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**NATIONAL
SENIOR CERTIFICATE**

GRADE 12

SEPTEMBER 2017

**MATHEMATICAL LITERACY P2
MARKING GUIDELINES**

MARKS: 150

Codes	Explanation
M	Method
MA	Method with Accuracy
CA	Consistent Accuracy
A	Accuracy
C	Conversion
D	Define
J	Justification/Reason/Explain
S	Simplification
RD	Reading from a table OR a graph OR a diagram OR a map OR a plan
F	Choosing the correct formula
SF	Substitution in a formula
O	Opinion
P	Penalty, e.g. for no units, incorrect rounding off, etc.
R	Rounding Off
NPR	No penalty for rounding OR omitting units
AO	Answer only

This marking guideline consists of 8 pages.

QUESTION 1 [31]

Ques.	Solution	Explanation	Level
1.1.1	Emerald – R 19 089 + ✓ Onyx R 23 551 + ✓	1A Emerald 1A Onyx (2)	F L2
1.1.2	Emerald = member + adult + child = R2 477 + R1 761 + R914 ✓ = R5 152 ✓ Onyx = member + adult + child = R3 587 + R2 362 + R1 149 ✓ = R7 098 ✓ Difference = 7 098 – 5 152 ✓ = R1 946 ✓	1RT Correct values 1CA Add values 1RT Correct values 1CA Add values 1M Subtracting 1CA Difference (6)	F L2
1.1.3	Government subsidy = R5 152 – R2 530 ✓ = R2 622 Government % = $\frac{2\,622}{5\,152} \times 100$ ✓ = 50,89% = 50,9% ✓	1MA Difference 1M $\times 100$ 1CA % Rounded to 1 decimal place (3)	F L2
1.1.4	It is important for people to be healthy. ✓✓ OR Accept any other relevant reason.	2O Importance (2)	D L4
1.2.1	Volume = $\pi \times r^2 \times h$ ✓ = $3,142 \times 0,225 \times 0,225 \times 0,84$ ✓✓ = 0,1336 m ³ Volume of traditional beer = $\frac{70}{100} \times 0,1336$ = 0,09353 m ³ ✓ OR Height of container = $0,7 \times 0,84$ = 0,588 m ✓ Volume = $\pi \times r^2 \times h$ = $3,142 \times 0,225 \text{ m} \times 0,225 \text{ m} \times 0,588 \text{ m}$ ✓✓✓ = 0,09353 m ³	1M Calculating radius 1 Conversion 1SF Substitution in formula 1MA Finding 70% 1MA Finding 70% 1M Calculating radius 1A Conversion 1SF Substitution in formula (4)	M L3
1.2.2	Length of store room = 2 m = 200 cm ✓ Number of the containers along the length = 200 / 45 ✓ = 4,444... = 4 containers ✓ Width of store room = 1,5 m = 150 cm Number of the containers along the width = 150 / 45 = 3,333... = 3 containers ✓ Number of containers in total = 4 × 3 = 12 containers ✓ Statement is invalid ✓	1M Conversion 1M Dividing by 45 1CA Number of containers across the length 1CA Number of containers across the width 1CA Total number of containers 1O Invalid (6)	M L4

Ques.	Solution	Explanation	Level
1.3.1	Amount before increase = $336000 / 106,5\%$ ✓✓ = R315 492,96 ✓	1M Dividing 1M Using 106,5% 1CA Amount (3)	F L2
1.3.2	Bonus = $336\ 000 / 12$ = 28 000 ✓ Year 1 = $\frac{105,8}{100} \times 28\ 000$ ✓ = R 29 624 ✓ Year 2 = $\frac{106,5}{100} \times 29\ 624$ ✓ = R 31 549,56 ✓	1M Monthly salary 1M Using 5,8% 1CA Amount 1MA Finding 6,5% 1CA Amount (5)	F L3

QUESTION 2 [42]

