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.

QUESTION 1

1.1	Monthly repayments = (R290 000 ÷ 1 000) × 10,66	LO 1	
	= R3 091,40	L3	
		Multi-step	(3)

1.2   – R290 000   The outstanding amount is R2 992,80 and not
R290 000. The initial bond was R290 000,
but the missed monthly payment was
R2 992,80

- Just writes R2 992,80

(right column: LO 1, L 4, Reasoning and reflecting)

–10,5   The interest rate should be divided by 100.
It should also be a monthly interest rate and
therefore it should also be divided by 12

- Just writes 0,00875
- Just writes 0,11
- Just writes 10,5%

–16   This is the number of years and not the number
of months that the money has been
outstanding.

- Just writes 16 x 12 = 192   (6)

1.3	B	LO 2	
	Or D	L 4	
		Reasoning	(2)
		and	
		reflecting	

1.4

1.4.1 $\dfrac{7,1}{100} \times 1\,000 = 71$

∴ 75 is incorrect

Or

$\dfrac{75}{1\,000} \times 100 = 7,5$

∴ 75 is incorrect

Or 7,1%   (3)

(right column: LO 1, L 4, Reasoning and reflecting)

1.4.2	Thando presumed all the provinces had the same number of houses or households	LO 4 L 4 Reasoning and reflecting

Or calculated the average of percentage and not the average of the homes

(2)

Or Used rounded figures

Or He calculated the mean himself instead of reading it off the graph

[16]

QUESTION 2

2.1   2.1.1 $(1,4 \text{ mg} \times 20) \div 1\,000\,000$

                $= 2,8 \times 10^{-5} \text{ kg}$

                $= 0,000028 \text{ kg}$

LO 1
L3
Multi-step

Or Conversion incorrect [m]

(4)

2.1.2 $(1,4 \text{ mg} \times 20) - (0,6 \text{ mg} \times 20)$

         $= 16 \text{ mg}$

LO 4
L 3
Multi-step

Or

    $(1,4 \text{ mg} - 0,6 \text{ mg}) \times 20$

    $= 16 \text{ mg}$

Note: Mark allocation: Subtraction[m]

                                 Both correct figures

                                 X 20[m]

                                 Answer

(4)

2.2   2.2.1 $100\% - 25\% - 35\%$

$= 40\%$

$40\% \times 44\,000$

$= 17\,600$

LO 1
L 3
Multi-step

OR

$25\% \times 44\,000 = 11\,000$

$35\% \times 44\,000 = 15\,400$

$\therefore 44\,000 - 11\,000 - 15\,400$

$= 17\,600$

(3)

2.2.2 $\dfrac{\frac{17\ 600}{44\ 000} \times 360\ °}{}$

= 144 °

LO 4
L 2
Simple
application

OR

$\frac{40°}{100} \times 360° = 144$ °

OR

25% = 90º
35% = 126º
360º - 90º - 126º = 144º

OR

Just 144º   (4)

                                                                                       [15]

QUESTION 3

3.1

    3.1.1 Mean $= \dfrac{16+19+18+\cdots 18}{16}$

                 $= \dfrac{269°}{16}$

                 $= 16{,}81°$

LO 4
$4 \times$ L 2
Application
$1 \times$ L 4
Reasoning and reflecting

OR

Just 16,81

OR

$\dfrac{452}{16} = 28{,}25$

OR

Just 252,13

                                                                                      (5)

	3.1.2	Mode = 29 Greater than the mode = 5 OR 5 OR Correct 5 cities	LO 4 L3 Multi-step (2)

3.2	3.2.1	Steenbras Lower: 87,5% × 33 517 million litres
		              = 29 327,375 million litres
		Steenbras Upper: 90,2% × 31 767 million litres
		              =28 653,834 million litres
		∴ Steenbras Lower Dam contained more water
		      OR
		
		Correct values, but divided instead of multiply
			LO 1
			6 × L 3
			Multi-step
			1 × L 4
			Reasoning and reflecting
			
			(6)

