NATIONAL SENIOR CERTIFICATE EXAMINATION
NOVEMBER 2013

MATHEMATICAL LITERACY: PAPER I

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.

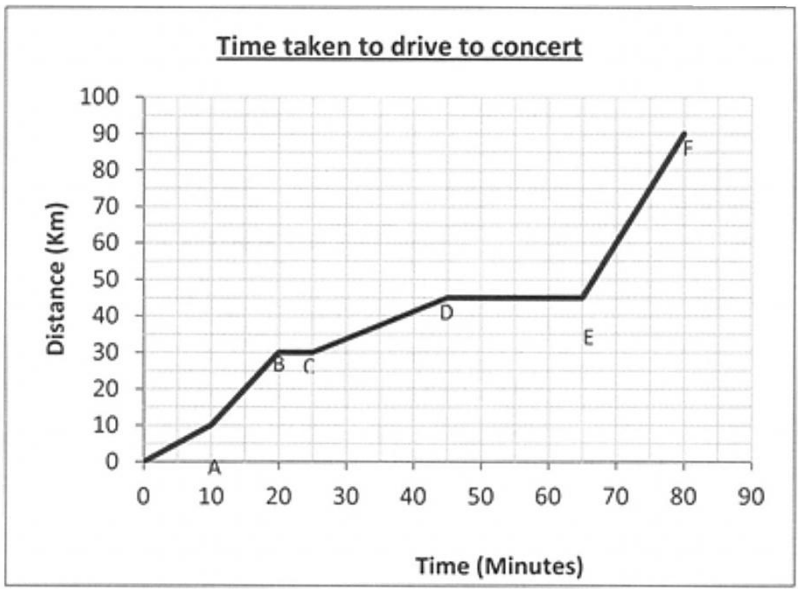
Key:
- ^{a} accuracy
- ^{ca} continued accuracy
- ^{m} method
- $\checkmark^{ma}$ method accuracy
- ^{r} rounding
- $\checkmark^{cap}$ continued accuracy based on previous answer

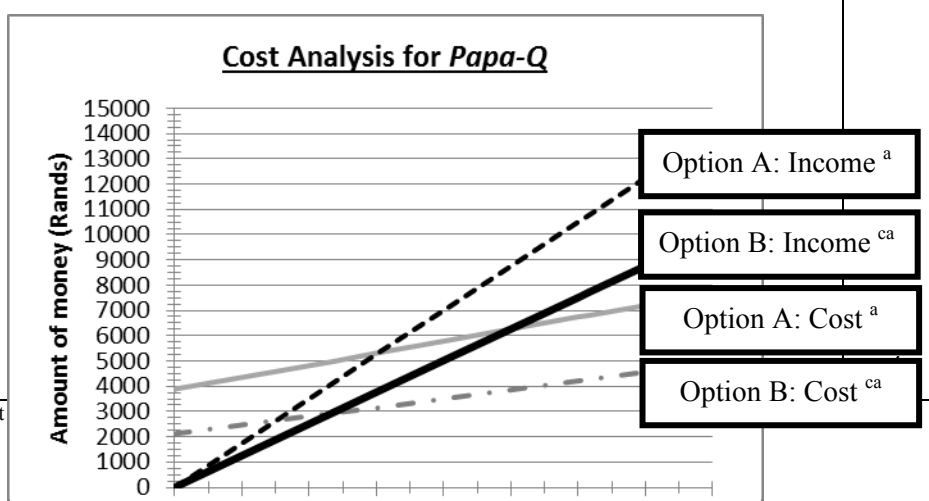
MA = Mark Allocation
AO = Answer Only
TL = Thinking Level

