NATIONAL SENIOR CERTIFICATE EXAMINATION
NOVEMBER 2013

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	reasoning

QUESTION 1

1.1 1.1.1 Difference $= (R1\,047\,000 -$ m (subtraction) $R159\,849) \div 12$
$= R887\,151 \div 12$ m (divide by 12)
$=$ **R73 929,25** c a (dependent on divide by 12)

OR

a(correct values)

Difference $= (R1\,047\,000$ m (divide by 12) $\div 12)$ m (subtraction) $- (R159\,849 \div 12)$
$= R87\,250 - R13\,320,75$
$=$ **R73 929,25** c a (dependent on both values divided by 12) (4)

1.1.2 $\frac{149,7208}{100} \times R116\,028$ m (percentage correct) a (multiply by correct value) $\div 12$
$= R173\,718,0498 \div 12$ m (divide by 12)
$=$ **R14 477** c a (dependent on divide by 12) (4)

1.1.3 $(R1\,047\,000 \div 12) \div$ m (divide values) $(R160\,275 \div 12)$ a (correct values)
$= R87\,250 \div R13\,386,25$
$=$ **6,5 months** c a (dependent on correct values)

or

$R1\,047\,000 \div$ m (divide values) $R160\,275$ a (correct values)
$= 6,5$ months c a (dependent on correct values) (3)

1.2 1.2.1 $R8\,881,91 \times \frac{34}{100}$ m (multiply by 34%)
$= R3\,020$ a (2)

1.2.2 Entertainment $= 100\% - (34\% + 11\% + 28\% + 9\% + 8\% + 4\%)$ m (adding values)
$= 100\% - 94\%$
$= 6\%$ a (subtracted from 100)

Therefore angle $= \frac{6}{100} \times 360°$ m (x 360)
$= 22°$ c a (dependent on x 360) (4)

1.3 Tax $= R28\,800$ a (tax bracket) $+ \frac{25}{100}$ m (multiply) $\times (R165\,525 - R160\,000)$ m (subtracting)
$= R28\,800 + \frac{25}{100} \times R5\,525$
$= R28\,800 + R1\,381,25$
$= R30\,181,25$ c a
Tax owed $= (R30\,181,25 - R11\,440$ m (subtract basic rebate) $- R6\,390$ m (subtract additional rebate)$) \div$
$= R12\,351,25 \div 12$ months m (divide by 12)
$=$ **R1 029,27** c a (dependent on previous working divided by 12) (8)
[25]

QUESTION 2

2.1 2.1.1 Map : Room
87 mm [a] : 12 m Accept 86 – 88 mm
87 mm : 12 000 mm [m]
1 mm : 137,93 … mm
1 **:** **138** [a] Accept 136 – 140 (4)

Variations:

Longer side as length	86mm or 8,6cm	87mm or 8,7cm	88mm or 8,8cm
	86mm[a] : 12m 86mm : 1200mm[m] 86 86[m] 1mm : 139,53mm 1 : 140 [c a]	87mm[a] : 12m 87mm : 1200mm[m] 87 87[m] 1mm : 137,93mm 1 : 138 [c a]	88mm[a] : 12m 88mm : 1200mm[m] 88 88[m] 1mm : 136,36mm 1 : 136 [c a]
Shorter side as length	68mm or 6,8cm	69mm or 6,9cm	70mm or 7cm
	68mm[a] : 12m 68mm : 1200mm[m] 68 68[m] 1mm : 176,47mm 1 : 176 [c a]	69mm[a] : 12m 69mm : 1200mm[m] 69 69[m] 1mm : 173,91mm 1 : 174 [c a]	70mm[a] : 12m 70mm : 1200mm[m] 70 70[m] 1mm : 171,428mm 1 : 171 [c a]

2.1.2 Map : Room
1 : 138
70 mm [a] : 138 × 70 mm [m]
= 9 660 mm ÷ 1 000
= 9,66 m
= **10 m** [a]
(Even though the range 136 – 140 is taken, answer is still 10 m) (3)

Variations:

Shorter side as breadth	68mm or 6,8cm	68mm or 6,8cm	68mm or 6,8cm
	1 : 140 68mm[a]: 140×68mm[m] = 9520mm / 1000 = 9,52m = 10m [c a]	1 : 138 68mm[a]: 138×68mm[m] = 9384mm / 1000 = 9,38m = 9m [c a]	1 : 136 68mm[a]: 136×68mm[m] = 9248mm / 1000 = 9,248m = 9m [c a]
	69mm or 6,9cm	69mm or 6,9cm	69mm or 6,9cm
	1 : 140 69mm[a]: 140×69mm[m] = 9660mm / 1000 = 9,66m = 10m [c a]	1 : 138 69mm[a]: 138×69mm[m] = 9522mm / 1000 = 9,52m = 10m [c a]	1 : 136 69mm[a]: 136×69mm[m] = 9384mm / 1000 = 9,38m = 9m [c a]
	70mm or 7cm	70mm or 7cm	70mm or 7cm
	1 : 140 70mm[a]: 140×70mm[m] = 9800mm / 1000 = 9,8m = 10m [c a]	1 : 138 70mm[a]: 138×70mm[m] = 9660mm / 1000 = 9,66m = 10m [c a]	1 : 136 70mm[a]: 136×70mm[m] = 9520mm / 1000 = 9,52m = 10m [c a]

Longer side as breadth	86mm or 8,6cm	86mm or 8,6cm	86mm or 8,6cm
	1 : 176 86mm[a]: 176×86mm[m] = 15136mm / 1000 = 15,136m = 15m [c a]	1 : 174 86mm[a]: 174×86mm[m] = 14964mm / 1000 = 14,964m = 15m [c a]	1 : 171 86mm[a]: 171×86mm[m] = 14706mm / 1000 = 14,706m = 15m [c a]
	87mm or 8,7cm	87mm or 8,7cm	87mm or 8,7cm
	1 : 176 87mm[a]: 176×87mm[m] = 15312mm / 1000 = 15,312m = 15m [c a]	1 : 174 87mm[a]: 174×87mm[m] = 15138mm / 1000 = 15,138m = 15m [c a]	1 : 171 87mm[a]: 171×87mm[m] = 14877mm / 1000 = 14,877m = 15m [c a]
	88mm or 8.8cm	88mm or 8.8cm	88mm or 8.8cm
	1 : 176 88mm[a]: 176×88mm[m] = 15488mm / 1000 = 15,488m = 15m [c a]	1 : 174 88mm[a]: 174×88mm[m] = 15312mm / 1000 = 15,312m = 15m [c a]	1 : 171 88mm[a]: 171×88mm[m] = 15048mm / 1000 = 15,048m = 15m [c a]

2.1.3 Area of wall = 12 m × 2,7 m ^{m}
= 32,4 m^2
Area of door = 2 m ^{a} × 0,9 m ^{am}
= 1,8 m^2
Area to be painted = 32,4 m^2 – 1,8 m$^{2\ m}$
= 30,6 m$^{2\ a}$

OR

Area of wall = 15 m × 2,7 m ^{m}
= 40,5 m^2
Area of door = 2 m ^{a} × 0,9 m ^{am}
= 1,8 m^2
Area to be painted = 40,5 m^2 – 1,8 m$^{2\ m}$
= 38,7 m$^{2\ a}$

1 ft^2 = 0,09 m^2
$\frac{100}{9}$ ft^2 = 1 m$^{2\ m}$
340 ft^2 = 30,6 m^2 OR 430ft^2=38,7m^2
$\frac{340\ ft^2}{350\ ft^2} = 0,97\ gal$ ^{a}
= 0,97 gal × 3,79 ℓ
= 3,68 ℓ
∴ Evidence is correct $^{c}_{a}$

OR

30,6÷0,09 ^{m}
= 340 ft$^{2\ c}_{a}$
∴ Evidence is correct $^{c}_{a}$

38,7÷0,09 ^{m}
= 430 ft$^{2\ c}_{a}$
430 – 350 = 80ft^2
$\frac{80}{350} \times 3,79 = 0,866$
0,866+3,79 = 4,66*l*
∴ Evidence is correct $^{c}_{a}$

