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
- c: continuous accuracy
- r: reasoning
QUESTION 1

1.1 1.1.1 Difference = (R1 047 000 – R159 849) ÷ 12
= R887 151 ÷ 12
= R73 929,25

OR

Difference = (R1 047 000 ÷ 12) – (R159 849 ÷ 12)
= R87 250 – R13 386,25
= 6,5 months

1.1.2 149,7208 × R116 028
= R173 718,0498 ÷ 12
= R14 477

1.1.3 (R1 047 000 ÷ 12) ÷ (R160 275 ÷ 12)
= R87 250 ÷ R13 386,25
= 6,5 months

1.2 1.2.1 R8 881,91 × 34
= R3 020

1.2.2 Entertainment = 100% – (34% + 11% + 28% + 9% + 8% + 4%)
= 100% – 94%
= 6% (subtracted from 100)

Therefore angle = \frac{6}{100} × 360°
= 22°

1.3 Tax = R28 800 (tax bracket) + 25\% ÷ 100 × (R165 525 – R160 000)
= R28 800 + 25\% × R5 525
= R28 800 + R1 381,25
= R30 181,25

Tax owed = (R30 181,25 – R11 440 ÷ 12 months)
= R1 029,27
QUESTION 2

2.1 2.1.1 Map : Room

87 mm $^a$ : 12 m Accept 86 – 88 mm
87 mm $^m$ : 12 000 mm $^m$
1 mm $^m$ : 137,93 … mm
1 $^a$ : 138 $^a$ Accept 136 – 140

Variations:

<table>
<thead>
<tr>
<th>Longer side as length</th>
<th>86mm or 8,6cm</th>
<th>87mm or 8,7cm</th>
<th>88mm or 8,8cm</th>
</tr>
</thead>
<tbody>
<tr>
<td>86mm $^2$ : 12m</td>
<td>87mm $^2$ : 12m</td>
<td>88mm $^2$ : 12m</td>
<td></td>
</tr>
<tr>
<td>86mm : 1200mm $^m$</td>
<td>87mm : 1200mm $^m$</td>
<td>88mm : 1200mm $^m$</td>
<td></td>
</tr>
<tr>
<td>86 $^m$</td>
<td>87 $^m$</td>
<td>88 $^m$</td>
<td></td>
</tr>
<tr>
<td>1mm : 139,53mm</td>
<td>1mm : 137,93mm</td>
<td>1mm : 136,36mm</td>
<td></td>
</tr>
<tr>
<td>1 $^a$ : 140 $^a$</td>
<td>1 $^a$ : 138 $^a$</td>
<td>1 $^a$ : 136 $^a$</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Shorter side as length</th>
<th>68mm or 6,8cm</th>
<th>69mm or 6,9cm</th>
<th>70mm or 7cm</th>
</tr>
</thead>
<tbody>
<tr>
<td>68mm $^2$ : 12m</td>
<td>69mm $^2$ : 12m</td>
<td>70mm $^2$ : 12m</td>
<td></td>
</tr>
<tr>
<td>68mm : 1200mm $^m$</td>
<td>69mm : 1200mm $^m$</td>
<td>70mm : 1200mm $^m$</td>
<td></td>
</tr>
<tr>
<td>68 $^m$</td>
<td>69 $^m$</td>
<td>70 $^m$</td>
<td></td>
</tr>
<tr>
<td>1mm : 176,47mm</td>
<td>1mm : 173,91mm</td>
<td>1mm : 171,428mm</td>
<td></td>
</tr>
<tr>
<td>1 $^a$ : 176 $^a$</td>
<td>1 $^a$ : 174 $^a$</td>
<td>1 $^a$ : 171 $^a$</td>
<td></td>
</tr>
</tbody>
</table>
### Variations:

<table>
<thead>
<tr>
<th>Shorter side as breadth</th>
<th>68mm or 6.8cm</th>
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</tr>
</thead>
<tbody>
<tr>
<td>1 : 140</td>
<td>68mm: 140×68mm(^a) = 9520mm (\frac{9520}{1000} = 9.52)m = 10m(^a)</td>
<td>1 : 138</td>
<td>68mm: 138×68mm(^a) = 9384mm (\frac{9384}{1000} = 9.38)m = 9m(^a)</td>
</tr>
<tr>
<td>69mm or 6.9cm</td>
<td>69mm: 140×69mm(^a) = 9660mm (\frac{9660}{1000} = 9.66)m = 10m (\frac{66}{1000})m</td>
<td>69mm: 138×69mm(^a) = 9522mm (\frac{9522}{1000} = 9.52)m = 10m (\frac{22}{1000})m</td>
<td>69mm: 136×69mm(^a) = 9384mm (\frac{9384}{1000} = 9.38)m = 9m (\frac{84}{1000})m</td>
</tr>
<tr>
<td>70mm or 7cm</td>
<td>70mm: 140×70mm(^a) = 9800mm (\frac{9800}{1000} = 9.8)m = 10m (\frac{80}{1000})m</td>
<td>70mm: 138×70mm(^a) = 9660mm (\frac{9660}{1000} = 9.66)m = 10m (\frac{66}{1000})m</td>
<td>70mm: 136×70mm(^a) = 9520mm (\frac{9520}{1000} = 9.52)m = 10m (\frac{20}{1000})m</td>
</tr>
</tbody>
</table>

### Longer side as breadth

<table>
<thead>
<tr>
<th>86mm or 8.6cm</th>
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<tbody>
<tr>
<td>1 : 176</td>
<td>1 : 174</td>
<td>1 : 171</td>
</tr>
<tr>
<td>86mm: 176×86mm(^a) = 15136mm (\frac{15136}{1000} = 15.136)m = 15m (\frac{136}{1000})m</td>
<td>86mm: 174×86mm(^a) = 14964mm (\frac{14964}{1000} = 14.964)m = 15m (\frac{64}{1000})m</td>
<td>86mm: 171×86mm(^a) = 14706mm (\frac{14706}{1000} = 14.706)m = 15m (\frac{6}{1000})m</td>
</tr>
<tr>
<td>87mm or 8.7cm</td>
<td>87mm or 8.7cm</td>
<td>87mm or 8.7cm</td>
</tr>
<tr>
<td>1 : 176</td>
<td>1 : 174</td>
<td>1 : 171</td>
</tr>
<tr>
<td>87mm: 176×87mm(^a) = 15312mm (\frac{15312}{1000} = 15.312)m = 15m (\frac{312}{1000})m</td>
<td>87mm: 174×87mm(^a) = 15138mm (\frac{15138}{1000} = 15.138)m = 15m (\frac{38}{1000})m</td>
<td>87mm: 171×87mm(^a) = 14877mm (\frac{14877}{1000} = 14.877)m = 15m (\frac{77}{1000})m</td>
</tr>
<tr>
<td>88mm or 8.8cm</td>
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</tr>
<tr>
<td>1 : 176</td>
<td>1 : 174</td>
<td>1 : 171</td>
</tr>
<tr>
<td>88mm: 176×88mm(^a) = 15488mm (\frac{15488}{1000} = 15.488)m = 15m (\frac{488}{1000})m</td>
<td>88mm: 174×88mm(^a) = 15312mm (\frac{15312}{1000} = 15.312)m = 15m (\frac{12}{1000})m</td>
<td>88mm: 171×88mm(^a) = 15048mm (\frac{15048}{1000} = 15.048)m = 15m (\frac{48}{1000})m</td>
</tr>
</tbody>
</table>

(Even though the range 136 – 140 is taken, answer is still 10 m) (3)
2.1.3 Area of wall = 12 m × 2,7 m
= 32,4 m²
Area of door = 2 m³ × 0,9 m
= 1,8 m²
Area to be painted = 32,4 m² − 1,8 m²
= 30,6 m²

OR

Area of wall = 15 m × 2,7 m
= 40,5 m²
Area of door = 2 m³ × 0,9 m
= 1,8 m²
Area to be painted = 40,5 m² − 1,8 m²
= 38,7 m²

1 ft² = 0,09 m²
\[
\frac{100}{9} \text{ ft}^2 = 1 \text{ m}^2
\]
340 ft² = 30,6 m² OR 430 ft² = 38,7 m²
\[
\frac{340}{350} \text{ ft}^2 = 0,97 \text{ gal}
\]
= 0,97 gal × 3,79 ℓ
= 3,68 ℓ
∴ Evidence is correct c_{a}

