



**higher education
& training**

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

MARKING GUIDELINE

NATIONAL CERTIFICATE

MATHEMATICS N1

14 November 2022

This marking guideline consists of 9 pages.

QUESTION 1

1.1 $128x^{-3} \times x^{-6} \div 16x^{-9}$

$\checkmark 2^{7\sqrt{}} x^{-9} \div 2^4 \sqrt{x^{-9}}$ or $\checkmark \frac{2^7 x^{-9}}{2^4 x^{-9}}$

$\checkmark 2^3 \sqrt{x^{-9+9}}$

$\checkmark 2^3 x^{-9+9}$

$\checkmark 2^3 x^0$

$\checkmark 2^3 (1)$

$\checkmark 2^3 / 8$

Instructions:

- Half mark each for rewrite into exponent form
- Half mark each exponent law
- 1 mark for $x^0 \vee 1$
- 1 mark answer

(4)

1.2 $\frac{3 \log x + \log x}{\log x^2}$

$\checkmark \frac{4 \log x}{2 \log x}$

$\checkmark 2$

Alternative answer:

$\checkmark \frac{\log x^3 + \log x}{\log x^2}$

$\checkmark \frac{\log (x^3 \times x)}{\log x^2}$

$\checkmark \frac{\log x^4}{\log x^2}$

$\checkmark \frac{4 \log x}{2 \log x}$

$\checkmark \frac{4}{2}$

$\checkmark 2$

Instructions:

- 1 mark for the numerator
- 1 mark for the denominator
- (No marks for answer only, question states without a calculator)

Alternative Instructions:

- 1 mark for the numerator
- 1 mark for the denominator
- $x^4 \vee 4x$
- (No marks for answer only, question states without a calculator)

(3)

1.3 $\log_x \sqrt{3} = \frac{1}{2} x^{\frac{1}{2}} = \sqrt{3}$ or $\sqrt{3} = x^{\frac{1}{2}}$

Instructions:

- 1 mark for LH side
- 1 mark for RH side

(2)

1.4 1.4.1 $-2x^5 - 5x^4 - \frac{3x^2}{4} + 7x - 4$

Instructions:

- Allocate marks as indicated

1.4.2 $-4\checkmark$

Instructions:

Allocate marks as indicated

1.4.3 $\frac{-3}{4}\checkmark$

Instructions:

- Allocate marks as indicated
- If negative sign left out, no marks.

(3 × 1) (3)

1.5 $\ln x = \ln e - \frac{1}{2} \ln(0,45)$
 $\ln x = 1,399$
 $\text{antiln} x = 4,052$

Instructions:

- Allocate marks as indicated
- If using log, subtract one mark

(3)
[15]**QUESTION 2**

2.1
$$\begin{array}{r} 2x^2 + 3xy - y^2 \\ 2x - 4y \overline{) 4x^3 - 2x^2y - 14xy^2 + 4y^3} \\ \underline{-(4x^3 - 8x^2y)} \\ 6x^2y - 14xy^2 \\ \underline{-(6x^2y - 12xy^2)} \\ -2xy^2 + 4y^3 \\ \underline{-(-2xy^2 + 4y^3)} \\ 0 \end{array}$$

Instructions:

- Allocate marks as indicated

(6)

2.2
$$\begin{array}{l} -5x^2 - 3x + 5 \\ -(2x^2 + x - 3) \\ \hline -7x^2 - 4x + 8 \end{array}$$

Instructions:

- Allocate marks as indicated
- (3 marks for answer only)

(3)
[9]**QUESTION 3**

3.1
$$\begin{array}{l} 2x + 2y + 3a(y - x) \\ \textcolor{red}{+} 2(x - y) - 3a(x - y) \\ \textcolor{red}{+} (x - y)(2 - 3a) \end{array}$$

Instructions:

- 1 mark for grouping and factorising $2(x - y)$
- 1 mark for changing sign $-3a(x - y)$
- 2 marks for final answer