OR

1 gallon = 350 ft^2
3,79 ℓ = 0,09 m^2 × 350 ^{m}
3,79 ℓ = 31,5 m$^{2\ a}$
$\frac{3,79\ \ell}{31,5\ m^2}$ = 1 m^2
$3,79/31,5 \times 30,6\ m^2$ = 30,6 m^2 **OR** $3,79/31,5 \times 38,7 m^2$ = 38,7 m^2
3,68 ℓ = 30,6 m^2 4,66 ℓ = 38,7 m^2
∴ Evidence is correct $^{c}_{a}$ (9)

2.2 2.2.1 5 9 9 10 12

$$\text{Mean} = \frac{\text{Total}}{\text{No.}}$$
$$9 = \frac{5+9+9+12+\text{Number}}{5}$$
$$45 = 35 + \text{Number}$$
$$10 = \text{Number}$$

5 9 9 12 (5)

(7)

2.2.2 25% = 3 students

100% = 3 × 4 [m]
100% = 12
40% = 12 students
100% = 12 × 2,5 [m]
= 30 students

or

$\frac{25}{100}\times$ students who attempted the question = 3 students [m]

$= 3\times\frac{100}{25}$
$= 12$ [a]

$\frac{40}{100}\times$ students in class [m] $= 12$

students in class $= 12\times\frac{100}{40}$
$= 30$ [c a]

OR

m m a (correct values)

3 ÷ 25% ÷ 40%
=30 students [c a]

OR

$\frac{3}{x}=\frac{25}{100}$ [m]

x = 12 students [c a]

$\frac{12}{y}=\frac{40}{100}$ [m]

y = 30 students [c a]

OR

m a

$\frac{25}{100}\times\frac{40}{100}=\frac{10}{100}$

∴ 10% of class is 3 learners
∴ 100% of class is 3× 10 learners [m]
∴ 100% of class is 30 learners [c a]

(4)

2.3 2.3.1 $\frac{90}{100}$ $^{m} \times 150 = 135$ ^{a} (2)

2.3.2 $\frac{80}{100}$ $^{m} \times 400 = 320$ ^{a} (2)

2.3.3 $320 - 135$ $^{m} - 77 = 108$ ^{a} (2)

2.3.4 $\frac{108}{150}$ $^{m} \times 100 = 72\%$ $^{c}_{a}$ (2)

OR

2.3.1 $\frac{90}{100}$$^{m} \times 150 = 135$ ^{a} (2)

2.3.2 $\frac{80}{100}$$^{m} \times 400 = 320$ ^{a} (2)

2.3.4 $(77+90+D) \div 3 = 80$
$D = 73\%$ (0)

2.3.3 $73 \times 1{,}5^{m} = 108{,}5$ $^{c}_{a}$ (2)

[35]

QUESTION 3

3.1
1 : 5
2 ℓ : 2 ℓ × 5
= 2 ℓ : 10 ℓ [a]
∴ 12 ℓ [a] × 1 000 mℓ
= **12 000 mℓ** [c a]

or

Juice = 2 ℓ + (5 × 2 ℓ)
= 2 ℓ + 10 ℓ [a]
= 12 ℓ [a] × 1 000 mℓ
= 12 000 mℓ [c a]

Or

1 : 6[a]
2 ℓ : 2 ℓ × 6
= 2 ℓ : 12 ℓ [a]
∴ 12 ℓ [a] × 1 000 mℓ
= **12 000 mℓ** [c a]

Any conversion × 1000 = 1 mark (3)

3.2 3.2.1 C = π × diameter
= 3,14 × 60 mm [a]
= 188,4 mm + 5 mm overlap [m]
= **193,4 mm** [a] or 19,34cm

Or

π × 60 mm [a]
= 188,5 mm + 5 mm overlap [m]
= **193,5 mm** [a] or 19,35cm

Adding 5mm to 60mm before substituting in equation max 1 mark (3)

