basic education

Department:
Basic Education
REPUBLIC OF SOUTH AFRICA

NATIONAL SENIOR CERTIFICATE

GRADE 12

MATHEMATICAL LITERACY P2

FEBRUARY/MARCH 2016

MEMORANDUM

MARKS: 150

Symbol	Explanation
M	Method
MA	Method with accuracy
CA	Consistent accuracy
A	Accuracy
C	Conversion
S	Simplification
RT/RG/RD	Reading from a table/graph/diagram
SF	Correct substitution in a formula
O	Opinion/reason/deduction
P	Penalty, e.g. for no units, incorrect rounding off, etc.
R	Rounding off
NP	No penalty for rounding

This memorandum consists of 14 pages.

QUESTION 1 [34 MARKS]			
Ques	**Solution**	**Explanation**	**Level**
1.1.1	SUBTOTAL ✓A = R2 893,86 + R394,74 + R180 + R2 719,30 + R30,70 ✓A = R6 218,60 ✓CA Calculating VAT = R6 218,60 × 14% **OR** **A** = R6 218,60 × 1,14 ✓M = R870,60 ✓M = R7 089,20 ✓CA A = R6 218,60 + R870,60 = R7 089,20 ✓CA	1A cost of gas 1A cost of gas piping 1M adding 1M calculating VAT 1CA simplification (5)	F L2
1.1.2	OPTION 2 Total cost = R3 499,00 + R499,00 + R189,00 + R235,00 + (4 × R3,50) + (R 23,50×2)+ (R 350,00×3) + R349,00 ✓✓M = R5 882,00 ✓CA Difference in price = R7 089,20 – R5 882,00 = R1 207,20 ✓CA Mr Chan's estimation is NOT valid. ✓O	2M for adding all correct values 1CA simplification 1CA for the difference 1O conclusion (5)	F L4
1.1.3	The brand of the gas stove. ✓✓O **OR** No time to shop around. ✓✓O **OR** The company will install the stove. ✓✓O **OR** Reputable dealer ✓✓O **OR** After sales service ✓✓O **OR** Any suitable answer ✓✓O	2O (any suitable answer) (2)	F L4

Ques	Solution	Explanation	Level
1.2.1	Length = 5 bottles Width = 2 bottles ✓M Height = 2 bottles Number of bottles in cage = 5×2× 2 = 20 bottles ✓CA	1M for number of bottles per dimension 1CA total number of bottles (2)	M L2
1.2.2	Length of shelve = 10 mm × 6 + 314 mm × 5 = 60 mm + 1 570 mm ✓M = 1 630 mm ✓CA Width of shelve = 10 mm × 3 + 314 mm × 2 = 30 mm + 628 mm ✓M = 658 mm ✓CA Length of sheet of metal = 3,4 m = 3 400 mm ✓C Width of sheet of metal = 2,1 m = 2 100 mm Lengthwise by lengthwise = 2 shelve lengths ✓CA Width wise by width wise = 3 shelve widths ✓CA Total number of shelves = 2 × 3 = 6 shelves ✓CA	1M adding correct lengths 1CA total length 1M adding correct widths 1CA total width 1C conversion to mm 1CA number of lengths 1CA number of widths 1CA number of shelves (8)	M L3

Ques	Solution	Explanation	Level
1.3.1	Tax rebate reduces the tax payable ✓✓O Medical aid credit reduces the amount of tax to be paid. ✓✓O	2O reason 2O reason (4)	F L4
1.3.2	Taxable income = R742 000 **Tax in 2015/2016** ✓RT ✓ MA Tax payable = R208 587 + 41% of (R742 000 – R701 300) – R13 257 – 12 × (2 × R270 + 3 × R181) ✓ MA = R208 587 + 41% of (R40 700) – R13 257 – 12 × (R540 + R543) = R208 587 + R16 687 – R13 257 – R12 996 ✓CA = R199 021 ✓CA **Tax in 2014/2015** TI = R195 212 + 40% of (R742 000 – R673 100) – R12 726 – 12 × (2 × R257 + 3 × R172) = R195 212 + 40% of (R68 900) – R12 726 – 12 × (R514 + R516) = R195 212 + R27 560 – R12 726 – R12 360 ✓CA = R197 686 ✓CA ✓O The statement is NOT valid, the increase is R1 335,00.	1RT tax bracket 1MA correct values 1MA correct values subtracted 1CA simplification 1CA total 1CA simplification 1CA total 1O deduction (8)	F L4
		[34]	

