basic education

Department:
Basic Education
REPUBLIC OF SOUTH AFRICA

NATIONAL SENIOR CERTIFICATE

GRADE 12

MATHEMATICAL LITERACY P2

FEBRUARY/MARCH 2017

MEMORANDUM

MARKS: 150

Symbol	Explanation
M	Method
M/A	Method with accuracy
CA	Consistent accuracy
A	Accuracy
C	Conversion
S	Simplification
RT/RG/RD	Reading from table/graph/diagram
SF	Correct substitution in formula
O	Opinion/Example
P	Penalty, e.g. for no units, incorrect rounding off, etc.
R	Rounding off
AO	Answer only full marks
NPR	No penalty for rounding
J	Justification

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QUESTION 1 [31 marks]			
Ques	**Solution**	**Explanation**	**Level**
1.1.1	World population = 65,3 million × 113 ✓M = 7 378,9 million ✓S = 74 hundred million ✓R = 7 400 million = 7 400 000 000 = 7,4 billion	1M multiplying 1S simplification in millions 1R answer in hundred million (3)	L2 D
1.1.2	% Europe = 100% – (12% + 29% + 14% + 39%) ✓M = 6 % ✓A Total displaced people = (65,3 + 21,3 + 10) million = 96,6 million ✓A Number of people distributed in Europe = 6% × 96,6 million ✓M = 5,796 million **OR** 5 796 000 ✓CA **OR** Total displaced people = (65,3 + 21,3 + 10) million = 96,6 million ✓A 12% + 29% + 14% + 39% = 94% ✓A 94% × 96,6 million = 90,804 million ✓M Number of people in Europe = 96,6 million – 90,804 million ✓M = 5,796 million ✓CA	1M adding to get 94% 1A percentage for Europe 1A total 1M percentage calculation 1CA number in Europe **OR** 1A total 1A adding to get 94% 1M percentage calculation 1M subtracting from total 1CA number in Europe (5)	L3 D
1.1.3	Number of persons from the three countries given = (1,1 + 2,7 + 4,9) million = 8,7 million ✓A % of refugees = $\frac{8,7\text{ million}}{21,3\text{ million}} \times 100\%$ ✓M ✓RT = 40,8 % ✓CA ∴ The statement is not valid. ✓O **OR**	1A total persons 1RT total of refugees 1M % calculation 1CA percentage 1O verification **OR**	L4 D

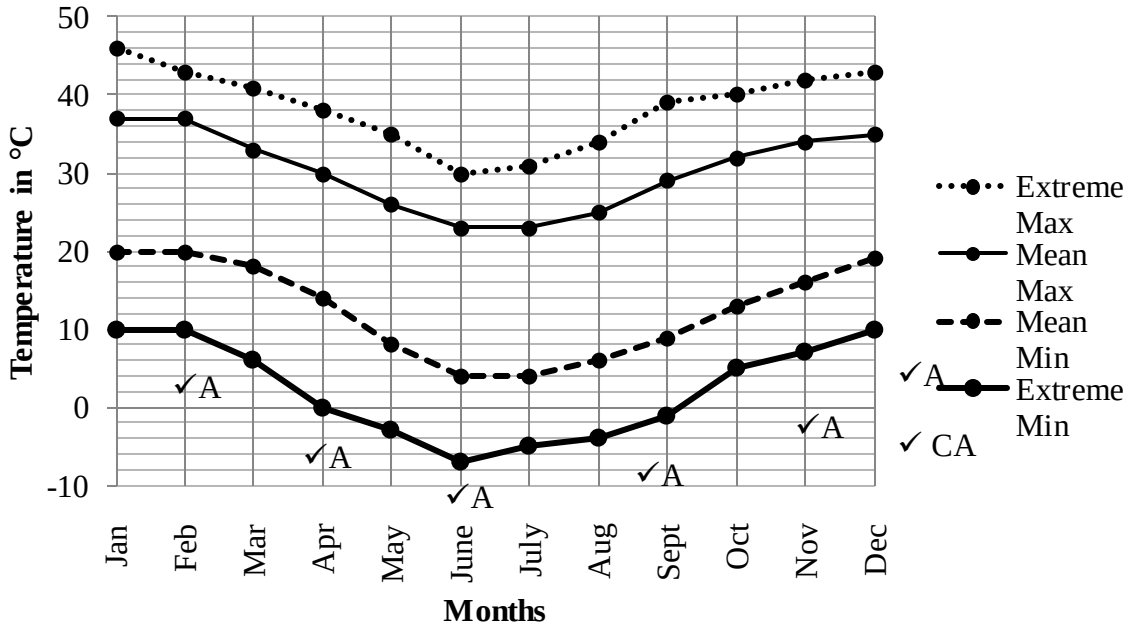
Ques	Solution	Explanation	Level
	OR Number of refugees from the three countries ✓RT ✓M = 21,3 million × 54% = 11,5 million ✓A Total number at the three countries = (1,1 + 2,7 + 4,9) million = 8,7 million ✓A ∴ The statement is not valid. ✓O	**OR** 1RT total refugees 1M % calculation 1A number 1A total persons 1O deduction NP for omitting millions (5)	
1.2.1	✓RT ✓M % females below 18 yrs = 8,8% + 10,2% + 6,6% = 25,6% ✓CA	1RT correct three values 1M adding 1CA simplification **AO** (3)	L2 P
1.2.2	This age group covers the largest range of ages. ✓✓O **OR** ✓✓O This age group is a workforce. They might not have work in their own country. **OR** They are physically fit and able to migrate. ✓✓O **OR** Adults fleeing to protect their children/ poltical climate of country. ✓✓O **OR** Any other valid reason	2O explanation (2)	L4 D
1.3.1	May ✓✓O	2A correct month (2)	L2 D
1.3.2	Mean $= \frac{5580 + 7373 + 10280 + 29810 + 40340 + 43460}{6}$ ✓M $= \frac{136\,843}{6}$ ✓A = 22 807,16667 ✓CA ≈ 22 807	1M calculating mean 1A sum of the number of refugees 1CA mean NPR (No mode or median calculated correctly full marks) (3)	L2 D