3.2.2 No. of stickers in height (1 m) = 1 000 mm ÷ 80 mm ^{m}
= 12,5
= 12 ^{a}
No. of stickers in length (5 m) = 5 000 mm ÷ 193,4 mm $^{ca\ m}$
= 25,88 …
= 25 ^{ca} (rounding incorrectly -1 only once)
∴ No. of stickers in Roll = 12 × 25
= 300 $^{c}_{a}$
∴ 600 ÷ 300 $^{c}_{a}$
= 2 rolls
OR
No. of stickers in height (1 m) = 1 000 mm ÷ 193,4 mm $^{ca\ m}$
= 5,170630817
= 5 ^{ca}
No. of stickers in length (5 m) = 5 000 mm ÷ 80 mm ^{m}
= 62,5
= 62 ^{a} (rounding incorrectly -1 only once)
No. of stickers in a roll = 62 × 5
= 310 ^{a}
∴ 600 ÷ 310^{m}
= 1,93 …
∴ 2 rolls
If student calculates area, then a maximum of 2 marks.
Area of Roll = 5 000 mm × 1 000 mm
= 5 000 000 mm$^{2\ a}$
Area of Label = 193,4 mm × 80 mm
= 15 472 mm$^{2\ a}$
Number of stickers on a roll = $\frac{5\ 000\ 000\ mm^2}{15\ 472\ mm^2}$
= 323,16
∴ 2 rolls is needed (6)

3.2.3 $V = \pi \times r^2 \times ht$
350 mℓ × 1 000 ^{m} = 3,14 × (30 mm)$^{2\ a}$ × ht
350 000 mm^3 = 2 826 mm^2 × ht
123,84 …^{ca} = ht
124 mm $^{c}_{a}$ must be mm
OR
1 cm^3 = 1 mℓ
∴ 350 cm^3 = 350 mℓ
350 cm$^{3\ m}$ = 3,14 × (3 cm)$^{2\ a}$ × height
350 cm^3 = 28,26 cm^2 × height
12,384 cm = height
12,384 cm × 10 = height
123,84 mm ^{ca} = height
124 mm $^{c}_{a}$ = height must be mm (4)

3.3 3.3.1 Money received = R7,50 [a m] × b [a]

or

Money received = R7,50 [a m] × no of cool drink bottles [a] (3)

3.3.2 The expenditure graph is higher than the income graph. [aa]

or

Income – Expense
R75 – R275 = -R200 [a] therefore a loss[a] (2)

3.3.3 (a) Income = R7,50 × 50
= R375 [c a]
Expense = R250 + (R2,50 × 50)
= R375 [a]
Profit = Income – Expense [m]
= R375 – R375
= R0 [c a] (4)

(b) Break-even point [caca] or an explanation of break-even point
Profit or Loss [ca ca] based on answer for 3.3.3(a) (2)
[27]

QUESTION 4

4.1 $\frac{85}{100} \times 35\ \ell$ [m]

$= 29,75\ \ell$ [ca]

Number of km = 29,75 ℓ ÷ 5,5 ℓ [m] × 100 km [m]

= **540,91 km**

Distance from Johannesburg to Durban = **625 km – 52 km** [m] = 573 km [ca]

∴ Jordan will need to fill up. [ca (reason)] (7)

OR

If 15% of 35 **×** however answer can get [ca]

OR

If distance used is 625 km: maximum 5 marks

OR

If started with km: then full marks apply

4.2 4.2.1 Cost = R50 000 [a] + (R1 634,29 × 60 months) [a]

= R50 000 + R98 057,40 [c a]

= **R148 057,40** [c a] (4)

4.2.2 (a) A – 3 [a]

B – 2 [a]

C – 6 [a] (3)

(b) $A = P(1 + i)^n$

$= R50\,000 \left(1 + \frac{0,045}{12}\right)^{60}$ [a a]

= **R62 589,79** [c a] (4)

(c) (R2 137,60 × 60[m]) + R50 000 [m] – R12 589,79 [m]

= R128 256 + R50 000 – R12 589,79

= R165 666,21 [c a]

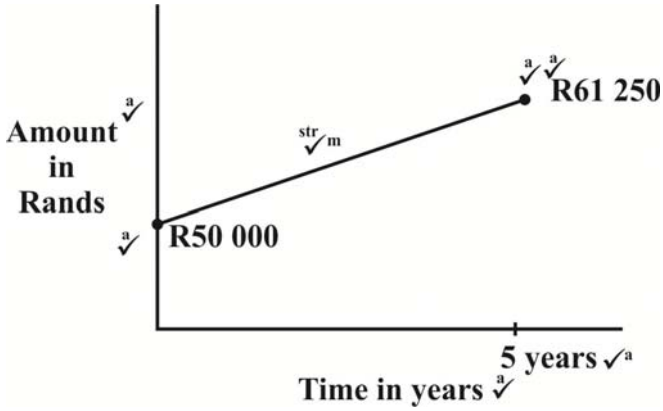
∴ not a cheaper option [c a] (5)

