



NATIONAL SENIOR CERTIFICATE EXAMINATION
NOVEMBER 2016

MATHEMATICAL LITERACY: PAPER II

MARKING GUIDELINES

Time: 3 hours

150 marks

These marking guidelines are prepared for use by examiners and sub-examiners, all of whom are required to attend a standardisation meeting to ensure that the guidelines are consistently interpreted and applied in the marking of candidates' scripts.

The IEB will not enter into any discussions or correspondence about any marking guidelines. It is acknowledged that there may be different views about some matters of emphasis or detail in the guidelines. It is also recognised that, without the benefit of attendance at a standardisation meeting, there may be different interpretations of the application of the marking guidelines.

Key: ✓^a accuracy
✓^m method
✓^{ca} continuous accuracy
✓^r rounding
✓^{ma} method accuracy

Topics

F Finance
MP Maps and Plans
M Measurement
P Probability
DH Data Handling

QUESTION 1					
1.1.1	Japan/JPY If only value (113,066) = 1 mark OR If table read incorrectly then GBP = 2 marks. If only value (1,43214) = 1 mark	2 marks	<i>a</i>	country	2
1.1.2	$\pounds 750 \times \frac{100}{104,5}$ $= \pounds 717,70$ $\pounds 717,70 \div 0,69820$ $= \$1\ 027,93$ See attached pages for variations	1 mark	<i>m</i>		5
		1 mark	<i>a</i>		
		1 mark	<i>m</i>	dividing	
		1 mark	<i>a</i>	0,69820	
		1 mark	<i>ca</i>	answer	
1.2.1	R2 800	2 marks	<i>a</i>		2
1.2.2	5 + 3 = 8 people on cruise R1 600 per person R1 600 × 5 = R8 000 If R2200×5 = R11000 – 1 mark only	1 mark	<i>a</i>		3
		1 mark	<i>ma</i>		
		1 mark	<i>a</i>		
1.2.3	6 people (R2 000 each)	2 marks	<i>a</i>		2
1.3.1	$65\text{ m}^2 \div 5,5\text{ m}$ = 11,82 m Accept 11,8/11,9/12 (no rounding penalised) Could use scale to determine length (11,6)	1 mark	<i>a</i>	65 m^2	3
		1 mark	<i>m</i>	dividing	
		1 mark	<i>a</i>		
1.3.2	$9 + 9 + 5,5 + 5,5 / 2(9 + 5,5)$ = 29 m Yes, it will be enough. No marks if calculated area	1 mark	<i>m</i>	Adding 4 values	4
		1 mark	<i>a</i>	Accurate values	
		1 mark	<i>a</i>		
		1 mark	<i>ca</i>		
1.3.3	The breadth of the lower deck is 2,6 cm but the breadth of the upper deck is 2,2 cm yet they both equal 5,5 m on the plan. <p style="text-align: center;">OR</p> 28 m = 12,7 cm is not proportional to 9 m = 7,4 cm Could compare areas visually	1 mark	<i>m</i>	measuring the plan	3
		1 mark	<i>m</i>	comparing ruler measurement to actual measurement	
		1 mark	<i>m</i>	explanation makes sense	
		1 mark	<i>m</i>	measuring the plan	
		1 mark	<i>m</i>	comparing ruler measurement to actual measurement	
		1 mark	<i>m</i>	explanation makes sense	
1.3.4	The areas are not all calculated correctly. Saloon: $13 \times 4,75 = 61,75\text{ m}^2$ Upper deck: $9 \times 5,5 = 49,5\text{ m}^2$ Could identify rounding as error Accepted 4,75 instead of 5,5 as error	1 mark	<i>a</i>	description	3
		1 mark	<i>a</i>		
		1 mark	<i>a</i>		

