



higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

MARKING GUIDELINE

NATIONAL CERTIFICATE

MATHEMATICS N1

28 July 2025

This marking guideline consists of 12 pages.

QUESTION 1

1.1

$$\begin{aligned} & \sqrt[3]{\frac{(4x^{-2}y^3)^2}{2x^2}} \\ &= \left(\frac{16x^{-4}y^6}{2x^2} \right)^{\frac{1}{3}} \checkmark \\ &= \left(\frac{8y^6}{x^6} \right)^{\frac{1}{3}} \checkmark \\ &= \frac{2y^2}{x^2} \checkmark \end{aligned}$$

Alternative answer:

$$\begin{aligned} & \sqrt[3]{\frac{(4x^{-2}y^3)^2}{2x^2}} \\ &= \left(\frac{2^4x^{-4}y^6}{2x^2} \right)^{\frac{1}{3}} \checkmark \\ &= \left(\frac{2^3y^6}{x^6} \right)^{\frac{1}{3}} \checkmark \\ &= \frac{2y^2}{x^2} \checkmark \end{aligned}$$

1.2

$$\begin{aligned} & \frac{\log_5 8}{\log_5 0,25} \\ &= \frac{\log_5 2^3}{\log_5 \frac{1}{4}} \\ &= \frac{\log_5 2^3}{\log_5 2^{-2}} \checkmark \\ &= \frac{3 \log_5 2}{-2 \log_5 2} \checkmark \\ &= -\frac{3}{2} \checkmark \end{aligned}$$

Instructions:

- 1 mark for simplification of the numerator $16x^{-4}y^6$
- 1 mark for simplification of the fraction in brackets $\frac{8y^6}{x^6}$
- 1 mark for final answer

Instructions:

- 1 mark for simplification of the numerator $2^4x^{-4}y^6$
- 1 mark for simplification of the fraction in brackets $\frac{2^3y^6}{x^6}$
- 1 mark for final answer

(3)

Instructions:

- 2 marks for prime factors
- 1 mark for the power rule
- 1 mark for final answer
- (1 mark for answer only, question states without a calculator)

(4)

1.3 $\log x^2 = 2$
 $10^2 = x^2 \checkmark$
 $\therefore x = 10 \checkmark$

Instructions:

- 1 mark for writing in exponent form
- 1 mark for final answer

Alternative answer:

$2\log x = 2$
 $\log x = 1 \checkmark$
 $x = 10^1/10 \checkmark$

Instructions:

- 1 mark for $\log x = 1$
- 1 mark for final answer

(2)

1.4 1.4.1 $7 \checkmark - 2a^3 \checkmark + 3a^4 \checkmark + a^5 \checkmark$

Instructions:

- Allocate marks as indicated

(4)

1.4.2 $a^2 \checkmark$ and a^1 or $a \checkmark$

Instructions:

- Allocate marks as indicated

(2)

[15]

QUESTION 2

2.1

$$\begin{array}{r}
 5a \checkmark - 2b \checkmark \\
 3a + b \overline{) \begin{array}{l} 15a^2 - ab - 2b^2 \\ -(15a^2 + 5ab) \checkmark \\ \hline -6ab - 2b^2 \\ -(-6ab - 2b^2) \checkmark \\ \hline 0 \end{array} }
 \end{array}$$

Instructions:

- Allocate marks as indicated

Alternative answer:

$(3a + b)(5a - 2b)$
 $= 15a^2 - 6ab + 5ab - 2b^2 \checkmark$
 $= 15a^2 \checkmark - ab \checkmark - 2b^2 \checkmark$

Instructions for alternative answer:

- Allocate marks as indicated

(4)

2.2 $(x - 2)^2(x + 3)$
 $= (x - 2)(x - 2)(x + 3)$
 $= (x^2 - 2x - 2x + 4)(x + 3)$
 $= (x^2 - 4x + 4)(x + 3)$
 $= x^3 + 3x^2 - 4x^2 - 12x + 4x + 12$
 $= x^3 \checkmark - x^2 \checkmark - 8x \checkmark + 12 \checkmark$

Instructions:

- Allocate marks as indicated
- Only answer

(4)

[8]

QUESTION 3

3.1 3.1.1 $3x(x+2) - 9x^2(2+x)$
 $= 3x(x+2) - 9x^2(x+2)$
 $= (x+2)(3x - 9x^2)$
 $= 3x\checkmark(1-3x)\checkmark(x+2)\checkmark$

Instructions:

- Subtract 1 mark if final answer is $= (x+2)(3x - 9x^2)$
- (3 marks for answer only) (3)

3.1.2 $\frac{1}{3}ax^2 + 4xc^2$
 $= \frac{1}{3}x\checkmark(ax + 12c^2)\checkmark$

Instructions:

- Allocate marks as indicated

Alternative answer:

$$= \frac{x}{3}\checkmark(ax + 12c^2)\checkmark$$

Instructions for alternative answer:

- Allocate marks as indicated

Alternative answer:

$$= \frac{x\checkmark(ax + 12c^2)\checkmark}{3}$$

(2)

3.2 3.2.1 $\frac{3b^3}{5a^2} + 6a$
 $= \frac{3b^3 + 6a(5a^2)}{5a^2}$
 $= \frac{3b^3\checkmark + 30a^3\checkmark}{5a^2\checkmark}$

Instructions:

- 2 marks for numerator
- 1 mark for LCM denominator $5a^2$
- (3)

3.2.2 $\frac{84x^7y^3}{3x^2} \times \frac{9x^4y}{4y^7}$
 $= \frac{756x^{11}y^4\checkmark}{12x^2y^7\checkmark}$
 $= \frac{63x^9\checkmark}{y^3\checkmark}$

Instructions:

- 1 mark for numerator
- 1 mark for denominator
- 1 mark for final answer
- (3 marks for answer only)

Alternative answer:

$$\frac{84x^7y^3}{3x^2} \times \frac{9x^4y}{4y^7}$$

$$= \frac{4 \times 3 \times 7x^7y^3}{3x^2} \times \frac{3^2x^4y}{4y^7}$$

$$= \frac{7 \times 3^2x^{11}y^4\checkmark}{x^2y^7\checkmark}$$

$$= \frac{63x^9\checkmark}{y^3\checkmark}$$

Instructions:

- 1 mark for numerator
- 1 mark for denominator
- 1 mark for final answer
- (3 marks for answer only)

3.3 3.3.1 $936x^4y^2z^8 = 2^2 \times 3^2 \times 13$
 $\times x^4y^2z^8 \checkmark$
 $420x^6y^4z^2 = 2^2 \times 3 \times 5 \times 7$
 $\times x^6y^4z^2 \checkmark$

3.3.2 $\text{LCM} = 2^3 \times 3^2 \times 5 \times 7 \times 13$
 $\times x^6y^4z^8$
 $\text{LCM} = \mathbf{32\ 760} \checkmark \quad \mathbf{x^6y^4z^8} \checkmark$

3.3.3 $\text{HCF} = 2^2 \times 3 \times x^4y^2z^2$
 $\text{HCF} = \mathbf{12} \checkmark \quad \mathbf{x^4y^2z^2} \checkmark$

Instructions:

- Allocate marks as indicated
- Do not allocate marks if the variables are missing

Instructions:

- 1 mark for 32 760
- 1 mark for $x^6y^4z^8$
- (2 marks for answer only)

Instructions:

- 1 mark for 12
 - 1 mark for $x^4y^2z^2$
 - (2 marks for answer only)
- (3 × 2) (6)

[17]

QUESTION 4

4.1 $\frac{1}{3}(x+2) + 4 = \frac{5x}{7}$
 $\frac{x+2}{3} + \frac{4}{1} = \frac{5x}{7}$
 $\frac{21(x+2)}{3} + \frac{21(4)}{1} = \frac{21(5x)}{7}$
 $7(x+2) + 21(4) = 3(5x)$
 $7x + 14 \checkmark + 84 \checkmark = 15x \checkmark$
 $7x - 15x = -14 - 84$
 $-8x = -98 \checkmark$
 $x = \frac{98}{8} \text{ or } \frac{49}{4} \text{ or } 12,25 \checkmark$

Instructions:

- 3 marks for eliminating fractions by multiplying with LCM
- 1 mark for simplifying like terms
- 1 mark for final answer

(5)

4.2 $b = ay - \frac{x^3}{3}$
 $\frac{x^3}{3} = ay - b \checkmark$
 $x^3 = 3(ay - b) \checkmark$
 $x = \sqrt[3]{3(ay - b)} \checkmark$

Alternative answer:

$\frac{x^3}{3} = ay - b \checkmark$
 $x^3 = 3ay - 3b \checkmark$
 $x = \sqrt[3]{3ay - 3b} \checkmark \text{ or } \sqrt[3]{-3b + 3ay}$

Instructions:

- Allocate marks as indicated
 - Do not penalise if the subject is on the RH side
- $\sqrt[3]{3(ay - b)} = x$

Instructions for alternative answer:

- Allocate marks as indicated
 - Do not penalise if the subject is on the RH side
- $\sqrt[3]{3ay - 3b} = x$

(3)

4.3 $x = \sqrt[3]{3(ay - b)}$
 $x = \sqrt[3]{3[(2)(6) - (-5)]}$ ✓
 $x = 3,448$ ✓

Alternative answer:

$x = \sqrt[3]{3ay - 3b}$
 $x = \sqrt[3]{3(2)(6) - 3(-5)}$ ✓
 $x = 3,448$ ✓

Instructions:

- 1 mark for substitution
- 1 mark for final answer

Instructions for alternative answer:

- 1 mark for substitution
- 1 mark for final answer

(2)

4.4 4.4.1 $s = v \times t$ ✓

Alternative answer:

distance = speed $\times$ time ✓

Instructions:

- 1 mark for answer only

Instructions for alternative answer:

- 1 mark for answer only

(1)

4.4.2 1 year
 $= 365 \text{ days} \times 24 \text{ hours} \times 60 \text{ minutes}$
 $\times 60 \text{ seconds}$

$1 \text{ year} = 365 \times 24 \times 60 \times 60$
 $= 31\,536\,000 \text{ seconds}$ ✓

Alternative answer:

$1 \text{ year} = 31,536 \times 10^6 \text{ seconds}$ ✓

Instructions:

- 1 mark for answer only
- Do not penalise if the unit is not indicated

Instructions for alternative answer:

- 1 mark for answer only
- Do not penalise if the unit is not indicated

(1)

4.4.3 $s = v \times t$
 $s = (3 \times 10^8)(31\,536\,000)$ ✓
 $s = 9,4608 \times 10^{15} \text{ m}$ ✓

Instructions:

- 1 mark for calculation
- 1 mark for final answer
- (1 mark for answer only)
- Do not penalise if the unit is not indicated

(2)

4.4.4 light-years
 $= \frac{4,132 \times 10^{16}}{9,4608 \times 10^{15}}$ ✓
 $= 4,367$ ✓

Instructions:

- 1 mark for calculation
- 1 mark for final answer
- (1 mark for answer only)

(2)

[16]

QUESTION 5

5.1 5.1.1 $c = 500$; $x = 4$; $y = 1300$

$$\begin{aligned} y &= mx + c \\ 1300 &= m(4) + 500 \checkmark \\ 1300 - 500 &= 4m \\ 800 &= 4m \\ m &= 200 \checkmark \end{aligned}$$

$$y = 200x + 500 \checkmark$$

Instructions:

- 1 mark for substituting x, y, c into $y = mx + c$
- 1 mark for calculation of the gradient
- 1 mark for final correct equation

(3)

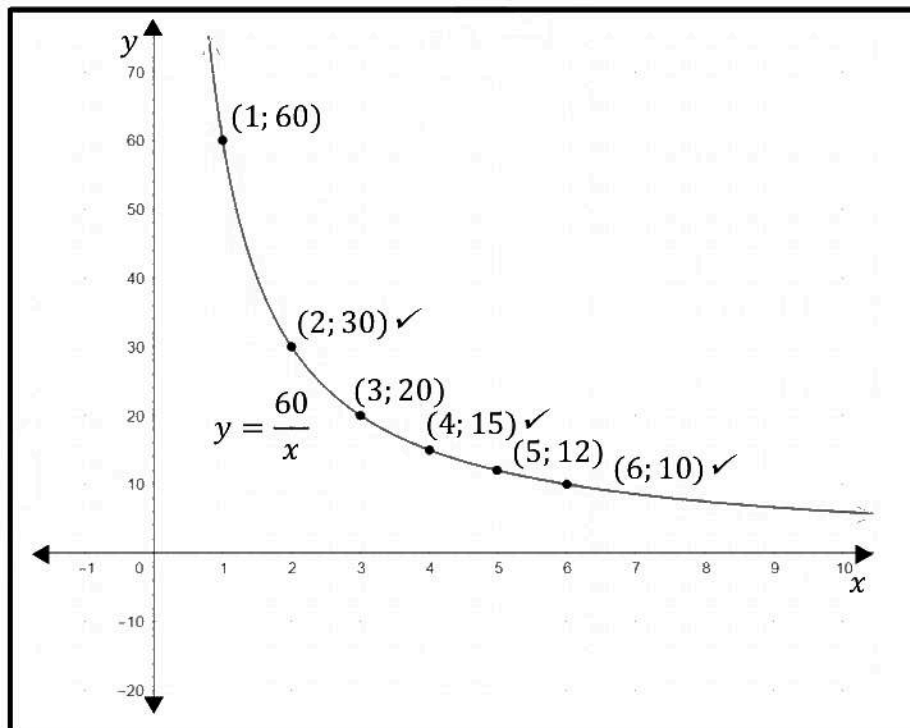
5.1.2 $y = 200x + 500$
 $y = 200(2,5) + 500 \checkmark$
 $y = 1\,000 \text{ m} \checkmark$