	Give full marks for answers only, unless question stipulates.			
	QUESTION 1	**MA**	**AO**	**TL**
1.1.1	$34{,}7 - 0 \div 4$ $= 34{,}7 - 0$ [a] $= 34{,}7$ [a] OR $347 \div 10$ ✓a $= 34{,}7$✓a	2	2	1
1.1.2	$40\% \times 2\,050$ g [m] **OR** $\frac{40^{m}}{100} \times \frac{2\,050}{1} = 820$ g [a] $= 820$ g [a]	2	2	1
1.1.3	$\frac{2}{5} \times 1\,000\,000$ [a] $= 400\,000$ [ca] **OR** $\frac{2}{5} \times 1 = 0{,}4$ [ca] million [a] *If they multiplied by any power of ten, one 'ca' for answer.	2	2	2
1.1.4	$60 \div 15 = 4$ [m] $P = 12 \div 4 = 3$ [a] **OR** $\frac{12}{60} = \frac{P}{15}$ [m] $\frac{1}{5} = \frac{P}{15}$ $P = 3$ [a] **OR** $60P = 180$ [m] $P = 3$ [a] *If $60 \div 12$ ✓m	2	2	1
1.2.1	$25 \div 60 = 0{,}4166666 \ldots$ [m] (5/12) 2 hrs 25 min $\approx$ 2,42 hrs [a] [m] Answer can be written as a mixed fraction: 2 5/12 or 29/12 If they just get 145min: No marks If 2,25: No marks **Penalise 1 mark for incorrect rounding or not rounding to 2 dec.* **Look out for 60 ÷ 25 = 2,4 : No marks*	2	2	2

	**If 60 ÷ 25 = 2,42 : 2 marks*			
1.2.2	Distance = Speed × Time Distance = 6,2 km/h ×2,42 h $^{m\ (substitution\ of\ previous\ answer)}$ Distance = 15,004 km ^{ca} (Accept 15 km) Only 'ca' if answer makes sense; not 6,2 × 145 = 899 *If incorrect substitution but answer correct ✓✓**OR** $\frac{25}{60} \times 6{,}2\ km \approx 2{,}583 \ldots km$ 6,2 km + 6,2 km + 2,583 km ^{m} = 14,98 ^{ca} ($\approx$ 15 km) 6,2 × 2 ✓m = 12,4 (Mark given only if they have indicated that they rounded. OR 6,2 × 2,4 = 14,88 ✓✓ OR 6,2 × 2,25 = 13,95 ✓ca if previous question NOT 2,25	2	2	1
1.3	2 000 g ^{a} ÷ 135 g $^{ma(right\ order)}$ = 14,8 $\approx$ 14 items $^{r(down)}$ **OR** 2 kg ÷ 0,135 kg ^{ama} = 14,8 $\approx$ 14 items ^{r} 2 ÷✓m 135 = 0,0148 ≈ 0,01✓r	3	3	1 & 2
1.4.1	R5 000 ÷ R15,07 ^{m} = £331,79 ^{a} £330, £331, £331,80, £331,78 Must be two decimals	2	2	1
1.4.2	£100 × 1,16 ^{m} = €116 ^{a} If they ÷ no marks	2	2	1
1.5.1	125 × 100^3 ^{m} for multiplying ^{a} for multiplying by 100^3 (or 1 000 000) = 125 000 000 cm^3 ^{a} OR 5 × 5 × 5 = 500 × 500 × 500 ✓m✓a= 125 000 000 cm^3 ✓^{a} **If they multiply by 100 and get an answer of 12 500 they get one mark only.* *If they multiply by any power of ten, one mark.	3	3	2
1.5.2	125 000 000 cm^3 ÷ ^{m} 512 000 cm^3✓ca (order must be previous answer ÷ by 512000) = 244,14 ^{ca} $\approx$ 244 $^{ca(r)}$ *If correct order but wrong values, can get 'ca' answer 2/3 OR	3	3	1

	$3\sqrt{125} = 500$ $\sqrt[3]{512\,000} = 80$ $500 \div 80 = 6{,}25$ $6 \times 6 \times 6 = 216$ *5 120 ÷ 125 = 40,96 ✓✓ *512 000 ÷ 12 500 = 40,96✓✓ *12 500 ÷ 512 000 = 0,0244… = 0 boxes ✓✓✓ *If answer only = 0 boxes ✓✓✓			
1.6	R2 545 × 105% = R2 672,25 [a] R2 545 + R2 672,25 [m] = R5 217,25 [ca] **OR** R2 545 × 205% [am] = R5 217,25 [ca] **Note: Students could multiply by a fraction or decimal in each case.*	3	3	2
1.7.1	$\frac{1}{9}$ [aa] OR 1 : 9 (9:1 ✓) Just 9 = no marks *0,1 = ✓	2	2	2
1.7.2	$\frac{1}{8}$ [a] = 0,125 c[a] (or 0,13 or 0,1) *If they only write 0,1 they get one mark *If incorrect fraction converted correctly, one mark *If just 8 then zero	2	2	2
1.8	15 km ÷ 250 000 [m(for dividing)] = 0,000 06 km 0,000 06 km × 100 000 [a] = 6 cm [ca] **OR** 15 km = 1 500 000 cm [a] 1 500 000 cm ÷ 250 000 [m] = 6 cm [ca] **OR** 1 : 250 000 = x : 1 500 000 [a] $x = \frac{1\,500\,000}{250\,000}$ [m] x = 6 cm [ca] *Only get 'ca' if they multiply by a power of ten. OR 15km × ✓m 0,4 ✓a= 6cm✓ca OR 250 000 ÷ 100 000 ✓m = 2,5 15 ÷ 2,5 ✓a = 6cm ✓ca	3	1	2
				35