1.4	<p>Needs: $1/2$ cup = 16 servings 60 servings = 1,875 cups 1 cup = 226 grams 1,875 cups = 423,75 grams Frosting: 3 tablespoons = 16 servings 60 servings = 11,25 tablespoons 1 tablespoon = 14 grams 11,25 tablespoons = 157,5 g</p> <p>Total needed = 423,75 g + 157,5 g = 581,25 grams</p> <p>Has: 2,5 blocks = 625 grams</p> <p>He has enough butter to make 60 brownies. OR</p> <p>$\frac{1}{2}$ cup + 3 teaspoons = 113 g + (14 g × 3) = 113 g + 42 g = 155 g ÷ 16 × 60 = 581,25 g needed</p> <p>$2\frac{1}{2} \times 250$ g = 625 g ∴ chef has enough</p> <p>Instead of calculating 2,5 blocks = 625 g, could convert 581,25 g to 2,325 blocks If only brownies or only frosting the max is 5/8 Accepted rounding 3,75 to 4 batches (total needed 620 g) Or $625 \div 155 = 4,03$, which is more than 3,75</p>				8
		1 mark	<i>a</i>	1,875 cups needed	
		1 mark	<i>a</i>	423,5 grams needed	
		1 mark	<i>ca</i>	11,25 tablespoons	
		1 mark	<i>ca</i>	157,5 grams needed for frosting	
		1 mark	<i>m</i>	adding frosting	
		1 mark	<i>a</i>	625 grams	
		1 mark	<i>m</i>	$250 \times 2,5$	
		1 mark	<i>ca</i>		
		1 mark	<i>ca</i>	total butter needed	
1.5	<p>First year: no tax</p> <p>Second year: $R1\ 650 + 2\% \times (R740\ 000 - R500\ 000)$ = $R1\ 650 + 2\% \times R240\ 000$ = $R1\ 650 + R4\ 800$ = R6 450 Total tax paid = R6 450 Total turnover = R1 015 000 $R1\ 015\ 000 - R6\ 450 = R1\ 008\ 550$ $1\ 008\ 550 \div 1\ 015\ 000 \times 100$ = 99,36%</p>	1 mark	<i>a</i>	indication that there was no tax paid in first year	8
		1 mark	<i>a</i>	correct tax bracket	
		1 mark	<i>a</i>	R240 000	
		1 mark	<i>ca</i>		
		1 mark	<i>a</i>		
		1 mark	<i>ca</i>	turnover minus tax	
		1 mark	<i>ma</i>		
		1 mark	<i>ca</i>	correct answer	
1.6	<p>$\frac{R1\ 837,50 - R1\ 500}{R1\ 500} \times 100$ = 22,5% increase $22,5\% \div 1,5$ years = 15% per annum</p>	1 mark	<i>M</i>	Correct values	6
		1 mark	<i>m</i>	X 100	
		1 mark	<i>a</i>		
		1 mark	<i>m</i>	per cent divided by time	
		1 mark	<i>a</i>	1,5	