	3.2.2	Picture A. The dam is 103,3% full and thus water is higher than the dam wall and so it is overflowing.	LO 1 L 4 Reasoning and reflecting (2)

3.3

Category	Cost (in cents) per kilolitre	Number of kilolitres used	Total Cost
From 0 to 6 kℓ	0,00	6	0,00
More than 6 kℓ to 15 kℓ	605,62	9	5 450,58 ✓a
More than 15 kℓ to 20 kℓ	660,05	5	3 300,25 ✓a
More than 20 kℓ to 40 kℓ	720,06	4 ✓a	2 880,24 ✓ca
More than 40 kℓ	750,03	0	0,00
Total kilolitres used and cost (excluding VAT)			11 631,07 ✓ca
VAT			1 628,3498 ✓ca
Total Owing (in cents)			13 259,4198 ✓ca
Total Owing (in Rands and cents)			R132,59 ✓ca

LO 1
6 x L 3
Multi-step
2 x L 4
Reasoning and reflecting

(8)

OR

Category	Cost (in cents) per kilolitre	Number of kilolitres used	Total Cost
From 0 to 6 kℓ	0,00	6	0,00
More than 6 kℓ to 15 kℓ	605,62	9	R54,51 ✓a
More than 15 kℓ to 20 kℓ	660,05	5	R33,00 ✓a
More than 20 kℓ to 40 kℓ	720,06	4 ✓a	R28,80 ✓ca
More than 40 kℓ	750,03	0	R0,00
Total kilolitres used and cost (excluding VAT)			R116,31 ✓ca
VAT			R16,28 ✓ca
Total Owing (in cents)			13 259,4198 ✓ca
Total Owing (in Rands and cents)			R132,59

Note: 7 marks only (final mark lost due to rounding)

[23]

QUESTION 4

4.1   Accepted range of measurement: 65 – 69 mm   LO 3
                                        (6,5 – 6,9 cm)   L 3
                                                               Multi-step

Ratio Method:

65 mm : 433 km
65 mm : 433 km × 1 000 000
65 mm : 433 000 000 mm
 1 mm : 433 000 000 mm ÷ 65 ^{m}
 1 mm : 6 661 538,46 mm
    1 : 7 000 000

(5)

Division Method:

433 km x 1 000 000 = 433 000 000 mm ÷ 65 mm
                  = 6 661 538,46
                  = 7 000 000
∴ Scale: 1 : 7 000 000

Measurement	Pre-rounded answer
65 mm (6,5 cm)	6 661 538,46
66 mm (6,6 cm)	6 560 606,06
67 mm (6,7 cm)	6 462 686,57
68 mm (6,8 cm)	6 367 647,06
69 mm (6,9 cm)	6 275 362,32

OR

1 : 7 000 000 or 1 : 6 000 000

4.2 Accepted Range of measurement: 89 – 94 mm

      (8,9 – 9,4 cm)

  Ratio Method:

    1 : 6 000 000

  89 mm : 6 000 000 × 89 mm

  89 mm : 534 000 000 mm

  89 mm : 534 000 000 mm ÷ 1 000 000

  89 mm : 534 km

  Multiplication Method:

  89 mm x 6 000 000 = 534 000 000 mm ÷ 1 000 000

        = 534 km

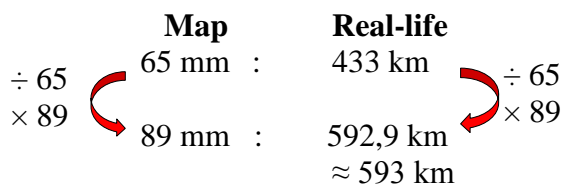| Measurement	1 : 6 000 000	1 : 7 000 000
89 mm (8,9 cm)	534 km	623 km
90 mm (9,0 cm)	540 km	630 km
91 mm (9,1 cm)	546 km	637 km
92 mm (9,2 cm)	552 km	644 km
93 mm (9,3 cm)	558 km	651 km
94 mm (9,4 cm)	564 km	658 km

    OR

  Using raw (non-rounded scale values):

  (e.g. using 6 661 538,46 instead of 7 000 000)