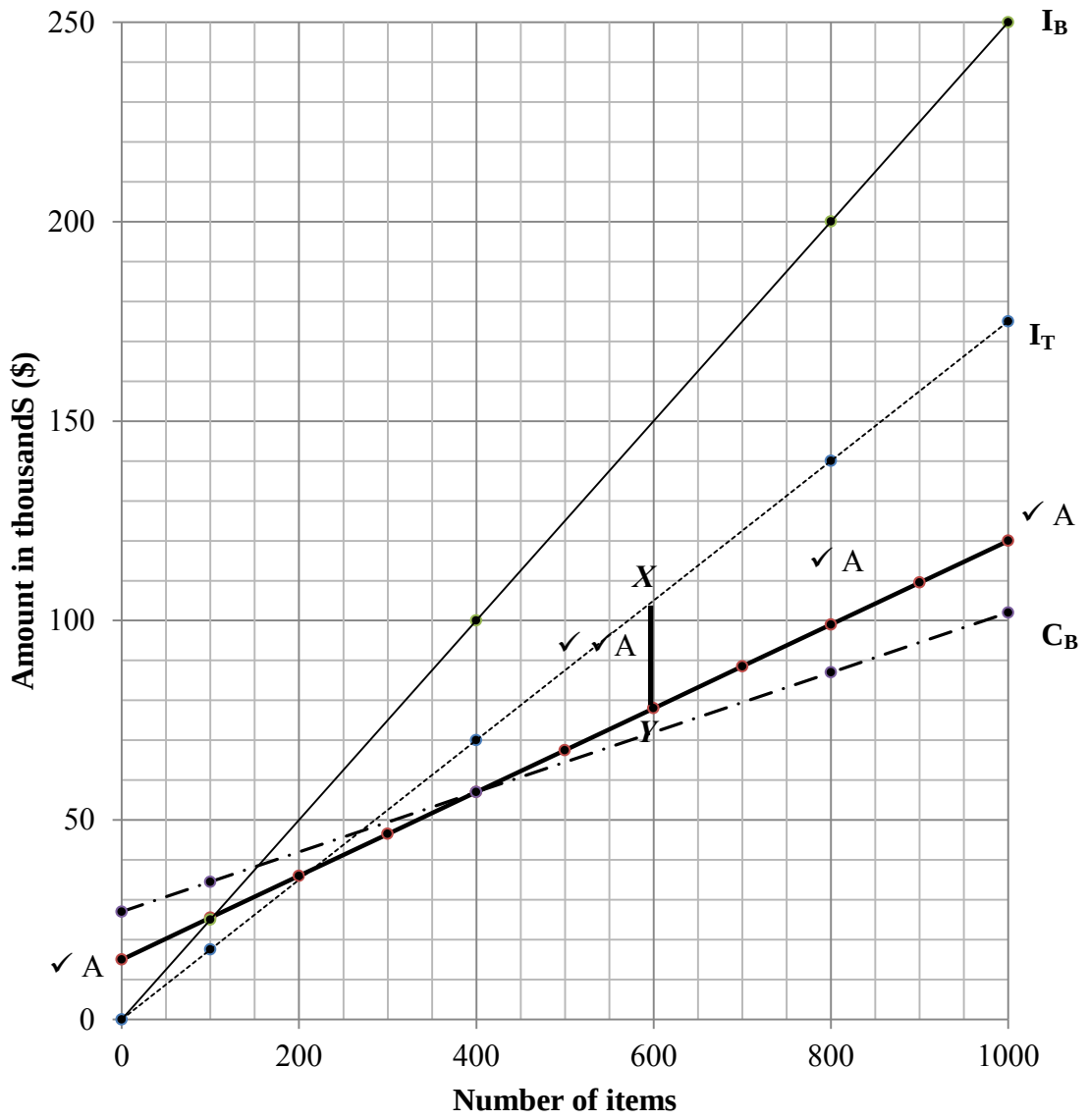
QUESTION 2 [28 MARKS]			
Ques	**Solution**	**Explanation**	**Level**
2.1.1(a)	July salary for a worker on Wage Rate A = R11 000 × 7% + R11 000 ✓ M ✓ CA = R770 + R11 000 = R11 770 ✓ CA ✓ M Daily earnings = R11 770 × 12 ÷ 365 = R 386, 9589041 ✓ CA Earnings lost after 28 days = R386, 9589041 × 28 = R10 834,85 ✓ CA	1M Calculating the 7% increase 1CA calculating salary after increase 1CA simplification 1M calculating daily rate 1CA multiplying by 28 1CA calculating loss of earnings (6)	F L3
2.1.1(b)	✓✓ O Workers bills will not be paid./Unpaid bills accumulate interest adding to debt **OR** ✓✓O Take a long time to make up the money lost due to a strike. **OR** Workers can become unemployed if the company closes its doors due to a prolonged strike. ✓✓O **OR** ✓✓O Workers can be retrenched due to loss of business.	2O for any correct reason (2)	F L4