	<p>Or</p> $SI = P(1 + I \times n)$ $337,5 = 1500 \times I \times 1,5$ $0,15 = i$ $0,15 \times 100 = i$ $15\% = i$ <p>Or</p> $A = P(1 + i \times n)$ $1837,50 = 1500(1 + i \times 1,5)$ $1,225 = 1 + i \times 1,5$ $0,225 = i \times 1,5$ $0,15 = i$ $0,15 \times 100 = i$ $15\% = i$ <p>Or</p> $1837,5 - 1500 = 337,50$ $337,5 / 18 = 18,75$ $18,75 \times 12$ $225 / 1500 \times 100$ $= 15\%$	1 mark	<p><i>a</i></p> <p><i>a</i></p> <p><i>a</i></p> <p><i>m</i></p> <p><i>ca</i></p>	<p>337,50</p> <p>Substitution</p> <p>0,15</p> <p>0,15</p> <p>answer</p>	
1.7.1	$R13\ 500 \div R1\ 700$ $= 7,9$ $= 7 \text{ full days}$	<p>1 mark</p> <p>1 mark</p> <p>1 mark</p>	<p><i>m</i></p> <p><i>a</i></p> <p><i>car</i></p>	<p>rounded down</p>	3
1.7.2	$R13\ 500 \div 10 = R1\ 350 \text{ per day}$ $60\% \times R1\ 350$ $= R810 \text{ for accommodation}$	<p>1 mark</p> <p>1 mark</p> <p>1 mark</p>	<p><i>a</i></p> <p><i>m</i></p> <p><i>ca</i></p>	<p>budget per day</p>	3
					55
QUESTION 2					
2.1	$24 \text{ m} \div 91 \text{ steps}$ $= 0,2637 \text{ m per step}$ $0,2637 \times 50 \text{ steps}$ $= 13,19 \text{ m}$ <p style="text-align: center;">OR</p> $50 \div 91 \times 24$ $= 13,19 \text{ m}$ <p style="text-align: center;">OR</p> $\frac{91 - 50}{50} \times 100$ $= 45,05\%$ $= 24 \text{ m} \times 45\%$ $= 24 - 10,8 \text{ m}$ $= 13,2 \text{ m}$	<p>1 mark</p> <p>1 mark</p> <p>1 mark</p> <p>2 marks</p> <p>1 mark</p> <p>1 mark</p> <p>1 mark</p> <p>1 mark</p> <p>1 mark</p>	<p><i>m</i></p> <p><i>m</i></p> <p><i>a</i></p> <p><i>m</i></p> <p><i>a</i></p> <p><i>m</i></p> <p><i>m</i></p> <p><i>a</i></p>		3
	OR				
	$91 \div 50$				
	$= 1,82$				
	$= 24 \div 1,82$				
	$= 13,18$				

	OR				
	$91 \div 24 = 3,79$				
	$50 \div 3,79 = 13,19$				
	OR				
	Pythagoras only	0 marks			
	OR				
	Pythagoras and went on making calculations	Max 2 marks			
2.2	Walking up the stairs: $91 \times 0,17$ calories $= 15,47$ calories	1 mark	<i>m</i>		8
	Walking down the stairs: $91 \div 20$ $= 4,55$ calories	1 mark	<i>a</i>		
	Total: $15,47 + 4,55$ $= 20,02$ calories	1 mark	<i>m</i>		
	Drink: $100 \text{ ml/g} = 38$ calories $330 \text{ ml/g} = 125,4$ calories	1 mark	<i>a</i>		
	$125,4 \div 20,02$ $= 6,3$ times up AND down/7 times	1 mark	<i>a</i>		
	OR				
	$91 \times 0,17 \times 5 = 77,35$ calories	1 mark	<i>m</i>	$\times 0,17$	
		1 mark	<i>a</i>	$\times 5$	
		1 mark	<i>a</i>	77,35	
	$91 \div 20 \times 5 = 22,75$ calories	1 mark	<i>m</i>	$\div 20$	
		1 mark	<i>a</i>	22,75	
	$77,35 + 22,75 = 100,1$ calories	1 mark	<i>ca</i>	100,1	
	\therefore more than 5 times required	1 mark	<i>ca</i>		
	125,4	1 mark	<i>a</i>	125,4 calories in drink	
	OR				
	38 calories				
	0,17 cal : every step				
	38 calories : x	1 mark	<i>m</i>		
	$x = 224$ steps	1 mark	<i>a</i>		
		1 mark	<i>m</i>		
	1 calorie : 20 steps down				
	38 calories : x	1 mark	<i>m</i>		
	$x = 760$ steps down	1 mark	<i>a</i>		
	$= 760 - 224$ steps	1 mark	<i>ca</i>		
	$= 536$ steps $\div 91$	1 mark	<i>m</i>		
	$= 5,89$ and reason	2 marks	<i>ca</i>	Must have reason for 2 nd mark	
2.3	Width of step = 1,3 cm/13 mm (12 mm)	1 mark	<i>a</i>	plan measurement	4
	Scale: 4,5 cm = 30 m 3 cm = 20 m 1,5 cm = 10 m $\therefore 1,3 \div 4,5 \times 30$ $= 8,7$ m (8 m \rightarrow 8,9 m)	1 mark	<i>a</i>	scale measurement	
		1 mark	<i>m</i>		
		1 mark	<i>ca</i>	answer	
	OR				
	1,3 cm	1 mark	<i>a</i>		
	1 mm = 0,2	1 mark	<i>a</i>		
	$\div 0,2$	1 mark	<i>m</i>		