Ques.	Solution	Explanation	Level
2.1.1	10 hours = 10×60 = 600 minutes ✓ 1 page = 26 minutes 600 minutes = $600 / 26$ ✓ = 23 pages ✓ Supposed to develop 23 papers therefore 20 papers are below norm time. ✓	1MA minutes in 10 hours 1M Dividing by 26 1CA Number of pages 1O Conclusion (4)	M L2
2.1.2	% increase = $\frac{2015\ Rate - 2013\ Rate}{2013\ Rate} \times 100$ ✓ = $\frac{169,30 - 147,36}{147,36} \times 100$ ✓ = 14,89 % ✓ Accept 14,9%	1M Difference 1M $\times 100$ 1CA answer % (3)	D L3
2.1.3	Amount of developing material: $\frac{Norm\ time}{60} \times rate\ for\ developing \times number\ of\ pages$ = $\frac{26}{60} \times 169,30 \times 161$ ✓ = 11 811,50 ✓ For 10 employees = $11\ 811,50 \times 10$ = 118 114,9667 ✓ Km travelled = $35 \times 2 \times 2 \times 7 + 2 \times 25 \times 3 \times 7 + 12 \times 2 \times 5 \times 7$ ✓ = 980 + 1 050 + 840 = 2 870 km ✓ Transport = rate for transport $\times$ number of km Amount = $2\ 870 \times 2,82$ ✓ = R8 093,40 ✓ Total amount = $118\ 114,9667 + 8093,40$ = R 126 208,37 ✓ Balance = R130 000 - R 126 208,37 = R 3 791,63 ✓ Statement invalid; Balance less than R4 000 ✓	1SF Substituting correct values 1S Simplification 1CA For 10 people 1M Calculating distance 1CA Total distance 1M Multiplying rate per km 1CA Amount 1CA Total Amount 1CA Difference 1O Invalid (10)	M&F L4

Ques.	Solution	Explanation	Level
2.2.1	USA: $46\,075,25 + 33\% \text{ of amount above } 189\,300 \checkmark$ $= 46\,075,25 + 0,33 (350\,500 - 189\,300) \checkmark$ $= 46\,075,25 + 0,33 \times 161\,200$ $= 46\,075,25 + 53\,196$ $= \frac{99\,271,25 \checkmark}{12 \checkmark}$ $= 8\,272,60 \text{ dollars } \checkmark$	1 correct tax bracket 1 SF 1 simplification 1M dividing by 12 1CA (5)	F L3
2.2.2	Income in South Africa $= \$350\,500 \times 14,11$ $= R\,4\,945\,555 \checkmark$ Income Tax $= 208\,587 + 41\% \text{ of amount above } 701\,300 \checkmark$ $= 208\,587 + 0,41 \times (4\,945\,555 - 701\,300)$ $= 208\,587 + 0,41 \times 4\,244\,255$ $= 208\,587 + 1\,740\,144,55 \checkmark$ $= 1\,948\,731,55 - 13\,257 \checkmark$ $= 1\,935\,474,55 / 12$ $= R\,161\,289,55 \checkmark$ $= R161\,289,55 / 14,11$ $= 11430,87 \text{ dollars } \checkmark$ Statement is valid $\checkmark$	1 conversion 1F Choosing correct tax bracket 1S Simplification 1M Subtract rebate 1CA Monthly Tax 1C Answer in Dollars 1O Valid (7)	L4
2.2.3	People in the higher tax brackets are feeding the government bills. $\checkmark \checkmark$ OR It is discouraging for people occupying higher positions and earning higher salaries. $\checkmark \checkmark$ OR People need to be treated equally $\checkmark \checkmark$ Accept any other valid reason	2R Reason (2)	D L4
2.3	$\text{Speed} = \frac{\text{distance}}{\text{time}}$ Time taken = 08:55 – 06:00 $= 2 \text{ hours } 55 \text{ minutes } \checkmark$ Less time spent in Nanaga $= 2 \text{ hrs } 55 \text{ min} - 0 \text{ h } 30 \text{ min } \checkmark$ $= 2 \text{ hrs } 25 \text{ minutes}$ $= 2,416666\dots \text{hrs } \checkmark$ $\text{Speed} = \frac{311}{2,416666} \checkmark$ $= 128,69 \text{ km/h } \checkmark$ They travelled above the speed limit $\checkmark$	1M Travelling time 1M Difference in time 1C Conversion 1SF Substitution 1CA Speed 1O Opinion (6)	M L3
2.4	School B $\checkmark$ has performed better. The mean of School B is higher, meaning 50% of the class were able to get 56. $\checkmark \checkmark$ Minimum mark in School B is higher. $\checkmark \checkmark$	1M Choosing school 2 O First reason 2 O Second reason (5)	D L4

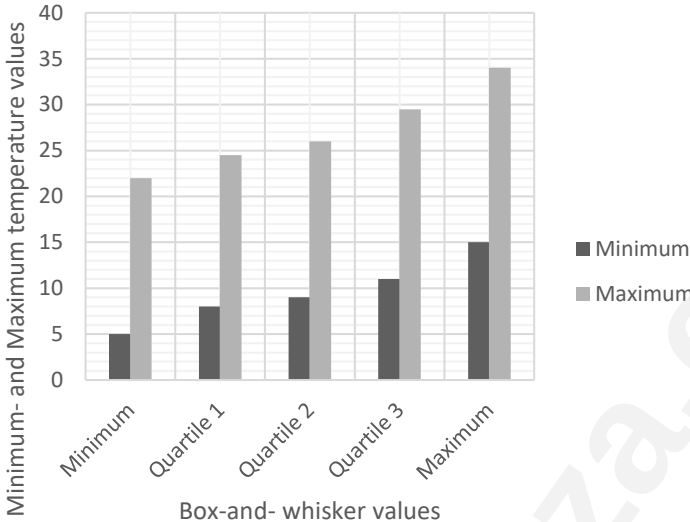
QUESTION 3 [30]

