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**NATIONAL
SENIOR CERTIFICATE**

GRADE 12

SEPTEMBER 2016

**MATHEMATICAL LITERACY P2
MEMORANDUM**

MARKS:

150

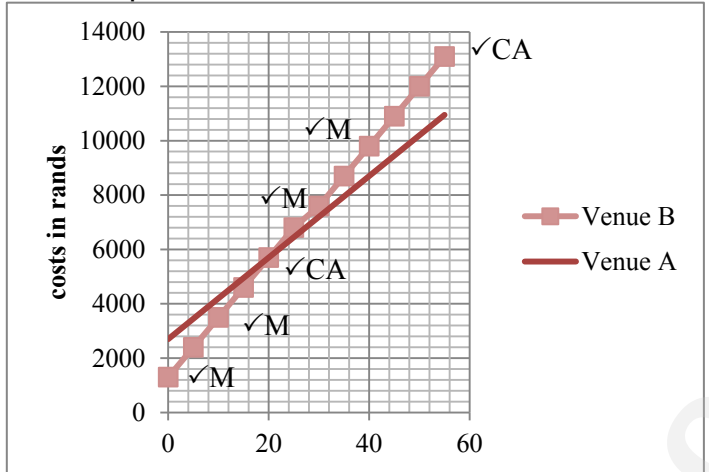
Symbol	Explanation
M	Method
MA	Method with accuracy
CA	Consistent accuracy
A	Accuracy
C	Conversion
S	Simplification
RT/RG/RM	Reading from a table/Reading from a graph/Read from map
F	Choosing the correct formula
SF	Substitution in a formula
J	Justification
P	Penalty, e.g. for no units, incorrect rounding etc.
R	Rounding /Reason

This memorandum consists of 10 pages.

QUESTION 1 [21]			
Ques	Solution	Explanation	Level
1.1	Two bedroomed flats in 1 block $= 2 \times 3$ $= 6$ Total no of flats in 8 blocks $= 6 \times 8$ $= 48$ One bedroomed flats $= 2 \times 3$ $= 6$ ✓M Total no of one bedroomed flats $= 6 \times 8$ $= 48$ Total no of flats $48 + 48$ $= 96$ ✓CA	1M Calculating no of both flats 1CA Total no of flat (2)	L2
1.2	Income for 2 bedroomed flats ✓M $= \frac{107,5}{100} \times 3200$ $= 3440 \times 48$ $= R 165\,120$ ✓M Income for 1 bedroomed flats $= 2300 \times 48$ $= R 110\,400$ ✓M Total income $= 165\,120 + 110\,400$ $= R 275\,520$ ✓CA	1M Increasing by 7,5% 1M For 2 bedroomed flats 1M For 1 bedroomed flats 1CA Total (4)	L3
1.3	If 1 Ghanaian cedi = 3,77 South African Rand ✓M $415 = 3,77 \times 415$ $= R 1\,564,55$ ✓CA Amount outstanding $= 2\,300 - 1\,564,55$ ✓M $= R 735,45$ $= R 735$ ✓CA	1C Using 3,77 1CA 1M Difference 1CA Answer (4)	L2