	6,5 m	1 mark	ca		
	OR				
	1,2 cm	1 mark	a		
	1 mm = 0,2	1 mark	a		
	÷ 0,2	1 mark	m		
	6 m	1 mark	ca		
	OR				
	1,2 cm	1 mark	a		
	2,9 cm	1 mark	a		
	4,4 cm	1 mark	m		
	7,9 m	1 mark	ca		
	OR				
	7 mm represents 5 m	1 mark	a		
	1 mm = 0,714 m	1 mark	a		
	Answer x 13	1 mark	m		
	=9,29 m	1 mark	ca		
	OR				
	6 mm represents 5 m	1 mark	a		
	1 mm = 0,833	1 mark	a		
	Answer x 13	1 mark	m		
	=10,83 m	1 mark	ca		
	≈ 11				
	OR				
	Measuring the base	1 mark	a		
	8,5 cm represents 55,3 m	1 mark	a		
	1 cm represents 6,5 m	1 mark	m		
	= 8,45 m	1 mark	ca		
2.4	North West OR WNW OR westerly/north westerly	2 marks	a		2
2.5	Vcube = 20 cm × 20 cm × 20 cm	1 mark	m		3
	Vcube = 8 000 cm ³	1 mark	a		
	Vpyramid = 8 000 cm ³ ÷ 6				
	Vpyramid = 1 333,33 cm ³	1 mark	ca	No penalty for not rounding	
	Vpyramid ≈ 1 300 cm ³				
	OR				
2.5	Vpyramid = 20 × 20 × 10	1 mark	m		3
	Vpyramid = 4000 ÷ 3	1 mark	a		
	Vpyramid = 1333.33	1 mark	ca		
2.6.1	Speed = $\frac{\text{Distance}}{\text{Time}}$	1 mark	m	changing formula	3
	$= \frac{193}{2 \frac{2}{60}}$	1 mark	m	$2 \frac{2}{60}$ (2,03 hr)	
	=94,92 km/h	1 mark	a		
2.6.2	15,5 km × 11	1 mark	m		3
	=170,5 km	1 mark	a		
	∴ He will need to stop.	1 mark	ca		
	OR				
2.6.2	193 km ÷ 15,5 km				3
	= 12,45 ℓ				
	One tank = 11 ℓ				
2.6.2	∴ he must stop.				3