Ques	Solution	Explanation	Level
1.3.3	✓O ✓O For both years the number of refugees increase from January to June ✓O ✓O **OR** ✓O For 2014 the number of refugees increase from January to June and for 2015 the number of refugees increase from January to June ✓O **OR** ✓O ✓O For both years the number of refugees increase substantially in April and June. ✓O **OR** ✓O ✓O ✓O Month to month there are an increase form 2014 to 2015 **OR** ✓O ✓O Compared to 2014, 2015 has more refugees entering Europe per month. ✓O **OR** ✓O ✓O There was a significant increase from March to April in both years ✓O	1O both years 1O increase 1O months **OR** 1O for year 1O increase 1O months **OR** 1O both years 1O increase substantially 1O months **OR** 1O both years 1O increase substantially 1O months **OR** 1O both years 1O increase substantially 1O months **OR** 1O both years 1O increase substantially 1O months (3)	L4 D
1.4	Budget amount for 2016 = US$ 5 300 million × 118,7% ✓A ✓M or (1,187) = US$ 6 291,1 million ✓CA = US$ 6 291 100 000 ✓C Factor increase = $\frac{6\,291100\,000}{300\,000}$ or $\frac{6\,291,1}{0,3}$ = 20 970,3333 ✓CA **OR** Increase from 2015 18,7% × US$ 5 300 million ✓M = US$ 991,1 ✓A Budget amount for 2016 = US$ 5 300 million + US$ 991,1 million = US$ 6 291,1 million ✓CA = US$ 6 291 100 000 ✓C Factor increase = $\frac{6\,291100\,000}{300\,000}$ = 20 970,3333 ✓CA	1M increase % 1A 118,7% 1CA increased amount 1C value in millions or 1950 budget to 0,3 1CA factor **NPR** **OR** 1M calculating % 1A amount 1CA increase amount 1C value in millions 1CA factor **NPR** (5)	L3 F
		[31]	

QUESTION 2 [40 marks]			
Ques	**Solution**	**Explanation**	**Level**
2.1.1	Density $= \frac{39\ 000}{13{,}5\text{ acres}}$ ✓SF ✓CA $= 2\ 888{,}88$ persons per acre ✓R $\approx 2\ 889$ persons per acre	1SF substitution of correct values 1CA simplification 1R rounding (3)	L2 M&P
2.1.2	$P = \frac{11393}{39\,000}$ ✓RT ✓M $\approx 0{,}29$ or 29,21% ✓CA	1RT reading values 1M probability concept 1CA correct rounded probability AO (3)	L2 P
2.1.3 (a)	✓RT ✓M 15 000 – 14 979 = 21 ✓CA	1RT values 1M subtracting 1CA number of seats (3)	
2.1.3 (b)	There are provisions made for disabled spectators who don't require seats. ✓✓O **OR** Some people can be standing . ✓✓O **OR** Staff , line judges, officials, coaches, media personnel. ✓✓O	2O reason (2)	L4 M&P
2.1.4 (a)	Width of the screen $= \frac{40\text{ m}^2}{5\text{ m}}$ ✓RT ✓ M $= 8$ m ✓ A	1RT value 1M dividing 1A width (3)	
2.1.4 (b)	Measured width of screen 6 mm Scale: 6 mm : 8 m ✓ A 6 mm : 8 000 mm ✓C 1 : 1333,33 ✓CA	1A scale 1C converting 1CA unit scale (3)	L3 M&P
2.2.1	12 ✓✓A	2A correct number (2)	L2 M&P
2.2.2	F ✓✓A	2A correct number (2)	L2 M&P