(Based on 4.2.1)

OR

If do not subtract interest: maximum 4 marks

(d)



A = P (1 + i.n)
= R50 000 (1 + 0,045 × 5)
= R61 250 (7)

OR

If axes swopped around: full marks

OR

If bar graph drawn: maximum 6 marks unless a line is drawn across the endpoints of bars.

4.3 Statement 1 – Graph 1 or 3 [a]
Statement 2 – Graph 6 [a]
Statement 3 – Graph 2 [a]
Statement 4 – Graph 1 [a] (4)

4.4 4.4.1 $\frac{11,6}{100}$ [a] + $\frac{18,4}{100}$ [a] = $\frac{30}{100} = \frac{3}{10}$ [c a] [m] (3)

4.4.2 100% –[m] (20,2% + 18,4% [m] + …)
= 100% – 95,9%
= **4,1 %** [a] (3)

4.5 4.5.1 Range = 26% [a] – –45% [a]
= 71% [a] (3)

If: 26 [a] – 45
= -19%

If: 45+26[a]
=71%[ca]

If: -45[a] +26[a]
=19%

If: 45-26
=19%[ca]

If: -45[a] to 26[a] or y [-45[a];26[a]

4.5.2 Mean $= \frac{\text{Total}}{\text{Number}}$

$-6{,}31\% = \frac{26\% + 24{,}4\% + 8\% + 3{,}6\% + 1{,}5\% + 1\% + -5\% + \ldots}{13}$ a

$-6{,}31 = \frac{-72{,}4\% + \text{Mercedes}}{13}$ a

$-82{,}03\%$ ca $= -72{,}4\% + \text{Mercedes}$

$-9{,}63\%$ ca **$= \text{Mercedes}$** (6)

No final ca if answer not less than -9,63%.

If Trial and Error: must be $9{,}1 < x < 9{,}9$ with explanation to get all 6 marks
If Trial and Error: Choose 9 or 10, max 4 marks

If answer is +9,63%, 4 marks only

1 mark only if used visual justification (i.e. Mercedes is half as long as Toyota)

6 marks if measured length of bars and used ratio

[49]

QUESTION 5

5.1 (1 min × 60 sec) + 24 sec
= 60 sec + 24 sec
= **84 sec** No penalty for missing units (2)

124 sec [ca]

5.2 Speed $= \frac{5{,}303 \text{ km}}{84 \div 60 \div 60 \text{ h}}$ [m (for s=d/t)]
$= \frac{5{,}303 \text{ km}}{7 \diagup 300 \text{ h}}$ [m (for converting time)]
$= 227{,}27 \ldots$ km/h No penalty for missing units
227 km/h [c a (P1R if not rounded)] (3)

5.3 5.3.1 307,574 km [m] ÷ 5,303 km
= 57,99 …
= **58 laps** [a] (2)

5.3.2 58 laps × 1 min 24 sec [m]
= **1 hrs**[ca] **21 min 12 sec** [ca]

or

58 laps × 84 sec [m]
= 4 872 sec ÷ 60
= 81,2 min
= 81 min 12 sec
81 min ÷ 60
= **1 hr** [ca] **21 min 12 sec** [ca]

or

307,574÷227 [m]
= = **1 hr** [ca] **21 min 12 sec** [ca]

or

If answer to 5.1 = 124 sec
58 laps × 124 sec [m]
= **1 hr** [ca] **59 min 52 sec** [ca]

(3)

5.4 Area = 5,303 km × 14 m
= 5 303 m [m] × 14 m [m]
= 74 242 m^2 No penalty for missing units
Cost = 74 242 m^2 × R150/m^2 [m]
= **R11 136 300** [c a] (4)
[14]

Total: 150 marks