	QUESTION 2	MA	AO	TL
2.1.1	 *a* – (*x* axis): Time (Minutes) [a] If Time(Hours) then wrong. *b* – (*y* axis): Distance (Km) [a] *c* – Appropriate Heading [a]	2 1		1 1
2.1.2	29/30/31 km [a] 14/15/16 only if axis swopped in 2.1.1	1	1	1
2.1.3	Part 5 = Between E and F. [a]	1	2	2
2.1.4	They stopped for supper. [a] Any mention of a VALID reason for stopping. They are NOT AT the concert.	1	1	1
2.1.5	4/5/6 min [a]	1	1	1
2.1.6	Distance = 45 km – 30 km = 15 km [a] Time = 45 min – 25 min = 20 minutes [a] = 0,333… hr c[a] Speed = 15 km ÷ 0,3 hr [m] Speed = 45 km/h [ca(must make mathematical sense)] **OR** Speed = 15 km [a] ÷ ✓m20 min [a] Speed = 0,75 … km/min [a] × 60 [m] Speed = 45 km/h [ca] OR 20 ✓a× 3✓ca = 60 15✓[a] × 3✓m = 45km/h✓ca *If swopped axis: D = 20km T = 15 min 20 ÷ 0,25 = 80 km/h *If C and D read correctly but not subtracted, two marks.	5	5	3

2.1.7	18h00 + 80 min [a] = 19h20 [ca] (OR 7:20 p.m.) (1h20min) If 18h80 : one mark If 80min past 18 : one mark *If axis swopped = 90 min = 19h30	2	2	2
2.2.1	238 × R35 = R8 330 [a] 316 × R25 = R7 900 [a] R8 330 + R7 900 = R16 230 [ca] R25 × 238 = R5950 WRONG! R35 × 316 = R11060 WRONG! Add = R17010 : One mark ✓ca (238 + 316) + (R35 + R25) WRONG	3	3	2
2.2.2	(554 ÷ 38) 233 ✓[m] × 100 = 1,45% [ca] *If right numbers, wrong order: one mark) OR 238 ÷ 38233 × 100 = 0,622% 316 ÷ 38233 × 100 = 0,827% 0,622% + 0,827% = 1,449% *If they do not add the two % they still get 2 marks *If 554 ÷ (38 233 – 554) = 1,47% ✓	2	2	2
2.3.1	Income Meal 1 = R35 × No. of Meals [a] Income Meal 2 = R25 × No. of Meals [a] [m] Notion of an equation, i.e. an = sign; two things on either side related to the scenario. **Note that any variables can be used, e.g. I = 35 m*	3	3	1
2.3.2	A = R4 351 [a] B = R8 330 [a] C = R2 806 [a] D = R5 000 [a]	4	4	1
2.4.1		4	4	1

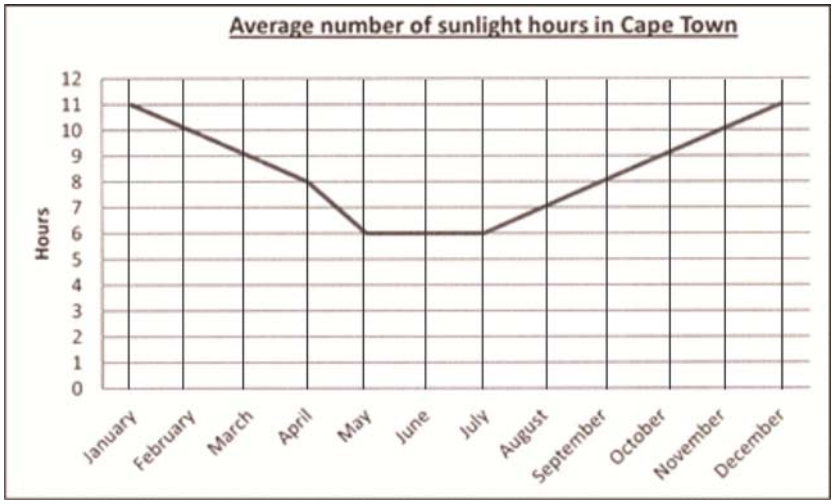
	Income graphs correct ✓a Cost graphs correct ✓a AB in correct order ✓a✓a			
2.4.2	[ca] one mark if they label the wrong graphs crossing. [aa] for correct answer (according to their labels). Meal 1 = 152 [ca] (Accept 150 – 154) **OR** Meal 2 = 117 [ca] (Accept 110 – 120)	3	3	3
				33