1.4	If all occupied : $48 \times 3\,440 = 165\,120 \checkmark M$ $93,75\% \times 48 = 45$ $93,75\% \text{ occupied} = 45 \times 3\,440$ $= 154\,800 \checkmark CA$ $\text{Money lost} = 165\,120 - 154\,800 \checkmark M$ $= R\,10\,320 \checkmark CA$ OR $\checkmark M$ $93,75\% \times 165\,120$ $= 154\,800$ $\checkmark M/A$ $\text{Money lost} = 165\,120 - 154\,800 \checkmark M$ $= R\,10\,320 \checkmark CA$ OR $93,75\% \times 48 = 45 \checkmark M/A$ $\checkmark CA$ $48 - 45 = 3 \times 3\,440 \checkmark M$ $= R\,10\,320 \checkmark CA$ OR $\checkmark M$ $0,0625 \times 48 = 3 \checkmark CA$ $3 \times 3\,440 \checkmark M$ $= R\,10\,320 \checkmark CA$ OR $100 - 93,75\% = 6,25\% \checkmark \checkmark M/A$ $= 6,25\% \times 165\,120 \checkmark \checkmark M/A$ $= R\,10\,320 \checkmark CA$	CA from 1.1.1 1M Total income 1CA 1M getting the difference 1CA 1M Calculating 93,75% 1CA Answer 1M Subtracting 1CA MA For 45 1CA Difference 1M Multiplying by 3440 1CA Answer 1M Calculating 6,25% 1CA 1M Multiplying by 3440 1CA 1MA Difference between 100% and 93,75% 2M 1CA (4)	L4
1.5	People in 8 blocks $36 \times 8 = 288 \checkmark M/A$ $\frac{37,5}{100} \times 288$ $= 108 \checkmark CA$ Children = $288 - 108$ $= 180 \checkmark CA \checkmark MA$ OR $\checkmark \checkmark M$ $\frac{62,5}{100} \times 288 = 108 \checkmark MA$ Children = $288 - 108 \checkmark M$ $= 180 \checkmark CA$	1MA Calculating the number of people 1CA 1M Subtraction 1CA Answer 2M Using 62,5% 1CA 1M Subtraction 1CA Answer (5)	L2
1.6	Probability = $\frac{1}{96} \checkmark A$ $\checkmark A$	CA from 1.1.1 1A numerator 1A denominator (2)	L2

QUESTION 2 [29]				
2.1	2.1.1	Range = max – min $78 = 132 - A$ (min) ✓M $A = 132 - 78$ ✓M $= 54$ ✓CA	1M Concept of range 1M Subtracting 1CA (3)	L2
	2.1.2	Mean = $\frac{\text{sum of the numbers}}{14}$ ✓MA $90 = \frac{65+79+B+98+54+68+90+76+84+102+132+121+B+B}{14}$ $90 \times 14 = 969 + 3B$ ✓S $1260 = 969 + 3B$ ✓M $1260 - 969 = 3B$ $291 = 3B$ $\frac{291}{3} = B$ Mode = 97 ✓CA	CA From 2.1.1 1MA Sum of values divided by 14 1S 1M Multiplying and adding B's 1A (4)	L4
	2.1.3	✓MA 54 65 68 76 79 84 90 97 97 97 98 102 121 132 Q_2 (median) = $\frac{90+97}{2}$ ✓A ✓M $= 93,5$ ✓CA Q_1 (lower Quartile) = 76 ✓CA Q_3 (upper Quartile) = 98 ✓CA	CA from 2.1.1 and 2.1.2 1MA Arranging in ascending order 1M Adding the 2 values 1M Dividing by 2 1CA Median 1CA Q_1 1CA Q_2 (6)	L3
	2.1.4	In paper 2 the mean is lower than in paper 1 ✓✓R therefore paper 1 was performed better than 2 OR Paper 2 was more difficult ✓✓R OR Paper 1 was more easier ✓✓R	2R 2R 2R (2)	L4
	2.1.5	Probability = $\frac{3}{14}$ ✓A $\frac{3}{14}$ ✓A	CA from 2.1.1, 2.1.2 and 2.1.3 1A numerator 1A denominator (2)	L2
2.2	2.2.1	Costs for venue A ✓M $= R1\ 500 + R1\ 200 + (R150 \times 66)$ $= R12\ 600$ ✓CA Costs for venue B = $R\ 1\ 000 + 220 \times 66$ $= R\ 15\ 520$ ✓CA Difference = $15\ 520 - 12\ 600$ $= R\ 2\ 920$ ✓CA	1M Multiply by 66 1CA Cost for venue A 1CA Cost for venue B 1CA Difference in cost (5)	L3