    OR

  Ratio scale method:

    Map **Real-life**

÷ 65 65 mm : 433 km ÷ 65

× 89   × 89

    89 mm : 592,9 km

        ≈ 593 km

LO 3
3 × L 3
Multi-step
2 × L 4
Reasoning and reflecting

(4)

4.3 75 BWP × 9 people × 9 days

  = 6 075 BWP ÷ 0,9057 BWP/R

  = R6 707,52

  OR: × 0,9057 (Max 5 marks only)

  OR: ÷ **0,9723** (Max 5 marks only)

  OR: × **0,9723** (Max 4 marks only)

LO 3
4 × L 3
Multi-step
2 × L 4
Reasoning and reflecting

(6)

4.4	4.4.1	If one does not exchange any money, then no commission can be charged.	LO 2 L 4 Reasoning and reflecting	(2)
		OR: Any indication that no commission was charged		
	4.4.2	There is a fixed minimum charge	LO 2 L 4 Reasoning and reflecting	(2)
		OR: Any indication of a constant / steady amount (e.g. no change)		
		NOT: There was no commission charged OR The same amount of money was exchanged		
	4.4.3	R57,50	LO 2 L 4 Reasoning and reflecting	(1)
	4.4.4	There is a constant charge for commission	LO 2 L 4 Reasoning and reflecting	
		OR: Any indication of a constant / steady rate (e.g. steady increase / increased by same amount, etc.)		
		OR: Direct proportion / relationship		(2)
		NOT: There was a positive increase OR any comment on increase without the sense of understanding a constant rate		

4.4.5 $R157,25 \times \dfrac{100}{1,85} = R8\,500$

   OR

   $\dfrac{1,85}{100} \times R8\,500 = R157,25$

   OR

   $\dfrac{R157,25}{0,0185} = R8\,500$

   OR

   $\dfrac{R157,25}{R5\,800} \times 100 = 1,85\%$

LO 1 L 4 Reasoning and reflecting (3)

4.5 $3 \times (50\% \times R250) = 3 \times R125 \quad = R375,00$

  $1 \times (25\% \times R250) = 1 \times R62,50 = R62,50$

  $5 \times R250 \qquad\qquad = 5 \times R250 \quad = \underline{R1\,250,00}$

          R1 687,50

LO 1 L 3 Multi-step (7)

4.6 4.6.1 A 2

     B 29

     C 5

     D 6

     E 5

     F 12

LO 4 L 3 Multi-step (6)

4.6.2 (a) $\dfrac{16}{45}$

		LO 4	(2)
		L 2	
		Application	

(b) $\dfrac{21}{45}$ = 0.47

LO 4 (3)
L 2
Application

(c) $\dfrac{5}{45}$ × 100 = 11.1%

LO 4 (3)
L 2
Application

$V = \pi \times r^2 \times h$

$= 3{,}14 \times (3 \text{ cm})^2 \times 12 \text{ cm} \times \dfrac{3}{4} \times 45 \text{ passengers} \times 3 \text{ cups}$

$= 339{,}12 \text{ cm}^3 (339{,}29 \text{ with } \pi) \times \dfrac{3}{4} \times 45 \text{ passengers} \times 3$ cups

$= 34\,335{,}9 \text{ cm}^3 \ (34\,353{,}32 \text{ with } \pi)$

No. of litres $= 34\,335{,}9 \text{ cm}^3 \div 1\,000 \text{ cm}^{3\ m}$

$= 34{,}3359 \ \ell \ (34{,}35332 \text{ with } \pi)$

No. of 2 ℓ bottles $= 34{,}3359 \ \ell \div 2 \ \ell^{\ m}$

$= 17{,}16795 \ (17{,}18 \text{ with } \pi)$

$= 18 \text{ bottles}$

LO 3 (10)
8 × L 3
Multi-step
2 × L 4
Reasoning and reflecting

QUESTION 5

5.1   5.1.1

Area to be painted = (15 mm × 180 mm × 2) +

(60 mm × 15 mm × 2) + (180 mm × 60 mm) +

((180 mm – 40 mm – 30 mm) × 60 mm)

= 5 400 mm^2 + 1 800 mm^2 + 10 800 mm^2 + 6 600 mm^2

= 24 600 mm^2

OR

Can be calculated into cm^2 and then converted.