Instructions:

- 1 mark for substitution of $x = 2,5$
- 1 mark for final answer
- (2 marks for answer only)
- Do not penalise if the unit is not indicated

(2)

5.2 5.2.1



Instructions:

- 1 mark for every 2 correct coordinates indicated on the graph.

(3)

5.2.2

- The graph shows an inverse relationship, ✓
- When the value of x increases, the value of y decreases and vice versa. ✓

(2)

[10]

QUESTION 6

6.1 $\triangle ABF \equiv \triangle IJM$ ✓ (SSS)✓

Instructions:

- 1 mark for $\triangle IJM$,
the letters must be in this
precise order
- 1 mark for (SSS)

6.2 $\triangle DEF \equiv \triangle NMO$ ✓ (RHS)✓

Instructions:

- 1 mark for $\triangle NMO$,
the letters must be in this
precise order
- 1 mark for (RHS)

6.3 $\triangle BFC \equiv \triangle MJK$ ✓ (SAS)✓

Instructions:

- 1 mark for $\triangle MJK$,
the letters must be in this
precise order
- 1 mark for (SAS)

6.4 $\triangle FGH \equiv \triangle MLK$ ✓ (AAS)✓

Instructions:

- 1 mark for $\triangle MLK$,
the letters must be in this
precise order
- 1 mark for (AAS)

(4 × 2)

[8]

QUESTION 7

7.1 7.1.1

$$\begin{aligned}\tan \hat{B} &\checkmark = \frac{5}{7} \checkmark \\ \hat{B} &= \tan^{-1} \left(\frac{5}{7} \right) \\ \hat{B} &= 35,538^\circ \checkmark\end{aligned}$$

Instructions:

- 1 mark for $\tan \hat{B}$
- 1 mark for $\frac{5}{7}$
- 1 mark for final answer
- Do not penalise if the unit is not indicated

(3)

7.1.2 $\hat{A} + \hat{B} + \hat{C} = 180^\circ$ (Interior $\angle$'s of $\triangle$) $\checkmark$

$$\begin{aligned}\hat{A} &= 180^\circ - 90^\circ - 35,538^\circ \\ \hat{A} &= 54,462^\circ \checkmark\end{aligned}$$

Instructions:

- 1 mark for equation and reason
OR substitution and reason
- 1 mark for final answer correct
- Do not penalise if the unit is not indicated
- (1 mark for answer only without reason indicated)

Alternative answer:

$$\begin{aligned}\tan \hat{A} &= \frac{7}{5}^\circ \checkmark \\ (\text{Trig no reason}) \\ \hat{A} &= \tan^{-1} \frac{7}{5} \\ \hat{A} &= 54,462^\circ \checkmark\end{aligned}$$

Instructions:

- 1 mark for equation
- 1 mark for final answer
- Do not penalise if the unit is not indicated

(2)

7.1.3 $AB^2 = BC^2 + AC^2$ (Pythagoras)

$$\begin{aligned}AB &= \sqrt{7^2 + 5^2} \checkmark \\ AB &= 8,602 \text{ m} \checkmark\end{aligned}$$

Instructions:

- 1 mark for Pythagorean theorem $AB = \sqrt{7^2 + 5^2}$
- 1 mark for final answer
- (1 mark for answer only)
- Do not penalise if the unit is not indicated

Alternative answer:

$$\begin{aligned}\sin \hat{B} &= \frac{5}{AB} \\ AB &= \frac{5}{\sin \hat{B}} \\ AB &= \frac{5}{\sin 35,538^\circ} \checkmark \\ AB &= 8,602 \text{ m} \checkmark\end{aligned}$$

Instructions:

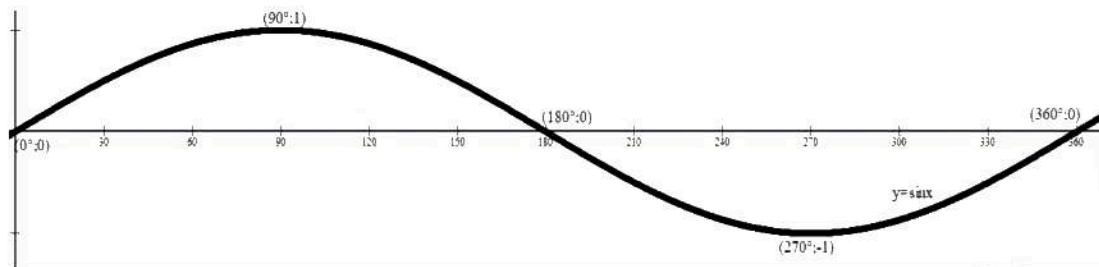
- 1 mark for calculations
- (1 mark for answer only)
- Do not penalise if the unit is not indicated

(2)

7.2

Instructions:

- 1 mark for every 4 correct coordinates indicated on the graph.
- 1 mark for equation on the graph.
- Penalise with 1 mark if the shape of the graphs has straight lines instead of a curve.



(5)
[12]

QUESTION 8

8.1

8.1.1

$$a = 65 \text{ cm} \div 100$$

$$a = 0,65 \text{ m}$$

$$V = a^3$$

$$V = (0,65)^3 \checkmark$$

$$V = 0,274625 \text{ m}^3 \checkmark \times 1\,000$$

$$V = 247,625 \text{ litre} \checkmark$$

Instructions:

- 1 mark for substitution of the converted value
- 1 mark for correct answer in m^3
- 1 mark for final answer correctly rounded off to 3 decimal places in litre
- Penalise with 1 mark if the final unit is not indicated

(3)

8.1.2

$$b = 900 \text{ mm} \div 1000$$

$$b = 0,9 \text{ m} \checkmark$$

$$A = lb$$

$$A = (2,1)(0,9) \checkmark$$

$$A = 1,89 \text{ m}^2 \checkmark$$

Instructions:

- 1 mark for converting b
- 1 mark for substitution
- 1 mark for final answer
- Do not penalise if the unit is not indicated
- (2 marks for answer only)

(3)

8.1.3

$$A_{\text{base}} = \frac{1}{2}bh$$

$$= 0,5(0,4)(0,3)$$

$$= 0,06 \text{ m}^2 \checkmark$$

$$\text{length} = \frac{\text{Volume}}{A_{\text{base}}}$$

$$= \frac{0,036}{0,06} \checkmark$$

$$= 0,6 \text{ m} \checkmark$$

Alternative answer:

$$V = \frac{1}{2}b \times h \times l$$

$$l = \frac{v}{\frac{1}{2}b \times h} \checkmark$$

$$l = \frac{0,036}{\frac{1}{2} \times 0,4 \times 0,3} \checkmark$$

$$l = 0,6 \text{ m} \checkmark$$

Instructions:

- 1 mark for calculating A_{base} (either separate or part of volume)
- 1 mark for substitution of values
- 1 mark for final answer
- Do not penalise if the unit is not indicated

Instructions:

- 1 mark for manipulating formula
- 1 mark for substitution of values
- 1 mark for final answer
- Do not penalise if the unit is not indicated

(3)

8.2

8.2.1

Increase amount

$$= 9126,80 \text{ kg} - 7385,50 \text{ kg}$$

$$= 1741,30 \text{ kg} \checkmark$$

Percentage increase

$$= \frac{1741,30}{7385,50} \times 100 \checkmark$$

$$= 23,577 \% \checkmark$$

Instructions:

- 1 mark for calculation of increase amount (either separate or part of percentage calculation)
- 1 mark for calculation of percentage increase
- 1 mark for final answer correctly rounded off to 3 decimal places
- Do not penalise if the unit is not indicated
- (2 marks for answer only)

(3)

8.2.2 $100\% = \frac{57,12}{119} \times 100 \checkmark$
 $= 48 \text{ litre} \checkmark$

Alternative answer:

$$\frac{57,12}{119,2} = \frac{x}{100}$$
$$x = \frac{57,12 \times 100}{119,2} \checkmark$$
$$x = 48 \text{ litre} \checkmark$$

Instructions:

- 1 mark for calculation
- 1 mark for final answer
- Do not penalise if the unit is not indicated
- (1 mark for answer only)

Instructions:

- 1 mark for calculation
- 1 mark for final answer
- Do not penalise if the unit is not indicated
- (1 mark for answer only)

(2)
[14]

TOTAL: 100