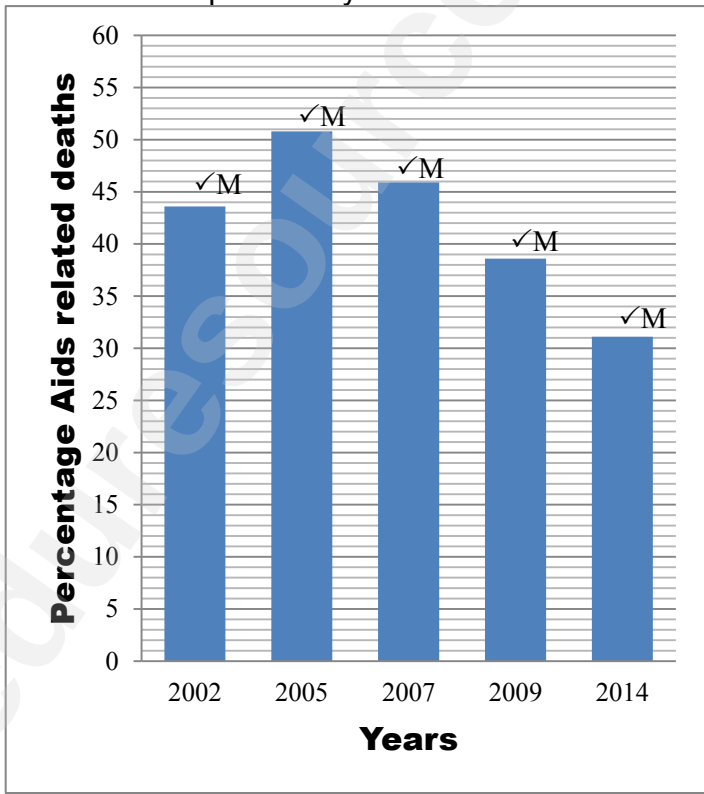
2.2.2	Graph to show costs of venues A and B  No. of learners	1M Plotting 0 and 1000 1M For every 3 values plotted correctly 1CA Joining points to form a line 1CA Breakeven point (6)	L3
2.2.3	Breakeven point is where the cost of Venue A is equal to the cost of venue B ✓O for the same number of learners ✓O Number of learners = 20 ✓RG Cost = R5 700	1A Same cost 1A Same number of learners 1RG For reading the cost and the number of learners (3)	L3

QUESTION 3 [30]

3.1	3.1.1	Annual income = 368 450 Tax bracket from table = 284 101 – 393 200 ✓RT Tax = 59 314 + 31% of the amount above = 284 100 ✓SF = 59 314 + 0,31(368 450 – 284 100) = 59 314 + 0,31 x 84 350 ✓S = 59 314 + 26 148,50 – [(270 x 2) + 181 x 12] ✓M = 85 462,50 – 13 257 - 8652 ✓M R 63 552,50 = $\frac{12}{52\,680,50}$ ✓M = R5 296,04 ✓M Monthly = 368 450 ÷ 12 = R30 704,17 % = $\frac{5\,296,94}{30\,704,17} \times 100$ = 17,25% ✓CA Accep17,3%	1RT Correct tax bracket 1SF 1S 1M Subtracting rebates 1M Subtracting medical aid credits 1M dividing by 12 1M Monthly Income 1CA % (8)	L4
	3.1.2	Tax payable ✓M = 85 462,50 – (13 257 + 7 407 + 2 466) = 85 462,50 – 23 130 = 62 332,50 – 8 652 ✓M = 52 680,50 $\frac{52\,680,50}{12}$ = R 4 473,38 Tax would be less ✓J	1M Adding rebates 1M subtracting rebates 1J (3)	L4

	3.1.3	Option 1 = $30\,704,17 \times \frac{6,9}{100} \times 3$ $= 6\,355,76 \checkmark M/A$ Amount = $R\,30\,704,17 + 6\,355,76 \checkmark M/A$ $= R\,37\,059,93 \checkmark CA$ Option 2: Year 1 = $\frac{106}{100} \times 30\,704,17 \checkmark M$ $= 32\,546,42 \checkmark CA$ Year 2 = $\frac{106}{100} \times 32\,546,42$ $= 34\,499,20 \checkmark CA$ Year 3 = $\frac{106}{100} \times 34\,499,20$ $= R\,36\,569,16 \checkmark CA$ Advise to use option 1 because there is more $\checkmark O$ money in the investment at the end of the period	1MA Multiply by 6,9% and 3 1MA adding interest 1CA 1M Multiply by 10,6% 1CA 1CA Year 2 1CA Year 3 1O (8)	L4
3.2	3.2.1	50 l model: Surface area = $(2 \times \pi \times r \times l) + (\pi \times r^2 \times 2) \checkmark \checkmark SF$ $= (2 \times 3,142 \times 225 \times 610) + (3,142 \times 225 \times 225 \times 2)$ $= 862\,479 + 318\,127,5 \checkmark S$ $= 1\,180\,606,5 \text{ mm}^2 \checkmark CA$ 100 l model: Surface area = $(2 \times \pi \times r \times l) + (\pi \times r^2 \times 2)$ $= (2 \times 3,142 \times 275 \times 840) + (3,142 \times 275 \times 275 \times 2)$ $= 1\,451\,604 + 475\,227,5 \checkmark S$ $= 1\,926\,831,50 \checkmark CA$ $\frac{1\,926\,831,50}{2} \checkmark M$ $= 963\,415,75 \checkmark O$ Not equal to the surface area of the 50 ml geyser	2SF Substitution in the formula 1S Simplification 1CA Surface Area 1S Simplification 1CA Surface Area 1M Dividing by 2 1O (8)	L4
	3.2.2	Length using a ruler = 50 mm $\checkmark A$ Actual length 840 mm Scale is 50:840 $\checkmark A$ $= 1:16,8 \checkmark CA$	1A Measure 50 mm 1A Scale 1CA Accept 49 – 51 mm (answers will be 1:17,1 – 1:16,5) (3)	L3