OR

30,6 ÷ 0,09 m
= 340 ft² c_{a}
38,7 ÷ 0,09 m
= 430 ft² c_{a}
∴ Evidence is correct c_{a}
430 − 350 = 80 ft²
\[
\frac{80}{350} \times 3,79 = 0,866
\]
0,866 + 3,79 = 4,66 l
∴ Evidence is correct c_{a}

OR

1 gallon = 350 ft²
3,79 ℓ = 0,09 m² × 350 m
3,79 ℓ = 31,5 m²
3,79 ℓ
\[
\frac{31,5}{3,79} \text{ m}^2 = 30,6 \text{ m}^2
\]
\[
\frac{3,79}{31,5} \times 30,6 \text{ m}^2 = 30,6 \text{ m}^2
\]
\[
\frac{3,79}{31,5} \times 38,7 \text{ m}^2 = 38,7 \text{ m}^2
\]
3,68 ℓ = 30,6 m²
4,66 ℓ = 38,7 m²
∴ Evidence is correct c_{a} (9)

2.2 2.2.1

\[
\text{Mean} = \frac{\text{Total}}{\text{No.}}
\]
\[
\frac{9}{5 + 9 + 9 + 12 + \text{Number}}
\]
\[
\frac{45}{5}
\]
\[
\frac{35 + \text{Number}}{10}
\]
\[
\frac{5}{9} \quad 9 \quad \frac{9}{12}
\]
(5)
(7)
2.2.2 25% = 3 students

100% = 3 × 4 \text{m}
100% = 12
40% = 12 students
100% = 12 × 2.5 \text{m}
= 30 students

or

\frac{25}{100} \times \text{students who attempted the question} = 3 \text{ students}

= 3 \times \frac{100}{25}
= 12 \text{ a}

\frac{40}{100} \times \text{students in class} = 12

\text{students in class} = 12 \times \frac{100}{40}
= 30 \text{ c a}

OR \quad \text{m m a (correct values)}

3 \div 25\% \div 40\%
= 30 \text{ students c a}

OR

\frac{3}{x} = \frac{25}{100}

x = 12 \text{ students c a}

\frac{12}{y} = \frac{40}{100}

y = 30 \text{ students c a}

OR

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

\therefore 10\% \text{ of class is 3 learners}
\therefore 100\% \text{ of class is } 3 \times 10 \text{ learners m}
\therefore 100\% \text{ of class is 30 learners c a}

(4)
2.3.1 \( \frac{90}{100} \times 150 = 135 \text{ a} \) 

2.3.2 \( \frac{80}{100} \times 400 = 320 \text{ a} \) 

2.3.3 \( 320 - 135 - 77 = 108 \text{ a} \) 

2.3.4 \( \frac{108}{150} \times 100 = 72\% \text{ c} \) 

OR

2.3.1 \( \frac{90}{100} \times 150 = 135 \text{ a} \) 

2.3.2 \( \frac{80}{100} \times 400 = 320 \text{ a} \) 

2.3.4 \( \frac{(77+90+D)}{3} = 80 \) 
\[ D = 73\% \] 

2.3.3 \( 73 \times 1.5 = 108.5 \text{ c} \)
QUESTION 3

3.1  \(1 : 5\)

\[2 \ell : 2 \ell \times 5\]

\[= 2 \ell : 10 \ell^a\]

\[\therefore 12 \ell^a \times 1000 \text{ m}\ell\]

\[= 12000 \text{ m}\ell\]

or

\[\text{Juice} = 2 \ell + (5 \times 2 \ell)\]

\[= 2 \ell + 10 \ell^a\]

\[= 12 \ell^a \times 1000 \text{ m}\ell\]

\[= 12000 \text{ m}\ell\]

\[\text{Or}\]

\[1 : 6^a\]

\[2 \ell : 2 \ell \times 6\]

\[= 2 \ell : 12 \ell^a\]

\[\therefore 12 \ell^a \times 1000 \text{ m}\ell\]

\[= 12000 \text{ m}\ell\]

Any conversion \(\times 1000 = 1\) mark (3)

