA Solution (4)	12.3.1 12.3.2
3.5.2	2 kW = 2 000 W ✓C Size of room = $\frac{2\,000\ W}{125\ W\ per\ m^2}$ ✓M $= 16\ m^2$ ✓A	1C Converting 1M Dividing 1A Area (3)	12.3.2

QUESTION 4 [31]			
Ques	**Solution**	**Explanation**	**AS**
4.1.1	✓RT ✓RT 48 534,06 = 1 140,00 + 42 × (B + 57,00) 47 394,06 = 42 × (B + 57,00) ✓CA 1 128,43 = A + 57,00 ✓M 1071,43 = A ✓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 ✓RT = R 23 534,06 ✓CA	1RT Reading from table 1CA Cost of loan (2)	12.1.3 12.2.1
4.1.3	A = R1 562,50 × 24 = R37 500 ✓A P = R25 000 i = … n = 24 $1 + i = \sqrt[24]{\frac{37\,500}{25\,000}}$ ✓M $1 + i = \sqrt[24]{1,5}$ ✓A $1 + i = 1,017\ldots$ ✓A i = 0,017 … per month ✓CA $\therefore i$ = 0,017 … × 12 per annum = 0,204 … per annum ✓CA = 0,204 …× 100% = 20,445 … % ≈ 20,45% ✓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
4.2.1	Deposit = 10% of R 25 000,00 ✓M ✓A = R 2 500,00	1M Calculating 10% 1A Value of deposit (2)	12.1.1
4.2.2	***P*** = Balance = R 25 000,00 – R 2 500,00 ✓CA = R 22 500,00 ***i*** = 33% per annum = 0,33 per annum = $\frac{0,33}{12}$ per month = 0,0275 per month ✓A ***n*** = 24 months ✓A Amount owing = ***A = P(1 + i × n)*** ✓SF = R 22 500(1 + 0,0275 × 24) = R 37 350,00 ✓CA OR *n* = 24 months = 2 years ✓C Amount owing = ***A = P(1 + i × n)*** ✓SF = R 22 500(1 + 0,33 × 2) = R 37 350,00 ✓CA Monthly repayment = $\frac{\text{R } 37\,350}{24}$ ✓M ✓CA = R 1 556,25	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	Total cost = R 2 500,00 + R 37 350,00 ✓M = R 39 850,00 ✓CA	1M Adding 1CA Total to be paid (2)	12.1.1

Ques	Solution	Explanation	AS
4.3	The total amount re-paid using the loan option is R 40 008,00. The total amount repaid using the hire purchase option is R 39 850 ✓CA Mosima should take the hire purchase option because she would pay R 158 less than the loan option. ✓✓J OR ✓CA 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	1CA Most economical option 2J Justification of option 1CA Most economical option 2J Justification of option (3)	12.2.1
4.4	Length of box = 60 cm + 1 cm = 61 cm ✓M Height of box = 2 cm + 5 cm + 45 cm + 1 cm = 53 cm ✓A Width of box = 20 cm + 1 cm = 21 cm ✓A Volume of box = 61 cm × 53 cm × 21 cm ✓M ✓CA = 67 893 cm^3	1M Finding dimensions 1 A Correct dimensions 1A Correct dimensions 1M Substitution 1CA Volume (5)	12.3.1

QUESTION 5 [26]			
Ques	**Solution**	**Explanation**	**AS**
5.1.1	Number of houses surveyed $= 723 + 219 + 534 + 427 + 298 + 291$ ✓A $= 2\,492$ ✓CA	1A Addition 1CA Solution (2)	12.1.1
5.1.2 (a)	P(2 or fewer people) $= \frac{\text{number of houses occupied by 2 or fewer people}}{\text{number of houses surveyed}}$ $= \frac{723 + 219 + 534}{2492}$ ✓S $= \frac{1476}{2492}$ ✓A ✓A $= \frac{369}{623}$	1S Substitution 1A Addition 1A Denominator (3)	12.4.5
5.1.2 (b)	P(more than 2 people) $= 1 - \frac{1\,476}{2\,492}$ ✓M $= \frac{1\,016}{2\,492}$ ✓S $= \frac{254}{623}$ P(2 or fewer people) > P(more than 2 people) ✓CA So, a greater probability is of choosing a house with 2 or fewer staying in it ✓J **OR** P(more than 2 people) $= \frac{427 + 298 + 291}{2\,492}$ ✓M $= \frac{1\,016}{2\,492}$ ✓A $= \frac{254}{623}$ P(2 or fewer people) > P(more than 2 people) ✓CA So, a greater probability is of choosing a house with 2 or fewer staying in it ✓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	Length of patio = 7 m – (1,5 m + 3 m) = 2,5 m ✓A Breath of patio = 6 m – 4 m = 2 m ✓A Area of patio = length × breadth = 2, 5m × 2m = 5 m^2 ✓CA Volume of rectangular prism = area of base × height 0,375 m^3 = 5 m^2 × thickness ✓SF thickness = $\frac{0,375m^3}{5m^2}$ = 0,075 m ✓A = 75 mm ✓C	1A Length of patio 1A Breadth of patio 1CA Solution 1SF Substitution in the formula 1A Thickness 1C Conversion to mm (6)	12.3.1

Ques	Solution	Explanation	AS
5.2.2	Length of part of kitchen containing the L-shaped cupboard = 1,5 m ✓A Area of kitchen containing the L-shaped cupboard = (1,5 m – 0,45 m) × (2 m – 0,45 m) ✓A ✓A = 1,05 m × 1,55 m = 1,6275 m^2 ✓CA Length of part of the kitchen containing the stove and sink = 1,5 m ✓A Area of kitchen containing the stove and sink = (2 m × 1,5 m) – 0,45 m^2 – (0,45 m × 1 m) ✓M ✓M = 3 m^2 – 0,45 m^2 – 0,45 m^2 = 2,1 m^2 ✓CA Area to be tiled = (4 m × 4 m) + 1,6275 m^2 + 2,1 m^2 = 16 m^2 + 1,6275 m^2 + 2,1 m^2 ✓A = 19,7275 m^2 ✓CA ≈ 19,73 m^2 ✓R	1A Length of first part of kitchen 1A Length to be tiled 1A Breadth to be tiled 1CA Area 1A Length of second party of kitchen 1M Area of kitchen containing the stove and sink 1M Area of sink 1CA Area 1A Area of living room 1CA Area 1R Rounding off (11)	12.3.1

TOTAL: 150