	OR $1 \text{ km} = 0.66 \text{ l}$ $\frac{11}{0.66} = 183.3 \text{ km per tank}$ $\therefore \text{he must fill up}$																																												
2.6.3	Time at the airport = 5:05 a.m. to 2:45 p.m. = 9 hours 40 minutes Time away from airport = 9 hours 40 minutes – 1 hours 30 minutes = 8 hours 10 minutes Travel time = 2 hours 20 minutes \times 2 = 4 hours 40 minutes \therefore Time at El Castillo = 8 hours 10 minutes – 4 hours 40 minutes = 3 hours 30 minutes (Variations in order accepted)	1 mark 1 mark 1 mark 1 mark 1 mark 1 mark	<i>a</i> <i>m</i> <i>a</i> <i>m</i> <i>a</i> <i>m</i>		7																																								
					33																																								
QUESTION 3																																													
3.1	The cost of buying 60 l (or full tank) of petrol on 3 July 2013 (or cost of R13,23) Or just a calculation of $60 \text{ l} \times \text{R}13,23 = \text{R}793,80$	1 mark 1 mark	A A	mentioning it is the cost mentioning the date	2																																								
3.2	The graph is not referring to the quantity of petrol, it is referring to the increasing cost of purchasing the 60 l.	2 marks	A	explanation logical and correct	2																																								
3.3	1 tube toothpaste = R9 $\text{R}127,80 \div 9 = 14,2$ tubes OR 14 tubes (if round up to 15 or down to 13 only get $\frac{2}{3}$)	1 mark 1 mark 1 mark	A M <i>a</i>		3																																								
3.4	140 km $\text{R}151,20$ or $\text{R}150,77$ ($140 \div 13 \times 14$) 20 km 5,4 or 5,38 $\text{R}21$ or $\text{R}21,54$ ($20 \div 13 \times 14$) $\text{R}473,80$ or $\text{R}473,91$ or $\text{R}473,37$ or $\text{R}474,34$	1 mark 1 mark 1 mark 1 mark 1 mark	A A A A <i>ca</i>	no penalisation for rounding	6																																								
<table border="1"> <thead> <tr> <th>(All trips there and back)</th> <th></th> <th>Total km per month</th> <th>\approx Litres used</th> <th>Total rand value</th> </tr> </thead> <tbody> <tr> <td>University</td> <td>7 km per day \times 5 days a week</td> <td>140 km</td> <td>$\approx 10,8$</td> <td>R151,20</td> </tr> <tr> <td>Gym</td> <td>3 km \times 3 days a week</td> <td>36 km</td> <td>$\approx 2,8$</td> <td>R39,20</td> </tr> <tr> <td>Socialising</td> <td>20 km per weekend</td> <td>80 km</td> <td>$\approx 6,2$</td> <td>R86,80</td> </tr> <tr> <td>Visiting home</td> <td>1 \times per month</td> <td>70 km</td> <td>$\approx 5,4$</td> <td>R75,60</td> </tr> <tr> <td>Shops</td> <td>2 \times per week</td> <td>20 km</td> <td>$\approx 1,5$</td> <td>R21,00</td> </tr> <tr> <td>Unforeseen</td> <td></td> <td>–</td> <td>–</td> <td>R100,00</td> </tr> <tr> <td colspan="2"></td> <td>TOTAL</td> <td>$\approx 26,7$</td> <td>R473,80</td> </tr> </tbody> </table>		(All trips there and back)		Total km per month		\approx Litres used	Total rand value	University	7 km per day \times 5 days a week	140 km	$\approx 10,8$	R151,20	Gym	3 km \times 3 days a week	36 km	$\approx 2,8$	R39,20	Socialising	20 km per weekend	80 km	$\approx 6,2$	R86,80	Visiting home	1 \times per month	70 km	$\approx 5,4$	R75,60	Shops	2 \times per week	20 km	$\approx 1,5$	R21,00	Unforeseen		–	–	R100,00			TOTAL	$\approx 26,7$	R473,80			
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QUESTION 4						
4.1	Bar graph	2 marks	A		2	
4.2	$\frac{44,1 + 42,3 + 41 + 40,6 + 39,2}{5}$ $= \frac{207,2}{5}$ $= 41,44 \text{ g}$	1 mark	M	adding 5 values	4	
		1 mark	ma	dividing by 5		
		1 mark	A	numerator		
		1 mark	ca	ca only if divided by 5		
4.3.1	31,7 g 33,7 g 35 g 36,3 g 36,4 g 37 g 39,2 g 40,6 g 41 g 42,3 g 44,1 g Median = 37 g	1 mark	M		3	
		1 mark	A			
		1 mark	A			
4.3.2	No	2 marks	A		2	
4.3.3	44,1 g – 31,7 g = 12,4 g	1 mark	M		3	
		1 mark	A			
		1 mark	A			
4.3.4	Mean There is no outlier.	1 mark	A		3	
		2 marks	A			
4.4	Play energy drink: 250 ml: 29,2 g 100 ml = 11,68 g Lemon Twist: 330 ml: 39,2 g 100 ml = 11,88 g Lemon Twist contains more sugar per 100 ml $\frac{1250}{330} = 3,79$ tins in a bottle $3,79 \times 44,1 = 167,14 \text{ g}$ in bottle $\frac{167,14}{1250} \times 100 = 13,4\%$ $\therefore 13,4\% \epsilon > 13\%$ thus yes. OR $29,2 \div 250$ 1:0,1168 100:11,6 $39,2 \div 330$ 1: 0,1187 100: 11,88	1 mark	M	Mark allocated for division/ ratio	5	
		1 mark	A	11,68 g		
		1 mark	M	Mark allocated for division/ ratio		
		1 mark	A	11,88 g		
		1 mark	ca	According to learner's answer		
4.5	$\frac{44,1 \text{ g}}{330 \text{ ml}} \times 100$ = 13,36% $\therefore 1,25 \text{ l}$ bottle will also contain 13,36% sugar as the amount of sugar per ml will be the same ratio. OR 1 250 ml : 167,05 g	2 marks	M	Dividing by 330 Using two correct values correctly	5	
		1 mark	A			
		2 marks				