Ques	Solution	Explanation	Level
2.1.2	Pay at the end of July if not on strike = R6 000 + R6 000 × 8% ✓ MA = R6 000 + R480 = R6 480,00 ✓ CA Lost income due to 28 day strike = R6 480 × 12 ÷ 365 × 28 = R213,04 × 28 = R5 965,15 ✓ CA Gain in increase after strike = R6 000 × 2% = R120 ✓ CA Salary gained from end July 2014 till end of June 2014 = 120 × 11 = R1 320,00 ✓ CA No, he will not be able to cover the loss. ✓ O	1M calculating salary increase if not on strike 1CA calculating new salary 1CA calculating loss in income for 28 days of striking 1CA calculating diff in increase if on strike 1CA calculating gained salary 1O Conclusion (6)	F L4

Ques	Solution	Explanation	Level
2.2.1	No change in employment. ✓✓O **OR** Employment numbers remain the same. ✓✓O	2O interpretation (2)	D L4
2.2.2	The year 2009 ✓✓A Number of jobs lost = 153 000 + 259 000 + 527 000 – 143 000 ✓✓RT = 796 000 ✓CA	1A reading correct year. 2RT reading correct values from table 1CA simplification (5)	DH L3
2.2.3	The year 2011 ✓RT All four quarters were positive improvement was experienced **2011:** $= \frac{5+18+197+218}{4}$ ✓MA ✓M = 109,5 thousand = 109 500 ✓CA	1RT stating the correct years 2011 and 2013 1MA adding all scores 1M dividing by 4 1CA calculating the mean (4)	DH L3
2.2.4	Number of people ✓M ✓A = 15 000 000 – (141 000 + 344 000 + 133 000) = 15 000 000 – 618 000 = 14 382 000 ✓CA	1 A reading correct values 1M subtracting 1CA simplification (3)	DH L3
		[28]	

QUESTION 3 [37 MARKS]			
Ques	**Solution**	**Explanation**	**Level**
3.1.1	71 ✓✓A	2A correct number of seats (2)	MP L2
3.1.2	Ratio of Business class seats to Economy seats = 26 : 80 ✓A ✓A = 13 : 40 ✓CA	1A counting 26 1A counting 80 1CA simplified ratio (3)	MP L2
3.1.3	✓O ✓O • Get up turn left walk down the aisle to the galley/kitchen. ✓O ✓O • Turn right, walk to the next aisle/pass the galleys and turn left. • Walk straight down this aisle till row 38, his friend is on his right hand side. ✓O **OR** ✓O ✓O • Get up turn left walk down the aisle past the galley/kitchen ✓O • Continue straight and pass the toilets at the rear, turn right • Walk to the next aisle and turn right ✓O • Walk straight to the second row from the back and the friend is on his left hand side ✓O	1O turn left 1O galley 1O turn right 1O turn left 1O right hand side. 1O turn left 1O galley 1O turn right 1O turn right 1O left hand side (5)	MP L2
3.1.4	✓A Probability = $\frac{9}{26}$ × 100% ✓A = 34,62% ✓CA	1A numerator 1A denominator 1CA percentage (3)	P L2
3.1.5	✓✓O The comfort due to space or types of seat **OR** Better on-board services received. ✓✓O **OR** More luggage allowed ✓✓O **OR** Any suitable answer	2O reason (2)	MP L4