LO 3

5 × L 3
Multi-step

3 × L 4
Reasoning and reflecting

(8)

5.1.2   Area to be painted

= (50 mm × 60 mm) +

(½ × 40 mm × 30 mm × 2)

= 3 000 mm^2 + 1 200 mm^2

= 4 200 mm^2

∴ Bongani's statement is incorrect

LO 3

2 × L 3
Multi-step

1 × L 4
Reasoning and reflecting

(6)

OR

Area to be painted

= (5 cm × 6 cm) +

(½ × 4 cm × 3 cm × 2)

= 3 0 cm^2 + 1 2 cm^2

= 4 2 cm^2

∴ Bongani's statement is incorrect

5.1.3   Total Area = Part A + Part B + Part C

= 24 600 mm^2 + 5 400 mm^2 + 4 200 mm^2 ^{m}

= 34 200 mm^2

NOTE Must add the figures from the questions 5.1.1 and 5.1.2.

LO 3

L 2
Application

(2)

5.1.4 $34\ 200\ \text{mm}^2 \div 1\ 000\ 000\ ^{\text{m}}$

$= 0,0342\ \text{m}^2$

$5\ \text{m}^2 \div 0,0342\ \text{m}^2$

$= 146,1988304 \times 5\ \ell\ ^{\text{m}}$

$= 730,994\ \ldots$

$= 730$ trucks

∴ yes he has enough paint

LO 3

$2 \times$ L 3
Multi-step

$3 \times$ L 4
Reasoning and reflecting

OR

$5\ \text{m}^2 \times 1\ 000\ 000 \times 5\ \ell\ ^{\text{m}}$

$= 25\ 000\ 000\ \text{mm}^2 \div 34\ 200\ \text{mm}^{2\ \text{m}}$

$= 730,994\ \ldots$

$= 730$ trucks

∴ yes he has enough paint

OR

$\dfrac{34\ 200}{1\ 000\ 000} = 0,0342\ \text{m}^2$

∴ 700 trucks $= 0,0342 \times 700$

$= 23,94\ \text{m}^2$

OR   OR

$23,94\text{m}^2 \div 5\ \text{m}^2 = 4,79\ \ell$ $5 \times 5 = 25\ \text{m}^2$

$\approx 5\ \ell$

∴ yes he has enough paint

Be aware of $65\ \text{m}^2 \div 0,03\ \text{m}^2$
$= 2\ 166$ trucks

(5)

5.2	5.2.1	Amount in Rand		LO 2	
		OR: Income, expense and profit (All three must be there)		L 4 Reasoning and reflecting	(1)

5.2.2 (a)   Expenses OR: Cost

(b)   Income

(c)   Profit OR: Loss

(d)   –R180 or –180

LO 2

L 4
Reasoning and reflecting

4×2
(8)

5.2.3 (a) $I = R20 \times t$

(b) $E = R180 + R8 \times t$

OR: Can be in words

LO 2

L 4
Reasoning and reflecting

2×2
(4)

5.2.4 $I = E$ [m]

$R20 \times t = R180 + R8 \times t$

$20t = 180 + 8t$

$20t - 8t = 180$

$12t = 180$

$t = 15$

OR

Trial and error

- Correct Method, but not correct answer[mm]

OR

Profit $= R20 - R8 = R12$

$\therefore$ [m] $\dfrac{R180}{R12} = 15$

LO 2

L 4
Reasoning and reflecting

LO 2

Multi-step
$4 \times$ L 4
Reasoning and reflecting

(4)

5.2.5 $P = I - E$

$= (R20 \times t) - (R180 + R8 \times t)$

$= (R20 \times 16) - (R180 + R8 \times 16)$ [m]

$= R12$

OR

1 truck above breakeven point, so R12 profit [m]

(2)