3.2  3.2.1 \(C = \pi \times \text{diameter}\)

\[= 3,14 \times 60 \text{ mm}^a\]

\[= 188,4 \text{ mm} + 5 \text{ mm overlap}^m\]

\[= 193,4 \text{ mm}^a\] or 19,34cm

\[\text{Or}\]

\[\pi \times 60 \text{ mm}^a\]

\[= 188,5 \text{ mm} + 5 \text{ mm overlap}^m\]

\[= 193,5 \text{ mm}^a\] 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) = \( \frac{1000 \text{ mm}}{80 \text{ mm/m}} \)
  = 12.5
  = 12 \text{ a}

No. of stickers in length (5 m) = \( \frac{5000 \text{ mm}}{193.4 \text{ mm/m}} \)
  = 25.88 \ldots
  = 25 \text{ ca} \) (rounding incorrectly -1 only once)

\[ \therefore \text{No. of stickers in Roll} = 12 \times 25 \]
  = 300 \text{ ca}

\[ \therefore 600 \div 300 \text{ ca} \]
  = 2 rolls

OR

No. of stickers in height (1 m) = \( \frac{1000 \text{ mm}}{193.4 \text{ mm/m}} \)
  = 5,170630817
  = 5 \text{ ca}

No. of stickers in length (5 m) = \( \frac{5000 \text{ mm}}{80 \text{ mm/m}} \)
  = 62.5
  = 62 \text{ a} \) (rounding incorrectly -1 only once)

No. of stickers in a roll = 62 \times 5
  = 310 \text{ a}

\[ \therefore 600 \div 310\text{ a} \]
  = 1.93 \ldots

\[ \therefore 2 \text{ rolls} \]

If student calculates area, then a maximum of 2 marks.

Area of Roll = \( 5000 \text{ mm} \times 1000 \text{ mm} \)
  = 5000000 \text{ mm}^2 \text{ a}

Area of Label = \( 193.4 \text{ mm} \times 80 \text{ mm} \)
  = 15472 \text{ mm}^2 \text{ a}

Number of stickers on a roll = \( \frac{5000000 \text{ mm}^2}{15472 \text{ mm}^2} \)
  = 323,16

\[ \therefore 2 \text{ rolls is needed} \quad (6) \]

3.2.3 \[ V = \pi \times r^2 \times \text{ht} \]

\[ 350 \text{ m}^3 \times 1000 \text{ m} = 3,14 \times (30 \text{ mm})^2 \times \text{ht} \]

\[ 350000 \text{ mm}^3 = 2826 \text{ mm}^2 \times \text{ht} \]

123,84 \ldots \text{ cm} \) = \text{ht}

124 cm \text{ ca} \) must be mm

OR

1 cm\(^3\) = 1 m\(^3\)

\[ \therefore 350 \text{ cm}^3 = 350 \text{ m}^3 \]

350 cm\(^3\) = 3,14 \times (3 \text{ cm})^2 \times \text{height}

350 cm\(^3\) = 28.26 cm\(^2\) \times \text{height}

12,384 cm = \text{height}

12,384 cm \times 10 = \text{height}

123,84 mm \text{ ca} = \text{height}

124 mm \text{ ca} = \text{height} \) must be mm

(4)
3.3  3.3.1 Money received = R\$7,50 a m \times b a \\

or

Money received = R\$7,50 a m \times \text{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 = R\$7,50 \times 50 \\
= R375 c a \\

Expense = R250 + (R\$2,50 \times 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 caca 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 \ell \ ÷ 5,5 \ell \ m \times 100 \ km \ m
\[= 540.91 \ km\]
Distance from Johannesburg to Durban = 625 \ km \ m – 52 \ km \ m = 573 \ km \ ca\]
\[\because \ Jordan \ will \ need \ to \ fill \ up. \ (7)\]

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 \times 60 \ months) \ a
\[= R50 000 + R98 057.40 \ ca\]
\[= R148 057.40 \ ca\] (4)

4.2.2 (a) A – 3 \ a
B – 2 \ a
C – 6 \ a (3)

(b) \[A = P (1 + i)^n\]
\[= R50 000 \left(1 + \frac{0.045}{12}\right)^{60}\]
\[= R62 589.79 \ ca\] (4)

(c) \[R2 137.60 \times 60 ^m + R50 000 ^m – R12 589.79 ^m\]
\[= R128 256 + R50 000 – R12 589.79\]
\[= R165 666.21 \ ca\]
\[\because \ not \ a \ cheaper \ option \ ca\]
(Based on 4.2.1) (5)