Ques	Solution	Explanation	Level
2.2.3	Area of the court = 41 m × 22 m = 902 m^2 ✓A Seed needed = 902 m^2 × 245 g/m^2 ✓M = 220 990 g = 220,99 kg ✓C Fescue seed = $\frac{3}{10}$ × 220,99 kg ✓M = 66,297 kg ✓CA The statement is not valid. ✓O **OR** Area of the court = 41 m × 22 m = 902 m^2 ✓A $\frac{3}{10}$ of area of the court = $\frac{3}{10}$ × 902 m^2 ✓M = 270,6 m^2 Fescue seed = 270,6 m^2 × 245 g/m^2 ✓M = 66 297 g ✓CA = 66,297 kg ✓C The statement is not valid. ✓O **OR** Area =902 m^2 ✓A Ratio 7 : 3 $\frac{3}{10}$ ✓M × 245 g = 73,5 g fescue/ m^2 ✓M ✓CA 73,5g/ m^2 × 902 m^2 = 66 297g = 66,297kg ✓C Not valid ✓O	1A area 1M multiply with spread rate 1C converting to kg 1M working with ratio 1CA mass of red fescue seed 1O conclusion 1A area 1M working with ratio 1M multiply with spread rate 1CA mass of red fescue seed 1C converting to kg 1O conclusion **OR** 1A area 1M working with ratio 1M multiply with spread rate 1CA mass of seed 1C converting to kg 1O conclusion (6)	L4 M

Ques	Solution	Explanation	Level
2.3.1	Percentage increase $= \frac{£2,50 - £1,70}{£1,70} \times 100\%$ ✓RT ✓SF $= 47,0588\ldots\%$ ✓CA % increase per year $= \frac{47,0588}{21}$ ✓A $\approx 2,24\ \%$ ✓CA	1RT reading values from graph 1SF substitution 1CA simplification 1A dividing by 21 1CA simplification NPR (5)	L3 F
2.3.2	Income $= 142\ 000 \times £2,50$ ✓M ✓RT $= £355\ 000$ ✓CA	1M multiplying 1RT price from graph 1CA income **AO** (3)	L2 F
2.3.3	The average inflation rate remained unchanged / constant ✓✓A **OR** The annual inflation rate change for the UK would have been 0% ✓✓A	2A comment (if the answer only refers to the price of strawberries max 1 mark) (2)	L4 F
		[40]	

QUESTION 3 [36 marks]			
Ques	**Solution**	**Explanation**	**Level**
3.1.1	✓RT 35°C – (–3°C) = 35°C + 3°C = 38°C ✓CA	1RT reading values from table 1CA difference **AO** (2)	M L2
3.1.2	✓M Range = 29°C – 9°C = 20°C ✓A Month: September ✓A	1M concept of range 1A range in °C 1A September (3)	D L2
3.1.3	 1A × 6 for each two points plotted correctly 1CA joining the points (7)	D L2
3.1.4	Inner band ✓✓A **OR** ✓A ✓A 25 to 75 percentile band. **OR** ✓A ✓A Above the mean but below the 75th percentile	2A band **OR** 1A interpreting the starting point of the percentile band 1A end point of percentile band (accept 50 to 75 percentile band) (2)	D L4

Ques	Solution	Explanation	
3.1.5	°F = (°C × $\frac{9}{5}$) + 32 119,1°F = (°C × $\frac{9}{5}$) + 32 ✓SF (°C × $\frac{9}{5}$) = 119,1 – 32 ✓S °C = 87,1 ÷ $\frac{9}{5}$ ✓S = 48,3888 ≈ 48,4 °C ✓CA	1SF substituting values 1S simplification 1S simplification 1CA Celsius value (4)	M L3
3.2.1	✓✓RT North	2RT modal wind direction. (2)	D L3
3.2.2	$P_{(westerly)}$ = 16% + 11% + 9% ✓RT = 36% ✓CA	1RT reading all W values 1CA probability **AO** (2)	P L2
3.2.3	✓✓O The percentages do not add up to 100%. **OR** Too many sectors needed ✓✓O	2O explanation (2)	D L4