Ques	Solution	Explanation	Level
3.2	Distance in km = $\frac{5222,086}{0,6215}$ km = 8 402 km ✓C Time taken = 24 h – 17h14min + 4h 11min ✓A Time = 10,95hrs ✓C Speed = $\frac{8\,402}{10,95}$ km/h = 767,31 km/h ✓M ✓CA Speed in knots = $\frac{767,31}{1,852}$ = 414,31 ✓CA	1C to km 1A correct time 1C converting to hr 1M substitution 1CA speed 1CA speed in knots (6)	M L3
3.3.1	A = \$175 000 ÷250 ✓M **OR** A = $\frac{\$79\,500 - 27\,000}{75}$ ✓M = 700 belts ✓CA B = \$27 000 + \$75 × 800 ✓M = \$87 000 ✓CA C = \$250 × 400 = \$100 000 ✓CA	1M dividing by 250 1CA simplification 1M adding US\$27 000 and multiplying by US\$75 1CA simplification 1A value (5)	F L2 L3
3.3.2	Income = \$250 × 800 + \$175 × 1 000 ✓A ✓A = \$375 000 ✓CA	1A income from belts 1A income from T-shirts 1CA simplification (3)	F L2

Ques	Solution	Explanation	Level
3.3.3(a) and (b)	**Points for the graph to be drawn:** (0 ; 15 000); (100; 25 500); (200; 36 000); (300; 46 500); (400 ; 57 000); (500; 67 500); (600; 78 000); (700; 88 500); (800 ; 99 000); (900; 109 500); (1 000; 120 000);		F L3
	 **KEY: I_B = Income from selling belts** **I_T = Income from selling T-shirts** **C_B = Cost of producing belts** 1A starting point 1A end point 3A for any other correct points 1A joining points (6)		
3.3.3(b)	Vertical line at 600 items between income and cost graphs. Refer to the graph line ***XY***. (2)		
	[37]		

QUESTION 4 [29 MARKS]			
Ques	**Solution**	**Explanation**	
4.1.1	✓RT 46% of 538 421 = 247 674 ✓ A ✓ A The closest is Gauteng with 246 989. **OR** ✓RT Gauteng $= \frac{246\,989}{538421} \times 100\% = 45{,}87\%$ ✓ A Gauteng. ✓A	1RT reading data from table 1A calc. percentage 1A province 1RT reading data from table 1A calc. percentage 1A province (3)	DH L2
4.1.2	✓ A P(teacher from EC) $= \frac{61\,260}{390\,608}$ ✓ M = 0,1568.. ≈ 0,16 OR 15,68%	1A number of teachers 1M probability (2)	P L3
4.1.3	Total number of learners = 9 × 1 346 335 ✓ M = 12 117 015 ✓ CA ✓ A A = 12 117 015 – (1 889 307 + 656 408 + 1 944 486 + 2 831 311 +1 034 151 + 284 908 + 784 184 + 1 026 744) A = 12 117 015 – 10 451 499 ✓ M = 1 665 516 ✓ CA	1M multiplying 1CA simplification 1A adding all correct values 1M subtracting correct values 1CA the value of A (5)	DH L2 L3
4.1.4	Public School's teacher-pupil ratio ✓ M 390 608 : 12 117 015 ✓ M 1: 31,0209 ✓ CA Independent Schools ✓ M 34 482 : 538 421 1 : 15,6145 ✓ CA ✓ O The educator's statement is valid.	1M correct values used 1M concept of ratio 1CA simplified ratio 1M correct values and ratio 1CA simplified ratio 1O correct deduction (6)	DH L4