Ques.	Solution	Explanation	Level
3.1.1	$58 + 279 + 45 + 455 + 232 + 303 + 280 + 49 + 498$ $= 2\,199 \text{ km}$	3RT (1 mark for every three correct values) 1M Adding 1CA Answer (5)	M&P L2
3.1.2	N1 – South Africa ✓ N4 – South Africa ✓ A3 – Botswana ✓ A2 – Botswana ✓ B6 – Namibia	4 (1 mark for route and country). If only roads mentioned max 2 If only countries mentioned max 2 (4)	M&P L2
3.1.3	OPTION 1: Accommodation = R 1 550 Breakfast = $R\,95 \times 4$ $= R\,380$ ✓ Total amount = $R\,1\,550 + R\,380$ $= R\,1\,930$ ✓ OPTION 2: Accommodation with breakfast = $R\,550 \times 4$ $= R\,2\,200$ ✓ Difference = $2\,200 - 1\,930$ $= R\,270$ ✓ Not true, they would save R 270 ✓	1MA Cost of breakfast 1CA Total cost 1MA Total cost 1CA Difference 1O Invalid (5)	F L4
3.1.4	Probability of getting a self-catering unit at no extra cost $= \frac{5}{8} \times 100$ $= 62,5\%$ ✓ $= 63\%$ ✓	1A Numerator 1A Denominator 1CA % 1 R Round to nearest % (4)	P L2
3.1.5	Distance travelled $= 58+98+41+41+550+105+105+738$ ✓ $= 1\,736 \text{ km}$ ✓ Difference = $2199 - 1736$ ✓ $= 463 \text{ km}$ ✓ Statement is valid ✓	1M Adding distances 1 CA Total distance 1MA Finding the difference 1CA distance 1O Valid (5)	M&P L4
3.2.1	Percentage achievement in Mathematical Literacy is decreasing from 2013 to 2016 ✓✓	2 O Describing the trend (2)	D L4
3.2.2	Maths decreased from 2013 to 2015 ✓ Maths increased from 2015 to 2016 ✓	1O Description for Mathematics for 2013 to 2015 1O Description for Mathematics for 2015 to 2016 (2)	D L4
3.2.3	Mathematics = $265\,810 - 263\,903$ $= 1\,907$ ✓ Mathematical Literacy = $388\,845 - 361\,865$ $= 26\,980$ ✓ Ratio = $1\,907 : 26\,980$ ✓	1A Increase in Mathematics 1A Decrease in Mathematical Literacy 1CA Ratio (3)	D L3

QUESTION 4 [47]

Ques.	Solution	Explanation	Level
4.1.1	$C = 2 \times \pi \times r$ $157,1 = 2 \times 3,142 \times r \checkmark$ $157,1 = 6,284r$ $r = \frac{157,1}{6,284} \checkmark$ $= 25 \text{ cm} \checkmark$ $= 0,25 \text{ m} \checkmark$	1SF Substituting correct formula 1S Simplification 1CA Calculate the radius 1C Convert to metres (4)	M L3
4.1.2	$D = 0,25 \times 2$ $= 0,5 \text{ m} \checkmark$ Total height = $1 + 0,75 + 0,5$ $= 2,25 \text{ m} \checkmark$ Space without decoration = $4 - 2,25$ $= 1,75 \text{ m} \checkmark$ From top and from bottom = $\frac{1,75}{2}$ $= 0,875 \text{ m} \checkmark$	1CA finding diameter 1CA total height 1CA space without decoration 1CA (4)	M L3
4.1.3	Area for red paint = area of rectangle + area of triangle $= l \times b + \frac{1}{2} b \times h \checkmark$ $= 1,5 \text{ m} \times 1 \text{ m} + \frac{1}{2} \times 0,75 \text{ m} \times 0,75 \text{ m} \checkmark$ $= 1,5 \text{ m} + 0,28125 \text{ m}$ $= 1,78125 \text{ m}^2 \checkmark$ For 15 decorations = $1,78125 \times 15$ $= 26,71875 \checkmark$ Two coats = $26,71875 \times 2$ $= 53,4375 \text{ m}^2 \checkmark$ Litres of paint needed = $\frac{53,4375}{8}$ $= 6,6796875 \checkmark$ 5 litres = $\frac{6,6796875}{5}$ $= 1,33 = 2 \text{ (5 litres of paint)} \checkmark$ Area for white paint $= \pi r^2 + \frac{1}{2} b \times \text{height}$ $= 3,142 \times 0,25 \times 0,25 + \frac{1}{2} \times 0,75 \times 0,75$ $= 0,196375 + 0,28125$ $= 0,477625 \checkmark$ For 15 decorations = $0,477625 \times 15$ $= 7,164375$ For 2 coats = $7,164375 \times 2$ $= 14,32875$ Litres needed = $\frac{14,32875}{8}$ $= 1,79$ $= 1 \text{ (5 litre)} \checkmark$ White paint = R499 $\checkmark$ Red = 505×2 $= \text{R } 1\,010 \checkmark$ Argument not valid, cost of red paint is not twice that of white paint $\checkmark$	1M Using correct formulae 1SF Substituting 1CA Area of shaded parts 1CA area for 15 decorations 1CA for 2 coats 1MA litres of paint needed 1MA number of 5 litre tins 1CA area for white paint 1CA number 5 litre tins 1MA cost for white paint 1MA cost for red paint 1O Not valid (12)	M&F L4