	$\frac{167,05 \text{ g}}{1250 \text{ ml}} \times 100$ $= 13,4\%$ <p>∴ Yes, it is correct to say so.</p> <p style="text-align: center;">OR</p> $13\% \text{ of } 1250 = 162,6 \text{ g}$ $1250 \div 330 = 3,78$ $44,1 \times 3,78 = 167,05 \text{ g}$ <p style="text-align: center;">Or</p> <p>Correct calculations without units 5/5</p> <p style="text-align: center;">Or</p> <p>Correct Calculations but units filled in 4/5</p> <p style="text-align: center;">Or</p> $13\% \times 330 = 42,9$ $44,1 > 13\% \therefore \text{Yes}$				
4.6	<p>Cream Soda = 36,4 g</p> $36,4 \times 12\,000\,000$ $= 436\,800\,000 \text{ gram}$ $= 436,8 \text{ ton}$ $436,8 \times R537$ $= R234\,561,60$	1 mark	A	value from graph	6
		1 mark	A	12 000 000	
		1 mark	<i>ca</i>	answer in gram	
		1 mark	<i>ca</i>	answer in ton	
		1 mark	<i>ma</i>		
		1 mark	<i>ca</i>		

4.7	<p>4 litres = 4 000 ml 4 000 ml × 4 weeks = 16 000 ml per month</p> <p>330 ml = 35 g = 7 teaspoons 16 000 ÷ 330 = 48,48 ... cans 7 × 48,48 ... or 7 x 48 ≈ 340 teaspoons = 336</p> <p style="text-align: center;">OR</p> <p>7 teaspoons per can 4 000 ÷ 330 = 12,12 ... cans per week 12,12 ... × 7 or 12 x 7 = 84 = 84,84 ... teaspoons per week 84,84 ... × 4 = 339,39 teaspoons 336 ≈ 340 teaspoons</p> <p style="text-align: center;">OR</p> <p>330 g = 7 teaspoons 16 000 g = ? = 339,39 teaspoons ≈ 340 teaspoons</p> <p style="text-align: center;">OR</p> $\frac{35}{330} \times 1000 = 106,06$ $106,06 \times 16 = 1696,97$ $\frac{1696,97}{5} = 339,39 = 340 \text{ teaspoons}$					
		1 mark	A	16 000 ml/16 ℓ per month		
		1 mark	A	7 teaspoons per can		
		1 mark	M			
		1 mark	A			
		1 mark	ma	X 7		
			car			
			car	rounding up to nearest teaspoon		
		1 mark				
		1 mark	A			
			M			
		1 mark				
			M			
		1 mark				
		1 mark	A	× 4		
		1 mark	ca			
			car	rounding up to nearest teaspoon		
		1 mark				
		1 mark	A	7 teaspoons per can		
		2 marks	A	16 000 g		
1 mark	M					
1 mark	ca					
	car	rounding up to nearest teaspoon				
				6		
				39		

QUESTION 5		1 mark
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5.1			A	6			
						1 mark	
		1 mark	A	Taxi (both)			
		1 mark	A	2			
			A	1			
						1 mark	
		1 mark	A	4			
			a	4			
							6

5.2	$\frac{3}{7} \times \frac{2}{10}$ $= \frac{6}{70}$ or $\frac{3}{35}$ OR 0,09 / 0,0857...	1 mark	A	fraction $\frac{3}{7}$	4
		1 mark	ca	fraction correct based on their tree diagram	
		1 mark	M	Multiplying	
			ca	Answer (based on their two fractions)	
					10

Total: 150 marks