Ques	Solution	Explanation	T&L
3.3.1	Accommodation per person = $\frac{R850}{3}$ ✓A = R283,33 ✓CA Kz 100 000 = R9 173,05 Amount Kwanza = $\frac{R283,33}{R9173,05} \times Kz100\,000$ ✓A ✓M ≈ Kz 3 088,76 ✓CA **OR** R9 173,05 = Kz 100 000 R1 = $\frac{100\,000}{9173,05}$ ✓M = Kz 10,9014995 ∴ R850 = Kz 10, 9014995 × 850 ✓A ≈ Kz 9 266,27 ✓CA Cost per person = $\frac{9\,266,27}{3}$ ✓A ≈ Kz 3 088,76 ✓CA	1A divide by 3 1CA accommodation per person in R 1A multiply by 100 000 1M divide by 9 173,05 1CA amount per person **OR** 1M divide by 9 173,05 1A multiply by 850 1CA total amount 1A divide by 3 1CA accommodation per person in Kz (using R850 per person max 5 marks. Multiplying R850 by 3 max 4 marks) (5)	F L3
3.3.2	$1 = Kz 169,27344 ✓M Average disposable salary = $ 1 760,41 × Kz 169,27344/$ ≈ Kz 297 990,66 ✓A Angola: Rent as a % of income = $\frac{145\,990}{297\,990,66} \times 100\%$ ✓M = 48,99% ✓CA South Africa Rent as a % of income = $\frac{4\,430}{16\,500} \times 100\%$ ✓M = 26,85% ✓CA ✓O Not valid .It is much cheaper in SA but not double.	1M multiplying 1A Disposable salary in Kz 1M percentage calculation 1CA percentage 1M percentage calculation 1CA percentage 1O conclusion (7)	F L4
		[36]	

QUESTION 4 [43 marks]			
Ques	**Solution**	**Explanation**	**Levels**
4.1.1	Volumetric mass = $\frac{43\,\text{cm} \times 30{,}5\,\text{cm} \times 14{,}5\,\text{cm}}{5\,000}$ ✓SF ✓C ✓RT = 3,8 kg ✓CA **OR** Volume (in mm^3) = 430 × 305 × 145 ✓SF = 19 016 750 Volumetric mass = $\frac{19\,016\,750}{5\,000}$ ✓RT = 3 803,35g ÷ 1 000 ✓C = 3,8 kg ✓CA	1SF substitution mm/cm 1C conversion to cm 1RT correct mass factor 1CA volumetric mass **AO** **OR** 1SF substitution in volume formula 1RT correct mass factor 1C conversion 1CA volumetric mass (4)	L2 M
4.1.2	Volumetric mass = $\frac{\text{volume of the parcel in cm}^3}{\text{mass factor}}$ 2 kg = $\frac{20\text{cm} \times 25\text{cm} \times 15\text{cm}}{\text{mass factor}}$ ✓SF Mass factor = $\frac{7\,500\,\text{cm}^3}{2\,\text{kg}}$ ✓S ✓S = 3 750 cm^3/kg ✓S ≈ 4 000 cm^3/kg ✓R **OR** Volumetric mass (using 5000) = $\frac{20\,\text{cm} \times 25\,\text{cm} \times 15\,\text{cm}}{5\,000}$ ✓SF = 1,5kg ✓S Volumetric mass (using 4000) = $\frac{20\,\text{cm} \times 25\,\text{cm} \times 15\,\text{cm}}{4\,000}$ ✓SF = 1,875kg ✓S Hence 4000cm^3/kg ✓O	1SF substitution 1S volume 1S change formula 1S simplification 1R rounding **OR** 1SF substitution 1S simplification 1SF substitution 1S simplification 1O conclusion (5)	L3 M