OR
If do not subtract interest: maximum 4 marks
(d) $A = P(1 + i.n)$

\[
A = R50\,000\ (1 + 0.045 \times 5) \\
= R61\,250 \quad (7)
\]

**OR**

If axes swapped around: full marks

**OR**

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

4.3

<table>
<thead>
<tr>
<th>Statement 1</th>
<th>Graph 1 or 3</th>
<th>$a$</th>
</tr>
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<tbody>
<tr>
<td>Statement 2</td>
<td>Graph 6</td>
<td>$a$</td>
</tr>
<tr>
<td>Statement 3</td>
<td>Graph 2</td>
<td>$a$</td>
</tr>
<tr>
<td>Statement 4</td>
<td>Graph 1</td>
<td>$a$</td>
</tr>
</tbody>
</table>

(4)

4.4

4.4.1

\[
\frac{11.6}{100} + \frac{18.4}{100} = \frac{30}{100} = \frac{3}{10} \quad (3)
\]

4.4.2

\[
100\% - m \ (20.2\% + 18.4\% m + \ldots) \\
= 100\% - 95.9\% \\
= 4.1\% \quad (3)
\]

4.5

4.5.1

Range $= 26\% - 45\%$

\[
= 71\% \quad (3)
\]

If: $26\% - 45$

\[
= -19\%
\]

If: $45 + 26$

\[
= 71\% 
\]

If: $-45 + 26$

\[
= 19\%
\]

If: $45 - 26$

\[
= 19\%
\]

If: $-45$ to $26$ or $y \ [-45;26]$
4.5.2 Mean

\[ \text{Mean} = \frac{\text{Total}}{\text{Number}} \]

\[ -6.31\% = \frac{26\% + 24.4\% + 8\% + 3.6\% + 1.5\% + 1\% + -5\% + \ldots}{13} \]

\[ -6.31 = \frac{-72.4\% + \text{Mercedes}}{13} \]

\[ -82.03\% \text{ ca} = -72.4\% + \text{Mercedes} \]

\[ -9.63\% \text{ ca} = \text{Mercedes} \]

(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
QUESTION 5

5.1 \(1 \text{ min} \times 60 \text{ sec} + 24 \text{ sec}
= 60 \text{ sec} + 24 \text{ sec}
= 84 \text{ sec}
\text{No penalty for missing units} \hspace{1cm} (2)
124 \text{ sec} \text{ ca}

5.2 \text{Speed} = \frac{5,303 \text{ km}}{84 \div 60 \div 60 \text{ h}}
= \frac{5,303 \text{ km}}{\frac{7}{300} \text{ h}}
= 227,27 \ldots \text{ km/h} \hspace{0.5cm} \text{No penalty for missing units}
227 \text{ km/h} \text{ ca} \hspace{0.2cm} (P1R if not rounded) \hspace{1cm} (3)

5.3 5.3.1 \[307,574 \text{ km} \div 5,303 \text{ km}
= 57,99 \ldots
= 58 \text{ laps} \text{ ca} \hspace{1cm} (2)

5.3.2 58 \text{ laps} \times 1 \text{ min} 24 \text{ sec}
= 1 \text{ hrs} \text{ ca} 21 \text{ min} 12 \text{ sec} \text{ ca}
or
58 \text{ laps} \times 84 \text{ sec}
= 4,872 \text{ sec} \div 60
= 81,2 \text{ min}
= 81 \text{ min} 12 \text{ sec}
81 \text{ min} \div 60
= 1 \text{ hr} \text{ ca} 21 \text{ min} 12 \text{ sec} \text{ ca}
or
307,574 \div 227
= = 1 \text{ hr} \text{ ca} 21 \text{ min} 12 \text{ sec} \text{ ca}

If answer to 5.1 = 124 \text{ sec}
58 \text{ laps} \times 124 \text{ sec}
= 1 \text{ hr} \text{ ca} 59 \text{ min} 52 \text{ sec} \text{ ca}

\text{5.4 Area} = 5,303 \text{ km} \times 14 \text{ m}
= 5,303 \text{ m} \times 14 \text{ m}
= 74,242 \text{ m}^2 \hspace{0.5cm} \text{No penalty for missing units}
\text{Cost} = 74,242 \text{ m}^2 \times R150/\text{m}^2
= R11,136,300 \text{ ca} \hspace{1cm} (4)

Total: 150 marks