Ques	Solution	Explanation	Level
4.1.5	Learners' population increase every year. ✓✓ O **OR** Learners transfer out of special schools to ordinary schools ✓✓ O	2O reason 2O Reason (2)	DH L4
4.2.1	R530 × 672 290 ✓M × 12 = R 4 275 764 400,00. ✓✓ A	1M multiplying 2A solution (3)	DH L2
4.2.2	✓A KZN with highest: 2014/2015: $\frac{2\ 901\ 697 - 2\ 866\ 570}{2\ 866\ 570} \times 100\%$ ✓M/A = 1,2254…% ≈ 1,23% ✓CA	1A correct province 1M/A calculation 1CA percentage (3)	DH L3
4.3	Length of table = 1,75 m Half the length of the table = 1,75 m ÷2 = 0,875 m ✓ A **If scale 1 : 8 is used** Length of model = 7,5 m ÷8 ×1 ✓ M = 0,9375 m ✓CA 0,9375 m will not fit on the actual table. Therefor the scale of 1 : 8 will NOT be suitable. ✓✓O	1A calculating half the table size 1M using the scale 1CA calculating modal length 2O deduction (5)	MP L4
		[29]	

QUESTION 5 [22 MARKS]			
Ques	**Solution**	**Explanation**	
5.1.1	Volume of a cylinder $= \pi \times (\text{radius})^2 \times \text{height}$ $60\text{m}^3 = 3{,}142 \times (\text{radius})^2 \times 7{,}35\text{ m}$ ✓ SF $(\text{radius})^2 = \frac{60\,\text{m}^3}{3{,}142 \times 7{,}35\,\text{m}}$ ✓ M $= 2{,}598111173\ \text{m}^2$ $\text{radius} = \sqrt{2{,}598111173}$ ✓ M $= 1{,}611865743$ m ✓ CA $\text{diameter} = 1{,}611865743\text{ m} \times 2$ $= 3{,}223731486$ m ✓ CA	1S substituting 1M changing the subject 1M square root 1CA radius 1CA diameter (5)	M L3
5.1.2	Total capacity $= 4 \times 60\ \text{m}^3$ ✓ M $= 240\ \text{m}^3$ $= 240\,000\ \ell$ ✓ C Capacity in gallon $= \frac{240\,000}{3{,}7}$ ✓ M $\approx 64\,864{,}86$ ✓ CA	1M multiplying 1C convert to ℓ 1M dividing 1CA gallons (4)	M L2
5.1.3	Volume of fertiliser in silos $= (15\% \times 60\text{m}^3) + (\frac{1}{4} \times 60\text{m}^3)$ ✓ M $= 9\ \text{m}^3 + 15\ \text{m}^3$ $= 24\ \text{m}^3$ ✓ A Fertiliser needed for wheat field ✓ M $= 1\,055$ acres $\times 22{,}65$ kg $= 23\,895{,}75$ kg $= \frac{23\,895{,}75}{1{,}3}$ litre $= 18\,381{,}35$ litre ✓ C Volume of fertiliser needed $= 18\,381{,}35 \div 1\,000$ $= 18{,}38\ldots\ \text{m}^3$ $\approx 18{,}4\ \text{m}^3$ ✓ C She will have enough fertiliser for the wheat field. ✓ O	1M % and $\frac{1}{4}$ of 60 1A volume of silos 1M multiply by 22,65 1C convert to ℓ 1C conversion 1O deduction (6)	M L4

Ques	Solution	Explanation	
5.2	June, July, Aug. Mean (2012) = $\frac{93,8 + 282,2 + 52,2}{3}$ ✓ M = 142,73 mm ✓ A Mean (2013) = $\frac{244,2 + 56,2 + 19,0}{3}$ = 106,47 mm ✓ A Mean (2014) = $\frac{316,4 + 32,6 + 14,8}{3}$ = 121,27 mm ✓ A Mean (2015) = $\frac{68,0 + 16,4 + 215,2}{3}$ = 99,8667 mm ✓ A The probability will be 75%. ✓ ✓CA	1M concept of mean 1A mean 2011 1A mean 2012 1A mean 2013 1A mean 2014 2CA probability in % (7)	P L2 L4
		[22]	
		TOTAL: 150	