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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: $\checkmark^a$ accuracy
 $\checkmark^m$ method
 $\checkmark^{ca}$ continuous accuracy
 $\checkmark^r$ rounding
 $\checkmark^{ma}$ 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		<i>a</i>	country
1.1.2	$£750 \times \frac{100}{104,5}$ $= £717,70$ $£717,70 \div 0,69820$ $= \$1\,027,93$ See attached pages for variations		<i>m</i>	
			<i>a</i>	
			<i>m</i>	dividing
			<i>a</i>	0,69820
			<i>ca</i>	answer
1.2.1	R2 800		<i>a</i>	
1.2.2	$5 + 3 = 8$ people on cruise R1 600 per person $R1\,600 \times 5$ $= R8\,000$ If $R2200 \times 5 = R11\,000$ – 1 mark only			
			<i>a</i>	
			<i>ma</i>	
			<i>a</i>	
1.2.3	6 people (R2 000 each)		<i>a</i>	
1.3.1	$65\text{ m}^2 \div 5,5\text{ m}$ $= 11,82\text{ m}$ Accept 11,8/11,9/12 (no rounding penalised) Could use scale to determine length (11,6)		<i>a</i>	65 m^2
			<i>m</i>	dividing
			<i>a</i>	
1.3.2	$9 + 9 + 5,5 + 5,5 / 2(9 + 5,5)$ $= 29\text{ m}$ Yes, it will be enough. No marks if calculated area		<i>m</i>	Adding 4 values
			<i>a</i>	Accurate values
			<i>a</i>	
			<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. OR $28\text{ m} = 12,7\text{ cm}$ is not proportional to $9\text{ m} = 7,4\text{ cm}$ Could compare areas visually		<i>m</i>	measuring the plan
			<i>m</i>	comparing ruler measurement to actual measurement
			<i>m</i>	explanation makes sense
			<i>m</i>	measuring the plan
			<i>m</i>	comparing ruler measurement to actual measurement
			<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		<i>a</i>	description
			<i>a</i>	
			<i>a</i>	

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

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

8

4

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

	OR 1 km = 0.66 l $\frac{11}{0.66} = 183.3 \text{ km per tank}$ $\therefore$ 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)		a		7
			m		
			a		
			m		
			a		
			m		
			a		
					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 l $\times$ R13,23 = R793,80		A	mentioning it is the cost	2
			A	mentioning the date	
3.2	The graph is not referring to the quantity of petrol, it is referring to the increasing cost of purchasing the 60 l.		A	explanation logical and correct	2
3.3	1 tube toothpaste = R9 R127,80 $\div$ 9 = 14,2 tubes OR 14 tubes (if round up to 15 or down to 13 only get $\frac{2}{3}$)		A		3
			M		
			a		
3.4	140 km R151,20 or R150,77 (140 $\div$ 13 $\times$ 14) 20 km 5,4 or 5,38 R21 or R21,54 (20 $\div$ 13 $\times$ 14) R473,80 or R473,91 or R473,37 or R474,34		A		6
			A	no penalisation for rounding	
			A		
			A		
			A		
			ca		
					13

QUESTION 4					
4.1	Bar graph		A		2
4.2	$\frac{44,1 + 42,3 + 41 + 40,6 + 39,2}{5}$ $= \frac{207,2}{5}$ $= 41,44 \text{ g}$		M	adding 5 values	4
			ma	dividing by 5	
			A	numerator	
			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				3
			M		
			A		
4.3.2	No		A		2
4.3.3	$44,1 \text{ g} - 31,7 \text{ g}$ $= 12,4 \text{ g}$		M		3
			A		
			A		
4.3.4	Mean There is no outlier.		A		3
			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 $\frac{167,14}{1250} \times 100 = 13,4\%$ $\therefore 13,4\% > 13\%$ thus yes. OR $29,2 \div 250$ 1:0,1168 100:11,6 $39,2 \div 330$ 1:0,1187 100:11,88				5
			M	Mark allocated for division/ ratio	
			A	11,68 g	
			M	Mark allocated for division/ ratio	
			A	11,88 g	
			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		M	Dividing by 330 Using two correct values correctly	5
			A		

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

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graph LR
    A[Getting to school] --> B[Sunny day 3/7]
    A --> C[Rainy day 4/7]
    B --> D[Bicycle 6/10]
    B --> E[Taxi 2/10]
    B --> F[Father 2/10]
    C --> G[Bicycle 1/10]
    C --> H[Taxi 5/10]
    C --> I[Father 4/10]
  
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Getting to school

Sunny day $\frac{3}{7}$

Bicycle $\frac{6}{10}$

Taxi $\frac{2}{10}$

Father $\frac{2}{10}$

Rainy day $\frac{4}{7}$

Bicycle $\frac{1}{10}$

Taxi $\frac{5}{10}$

Father $\frac{4}{10}$

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

Total: 150 marks