	QUESTION 3	**MA**	**AO**	**TL**
3.1	\$35 ÷ \$0,12 [m] = R291,67 [a]	2	2	2
3.2.1	Diameter = 140 cm ÷ π [a (substituting)] Diameter = 44,59 cm [ca] (**OR** 44,56 if they used π on the calculator) **No penalisation for rounding(even 45)*	2	2	1
3.2.2	Radius = 22,3 cm [ca] **OR** Radius = 22,28 cm [ca] **OR** Radius = 22,29 cm [ca] Previous answer ÷ 2 (OR 22,5)	1	1	1
3.2.3	Volume of Sphere = $\frac{4}{3}\ \pi\ (22,3)^3$ [a] $\quad[\pi = 3,14]$ Volume of Sphere = 46 428,32051 cm^3 [ca] $\approx$ 46 428,3 cm^3 [ca(r)] **OR** Volume of Sphere = $\frac{4}{3}\ \pi\ (22,3)^3$ [a] $\quad[\pi$ on calculator$]$ Volume of Sphere = 46 451,87 cm^3 [ca] $\approx$ 46 451,9 cm^3 [ca(r)] **OR** Volume of Sphere = $\frac{4}{3}\ \pi\ (22,29)^3$ [a] $\quad[\pi = 3,14]$ Volume of Sphere = 46 365,88889 cm^3 [ca] $\approx$ 46 365,9 cm^3 [ca(r)] **OR** Volume of Sphere = $\frac{4}{3} \times \pi\ (22,29)^3$ [a] $\quad[\pi$ on calculator$]$ = 46 389,40634 cm^3 [ca] $\approx$ 46 389,4 cm^3 [ca(r)] **OR** Volume of Sphere = $\frac{4}{3} \times \pi\ (22,28)^3$ [a] $\quad[\pi = 3,14]$ = 46 303,51326 cm^3 [ca] $\approx$ 46 303,5 cm^3 [ca(r)] **OR** Volume of Sphere = $\frac{4}{3} \times \pi\ (22,28)^3$ [a] $\quad[\pi$ on calculator$]$ = 46 326,99907 cm^3 [ca] $\approx$ 46 327 cm^3 [ca(r)] [If] r = 22,5 then V = 47 688,75 $\approx$ 47 688,8 ✓✓✓	3	2	1

3.3	Volume of Gumball = $\frac{4}{3}\ \pi\ (1{,}5)^3$ m $\quad [\pi = 3{,}14]$ Volume of Gumball = 14,13 cm^3 a Volume of Sphere ÷ Volume of Gumball 46 428,3 ÷ 14,13 m = 3 285,796 ca ≈ 3 285 r(down) **Depending on previous answer and which value of π was used, answers vary from 3 275 to 3 293.* OR (r3 ÷ r3) = (22,3)3 ÷ 1,53 = 3 285,796 ✓ca ≈ 3 285 ✓r(down)	5	5	3
3.4.1	3 277 ÷ 150 = 21,8 ca She will need 22 packets ca(round up) 22 × R34,95 = R768,90 ca **OR** 3 293 ÷ 150 = 21,95 ca She will need 22 packets ca 22 × R34,95 = R768,90 ca *Any value between 3 275 and 3 293 still calculates to 22 packets. **If they multiply by a fraction of a packet, they only get two marks.* **If R34,95 ÷ 150 = R0,233 per gumball × previous answer.* ✓✓	3	3	3
3.4.2	R768,90 ÷ R300 ma = 2,563 After 2,6 (or 3) months, Ashley will make a profit. ca *Could also be repeated subtraction.	2	2	1
				18
	QUESTION 4	**MA**	**AO**	**TL**
4.1.1	E6 a	1	1	2
4.1.2	Shoprite (G57) a	1	1	1
4.1.3	Wimpy (G07)aa (If they say shop G10 one mark) ~~OR~~ G10 / G09 / G60 /G59 / G62 / G6 / G42 / G44	2	2	2
4.1.4	Ackermans (G41) a **OR** Russells (G42) a OR Jam(G50) ✓a OR Truworths(G44)✓a	1	1	1