Ques	Solution	Explanation	Level
4.1.3	Surface area of a rectangular-based box ✓A ✓SF = 2(575 mm × 375 mm + 575 mm × 400 mm + 375 mm × 400 mm) ✓CA = 1 191 250 mm^2 Surface area of a square based box ✓A ✓SF = 2 × 410 mm (2 × 600 mm + 410 mm) ✓CA = 1 320 200 mm^2 ✓O The statement is not valid. **OR** Surface area of a square based box ✓SF ✓A = 4 × 410 mm × 600 mm + 2 × (410 mm)^2 ✓CA = 1 320 200 mm^2 ✓O The statement is not valid.	1SF substitute into formula 1A correct values 1CA simplification 1SF substitution 1A using the squared side (410) 1CA simplification 1O conclusion (7)	L4 M
4.2.1	✓✓O These places are far from Mbombela. **OR** ✓✓O There might not be many parcels to deliver to those places. **OR** ✓✓O From Mbombela parcels might go to a central depot to be delivered from there.	2O reason (2)	L4 M&P

Ques	Solution	Explanation	Level
4.2.2 (a)	Package to Graskop: Less than 30 kg @ R70,00 ✓A Package to Klerksdorp: 18 kg 15 kg + 1 excess of 5 kg ✓A Delivery cost R106,00 + R15,00 = R121,00 ✓A ✓CA Package to Port Alfred: 18 kg 10 kg + 2 excess of 5kg ✓A Delivery cost R160,00 + 2 × R15 = R190 ✓A ✓CA Total cost = R70 + R121 + R190 = R381 ✓M VAT = R381 × 14% ✓M = R53,34 Total cost including VAT = R434,34 ✓CA **OR** Prices with VAT Local: R70 ×114% = R79,80 Klerksdorp: R106 ×114% = R120,84 ✓M Shaded areas:R160 ×114% = R182,40 Excess label: R15×114% = R17,10 To Graskop cost = R79,80 ✓A To Klerksdorp cost = R120,84 + R17,10 = R137,94 ✓A ✓A ✓CA To Port Alfred cost = R182,40 + 2 × R17,10 = R216,60 ✓A ✓A ✓CA Total cost = R79,80 + R137,94 + R216,60 ✓M = R434,34 ✓CA	1A Graskop R70 1A splitting mass to Klerksdorp 1A R106 1CA cost 1A splitting mass to PA 1A R160 1CA cost 1M adding 1M VAT 1CA total cost incl. VAT (For Port Alfred max 3 marks if cost is calculated using R106 - Cost R121 or R117 - Cost 132) **OR** 1M adding VAT to costs 1A Graskop cost Klerksdorp: 1A basic cost 1A one excess label 1CA cost Port Alfred 1A basic cost 1A two excess labels 1CA cost 1M adding 1CA total cost incl. VAT (10)	L3 F

Ques	Solution	Explanation	Level
4.2.2 (b)	30 April from 14:50 to 24:00 is 9 hours 10 min ✓A 1 May is 24 hours 2 May from 00:00 to 8:15 is 8 hours 15 min } ✓A Total elapsed time = 41 hours 25 min ✓CA This is within the 48 hour service. ✓O **OR** 30 April from 14:50 To 1 May 14:50 (24 hours / 1st day) ✓A To 2 May 14:50 (48 hours / 2nd day) ✓A But 2 May 8:15 is before 48 hours. ✓A It is within 48 hours ✓O	1A time 30 April 1A time 1 and 2 May 1CA adding time 1O opinion based on CA from 4.2.2 (a) OR 1A 1st day 1A 2nd day 1A conclusion 1O conclusion (4)	L4 M
4.2.3 (a)	Box size A: Number of boxes = $\frac{650}{7}$ = 92,857 ✓M ≈ 93 ✓R Mass of box = 7 × 2 kg = 14 kg ✓A Cost = R117,00× 93 = R10 881 ✓CA	1M dividing 1R rounding up 1A rate to George 1CA cost (4)	L3 F

Ques	Solution	Explanation	Level
4.2.3 (b)	Box size B: Number of boxes = $\frac{650}{15}$ = 43,333 ✓MA 43 boxes packed with 15 parts, mass 30 kg each ✓R Number of parts left = 650 – 43 × 15 = 5 ✓CA Mass of the parts = 5 × 2 kg = 10 kg 1 box packed with the remaining 5 parts, mass 10 kg ✓A Cost per 30 kg box = R117 + 3 × R15 = R162 Cost = R162 × 43 + R117 ✓M = R7 083 ✓CA Box size B is more economical. ✓O **OR** (for the first part) Mass of all the parts = 650 x 2kg = 1 300 kg Mass of a box with 15 parts = 30 kg Number of boxes needed = $\frac{1300}{30}$ = 43,33	1MA dividing 1R rounding down 1CA extra smaller box 1A cost per box 1M multiply and adding 1CA cost 1O advice (7)	L4 F
		[43]	
		TOTAL	**150**

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