QUESTION 4 [31]				
4.1	4.1.1	Arrival 8:00 Depart at = 8:00 + 3h 45min = 11:45 ✓M/A Time taken at 90km per hour $\text{Average Speed} = \frac{\text{distance travelled}}{\text{time taken}}$ $90 = \frac{86}{\text{time taken}} \quad \checkmark\text{SF}$ $\text{Time taken} = \frac{86}{90}$ $= 0,955555 \times 60$ $= 57,3 \text{ minutes} \quad \checkmark\text{CA}$ Arrival = 11:45 + 57,3 minutes = 12:42 ✓CA ✓M Will be late by 12 minutes ✓O	1MA Time 1SF Substitution in the formula 1CA Calculating minutes 1CA Addition 1A Time of arrival 1O CA (6)	L3
	4.1.2	Costs: Hiring = R2 800 Ferry = 70×2 (return) = 140 ✓M/A = 140×2 (for two days) = R280 ✓CA Accommodation = $543 \times 2 \times 3$ = R 3 258 ✓M/A Total = $2\,800 + 280 + 3\,258$ = R6 338 ✓M/A Available = $700 \times 14,391$ = R10 073,70 ✓C Therefore it will be enough	1MA Calculating return cost 1CA Cost for 2 days 1MA Calculate accommodation 1MA Total 1C Conversion 1O (6)	L3
	4.1.3	No ferry rides because it can be swept away by heavy currents ✓✓O OR Can cause ferry to capsize ✓✓CA OR Accept any other relevant reason ✓✓CA	2O Reason (2)	L4
4.2	4.2.1	The % of aids related deaths is decreasing from 2007 to 2014 ✓✓A Reasons – people more educated about HIV - People are taking medication ✓✓A - Practising safe sex ✓✓O (Accept any other TWO relevant reasons)	2A Explaining the trend 2R 1Reason (4)	L4

4.2.2	Total number of births = 1 125 755 + 1 132 500 + 1 141 468 + 1 152 319 + 1 163 629 + 1 173 164 + 1 184 867 + 1 196 395 + 1 207 711 ✓M = 10 477 808 ✓CA Total number of Aids related deaths = 343 194 + 297 659 + 257 504 + 228 051 + 213 864 + 211 839 + 203 293 + 189 376 + 171 733 = 2 116 513 ✓CA Difference = 10 477 808 - 2 116 513 = 8 361 295 ✓CA	1M Addition 1CA Total (births) 1CA Total (deaths) 1CA Difference (4)	L2												
4.2.3	$\frac{1\,207\,711 - 1\,196\,395}{1\,196\,395} \times 100$ ✓M = 0,95% ✓CA Incorrect ✓O Accept 0,9%	1M Difference 1M Correct denominator 1CA Finding % 1O (4)	L2												
4.2.4	Bar graph to show percentage Aids related deaths over a period of years  <table><caption>Percentage Aids related deaths over a period of years</caption><tr><th>Years</th><th>Percentage Aids related deaths</th></tr><tr><td>2002</td><td>44</td></tr><tr><td>2005</td><td>51</td></tr><tr><td>2007</td><td>46</td></tr><tr><td>2009</td><td>39</td></tr><tr><td>2014</td><td>31</td></tr></table>	Years	Percentage Aids related deaths	2002	44	2005	51	2007	46	2009	39	2014	31	5M 1mark for each correct bar	L2
Years	Percentage Aids related deaths														
2002	44														
2005	51														
2007	46														
2009	39														
2014	31														