4.2.1	P = 135 m + 135 m + 90 m + 90 m ^{m} OR P = 2 (135 + 90) ^{m} P = 450 m ^{a} P = 450 m ^{a} *If measured with a ruler: (7,7cm + 5cm) × 2 = 25,4cm ✓m *If 135 + 90 × 2 = 315 ✓m	2	2	1
4.2.2	A = 135 m × 90 m ^{ma} A = 12 150 m^{2} ^{a}	2	2	1
4.3.1	10% ×✓^{ma} R3 299 = R329,90 ^{a}	2	2	1
4.3.2	R3 299 – ✓^{m} R329,90 = R2 969,10 c^{ap} OR 90% × R3299 = R2 969,10 *No marks if they add.	2	2	1
4.3.3	A = R2 969,10 ✓cap (1 + 22,1% × 2 ^{a}) A = R4 281,44 c^{a} *If compound interest formula used, then one mark for P, and one mark for n = 2. Total Amount = R4 281,44 + R329,90 ^{m} = R4 611,34 $^{ca(based on addition of previous correct answers)}$	5	5	2
4.3.4	R4 281,44 ÷ 24 ^{ca} ≈ R178,39 ^{ca} *Allow for 5c denominations. *If the ÷ 12 correctly, one mark for 'ca' answer.	2	2	1
				20
	QUESTION 5	**MA**	**AO**	**TL**
5.1	2006 ^{a}	1	1	1
5.2	December ^{a} 2010 ^{a} OR December 2009 / Sept 2009 **If they answer December 2008 May 2009, they get one mark.*	2	2	1
5.3	September ^{am}	2	2	1
5.4.1	412 ^{a} ÷ 12 ^{ma} = 34,3 mm ^{ca}	3	3	2
5.4.2	136 OR Oct 2010^{aa}	2	2	1
5.5	0 15 18 20 22 22 28 30 31 41 49 136 ^{m} Median = (22 + 28) ÷ 2 ^{m} = 50 ÷ 2 = 25 mm ^{a} *If (49 + 41) ÷ 2 ✓m= 45 One mark.	3	1	2

	*If odd number of data points, then ✓✓ if value chosen correctly. *If data not ordered then 22 + 14 = 36mm ✓✓			
5.6	22✓[a] mm [a(unit)]	2	2	1
5.7	136 – 0 = 136 mm [ma]	2	1	1
5.8	0 15 18 20 22 22 28 30 31 41 49 136 Lower Quartile = 19 [a] Upper Quartile = (31 + 41) ÷ 2 [m] = 36 mm [a] IQR = 36 mm – 19 mm [m] = 17 mm [ca]	5	1	2

5.9.1	 [a] *x* axis heading [a] *y* axis heading [a] *y* axis increment [a] Heading of Graph [aaa] plotting of graph : 1 or 2 points wrong: -1 3 or 4 points wrong: - 2 5 or more: - 3 *If they started line at zero, they lost one accuracy mark. *If the line not joined, minus one accuracy. *If drawn a bar graph, minus two marks.	7		2
5.9.2	January [a] and December [a] OR Summer months ✓✓	2	2	1
5.9.3	6 hours [a] (OR 180 OR 186)	1	1	1
5.9.4	7 ✓[a] hours of sunlight ∴ August [a]	2	2	1
5.9.5	19:46 [a] – ✓m05:28 = 14 hours [a] 18 min [a] *If 2h18✓a + ✓m12 = 14 h 18 min✓[a]✓[a] *If just wrote 4,18 ✓✓✓✓	4	4	2
5.10.1	R2 700 **OR** R2 750 [a] R2 700 ≤ *x* ≤ R2 750 [aa]	2	2	1
5.10.2	R550 [aa] R500 < x < R600 ✓✓ *If previous answer ÷ 5 correctly, ✓✓ *If R550 ÷ 5 ✓	2	2	1
5.10.3	3 [aa] (Accept 4 due to rounding up)	2	2	1
				44

Total: 150 marks