Ques.	Solution	Explanation	Level
4.2.1	North East	2A Direction (2)	M&P L2
4.2.2	Mean = $\frac{\text{sum of values}}{21}$ $26,762 = \frac{22+33+34+30+25+29+23+22+30+29+30+28+24+25+25+58}{21} \checkmark$ $26,762 \times 21 = 432 + 5B \checkmark$ $562 - 432 = 5B$ $130 \checkmark = 5B$ $\frac{130}{5} = B$ $26^\circ\text{C} = B \checkmark$	1SF Substitution 1M Mean value $\times 21$ 1S Simplification 1CA Value of B (4)	D L3
4.2.3	<u>Minimum temperatures:</u> Lower quartile (Q_1) = 8 Upper quartile (Q_3) = 11 Interquartile range = $11 - 8$ = 3 $\checkmark$ <u>Maximum temperatures:</u> 22 22 23 23 24 25 25 25 26 26 <u>26</u> 26 26 28 29 29 30 30 30 33 34 $\checkmark$ Median = 26 $\checkmark$ Lower quartile = $\frac{24+25}{2}$ = 24,5 $\checkmark$ Upper quartile = $\frac{29+30}{2}$ = 29,5 $\checkmark$ Interquartile range = $29,5 - 24,5$ = 5 $\checkmark$ Difference = $5 - 3$ = 2 $\checkmark$	CA from 4.2.2 1MA Finding IQR for min. temp. 1M Ascending order 1CA Median 1MA Finding Q_1 1MA Finding Q_3 1CA Finding IQR 1CA Difference (7)	D L3

Ques.	Solution	Explanation	Level																		
4.2.4	Compound Bar Graph for the Box-and-Whisker values for the minimum and maximum temperatures  <table><caption>Data for Compound Bar Graph</caption><thead><tr><th>Box-and- whisker values</th><th>Minimum</th><th>Maximum</th></tr></thead><tbody><tr><td>Minimum</td><td>5</td><td>22</td></tr><tr><td>Quartile 1</td><td>8</td><td>24</td></tr><tr><td>Quartile 2</td><td>9</td><td>26</td></tr><tr><td>Quartile 3</td><td>11</td><td>29</td></tr><tr><td>Maximum</td><td>15</td><td>34</td></tr></tbody></table>	Box-and- whisker values	Minimum	Maximum	Minimum	5	22	Quartile 1	8	24	Quartile 2	9	26	Quartile 3	11	29	Maximum	15	34	CA from 4.2.2 and 4.2.3 5M (1 mark for every set of bars plotted correctly) 1M Correct graph (6)	D L2
Box-and- whisker values	Minimum	Maximum																			
Minimum	5	22																			
Quartile 1	8	24																			
Quartile 2	9	26																			
Quartile 3	11	29																			
Maximum	15	34																			
4.2.5	Probability that a temperature is $\geq 28^{\circ}\text{C}$ $= \frac{8}{21}$ $= 0,380952381$ $= 0,381$	1A Numerator 1A Denominator 1R To 3 decimal places (3)	P L2																		
4.2.6	Measured distance = 6,6 cm $= 6,6 \text{ cm} : 1\,045 \text{ km}$ $= 6,6 : 104\,500\,000$ $= 1 : 15\,833\,333,33$ $= 1 : 16\,000\,000$	1MA Measure on map (accept 6,4 - 6,8) 1M Ratio 1C Converting to cm 1S Simplification 1R Round to nearest million (5)	M&P L3																		

TOTAL: 150