(5)

QUESTION 5 [37]				
5.1	5.1.1	To allow allowance for opening the doors If the doors are the same size, they will be too big and won't fit. ✓✓O	20 (2)	L4
	5.1.2	Front doors = $2\,700 \div 39,7$ $= 6$ doors ✓M $= 1\,830 \div 716$ $= 2$ doors ✓CA No. of doors = 6×2 $= 12$ doors in 1 board ✓CA Doors needed = 20 2 boards needed ✓A Sides = $2\,700 \div 540$ $= 5$ ✓M $1\,830 \div 720 = 2$ No. of sides = $5 \times 2 = 10$ Boards needed = 2 ✓CA Back = $2\,200 \div 720 = 3$ $1\,200 \div 800 = 1$ 3 in 1 board ✓M $\therefore$ For 10 backs = 4 boards ✓CA Bottom = $2\,700 \div 54$ $= 5$ $1\,830 \div 716 = 2$ $5 \times 2 = 10$ No. of boards = 2 ✓CA Top = $3\,400 \div 780 = 4$ For ten cupboards = 3 tops ✓M	1M Number of doors - length 1M Number of doors - width 1CA Total doors 1A Number of boards 1M Number of sides 1CA Boards needed for sides 1M Calculating the backs 1CA Number of boards 1CA Number of boards 1M Number of tops (10)	L3
	5.1.3	Cost of material : 2 × cherry, 4 × melamine, × Masonite, 3 tops $4 \times 390 + 2(390 + 90) + 4 \times 90 + 800 \times 3$ $= 1\,560 + 960 + 360 + 2\,400$ ✓CA $= 5\,280$ ✓CA $5\,280 \times \frac{114}{100}$ ✓CA $= R\,6\,019,20$ ✓CA	CA from 5.1.2 1M Using R90 1M Multiplying 1M Addition 1CA Total 1M Using 14% VAT 1CA Price including VAT (6)	L3

	5.1.4	Dimensions = $3\text{m} \times 4\text{m}$ $= 3\,000\text{mm} \times 4\,000\text{mm} \checkmark C$ Using 780mm by 600mm $\checkmark A$ $= \frac{4\,000}{780} \times \frac{3\,000}{600}$ $= 5 \times 5$ = 25 cupboards $\checkmark M$ 10 will fit $\checkmark CA$	1C Conversion to mm 1A Using correct values 1M Calculating number of cupboards 1O Conclusion (4)	L4
5.2	5.2.1	$17+19+20+22+26+28+29+30+31+32+33+2(34)+5(35)+2(36)$ $= 602$ No. of people = $\frac{1}{3} \times (602 - 2 \text{ wheelchairs})$ $= 200 \checkmark M/A$ $2\text{Men} + 3\text{men} = 2 : 3 \checkmark CA$ $\therefore \text{Men} = \frac{200}{5} \times 2$ $= 80 \checkmark CA$ OR Women = $\frac{3}{5} \times 200 \checkmark MA$ $= 120 \checkmark CA$ Men = $200 - 120$ $= 80 \checkmark CA$	1MA Number of people in hall 1M Using concept of ratio 1CA Number of men 1M Concept of ratio 1CA Number of women 1CA number of men (3)	L3
	5.2.2	Row A15 Row B17 $\checkmark A$ Row V33	1A First row 1A Second row 1A Third row (3)	L3
	5.2.3	$\frac{32}{602} \checkmark A$ $= 0,053156146 \checkmark A$ $= 0,053 \checkmark CA$	1A numerator 1A denominator 1CA 3 decimal places (3)	L3
	5.2.4	Enter through door 4, turn right and go straight to the end of the seats. Turn left and go straight past 8 rows. On the 9th row turn left. The seats are in row M seat numbers 2 and 3 $\checkmark \checkmark \checkmark$	3A for clear directions to their seats (3)	L4
	5.2.5	Short-sighted person will be on D1 $\checkmark A$ Farsighted person will be on T12 $\checkmark A$ Short-sighted people can see things which are closer whereas longsighted people can see things which are far $\checkmark A$	1A Correct seat number 1A Correct Seat number 1O Reason (3)	L4
TOTAL: 150				