(4)

$$3.2 \quad \frac{12x^3y - 3(3xy - 5y^2x)}{3xy}$$

$$i \quad \frac{12x^3y - 9xy + 15x^2y}{3xy}$$

$$i \quad \frac{12x^3y}{3xy} - \frac{9xy}{3xy} + \frac{15x^2y}{3xy}$$

$$i \quad 4x^2 - 3 + 5y$$

Alternative answer:

$$i \quad \frac{12x^3y - 9xy + 15x^2y}{3xy}$$

$$i \quad \frac{3xy(4x^2 - 3 + 5y)}{3xy}$$

$$i \quad 4x^2 - 3 + 5y$$

Instructions:

- 1 mark for simplifying brackets
- 3 marks for final answer

Instructions for alternative answer:

- 1 mark for common factor
- 3 marks for final answer

(4)

$$3.3 \quad \frac{36abc - 54a^2b^3c}{162abc}$$

$$i \quad \frac{18abc(2 - 3ab^2)}{162abc}$$

$$i \quad \frac{(2 - 3ab^2)}{9}$$

Alternative answer:

$$i \quad \frac{36abc}{162abc} - \frac{54a^2b^3c}{162abc}$$

Instructions:

- 1 mark for common factor and bracket
- 1 mark for answer

Alternative Instructions:

- Allocate marks as indicated

$$i \quad \frac{2}{9} - \frac{1ab^2}{3}$$

(3)

$$3.4 \quad 3.4.1$$

$$68x^2y^5z^6 = 2 \times 2 \times 17 \times x^2y^5z^6$$

$$16x^4y^5z^3 = 2^4 \times x^4y^5z^3$$

or

2	2			1	x				y	y				z	z	z	z	z	z
				7															
2	2	2	2		x	x	x	x	y	y	y	y	y	z	z	z			
2	2	2	2	1	x	x	x	x	y	y	y	y	y	z	z	z	z	z	z
				7															

Instructions:

- Allocate marks as indicated, row one and row two.
- Do not allocate marks if the variables are missing

$$3.4.2 \quad LCM = 2^4 \times 17 \times x^4y^5z^6$$

$$LCM = 272x^4y^5z^6$$

Instructions:

- 1 mark for 272
- 1 mark for $x^4y^5z^6$

- (2 marks for answer only)

3.4.3 $HCF = 4x^2y^3z^3$

Instructions:

- 1 mark for 4
- 1 mark for xy^2z^3
- (2 marks for answer only)

(3 × 2)

(6)

[17]**QUESTION 4**

4.1 $3(5x-2)=2(4x+11)$
 $15x-6=8x+22$
 $15x-8x=22+6$
 $7x=28$
 $x=4$

Instructions:

- 4 marks for simplifying brackets
- 1 mark for simplifying like terms
- 1 mark for final answer

(6)

4.2 $u^2+2as=v^2$
 $2as=v^2-u^2$
 $s=\frac{v^2-u^2}{2a}$

Instructions:

- Allocate marks as indicated
- Do not penalise if the subject is on the RH side

$$\frac{v^2-u^2}{2a}=s$$

(2)

4.3 $s=\frac{v^2-u^2}{2a}$
 $s=\frac{(5)^2-0}{2(3)}$
 $s=4,167\text{ m}$

Instructions:

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

Alternative answer:

$$s=\frac{25}{6}\text{ m}$$

(2)

4.4 349 hours 38 minutes

$$349+\frac{38}{60}$$

$$349,633\text{ hours}$$

$$s=v \times t$$

$$s=(30)(349,633)$$

$$s=10\,488,99\text{ km}$$

$$s=10\,488,99 \times 1\,000=10\,488\,990\text{ m}$$

Instructions:

- 1 mark for conversion to hours
- 1 mark for substitution
- 1 mark for answer in km
- 1 mark for answer in meter

(4)

4.5 $560 \text{ r/min} = \frac{560}{60}$
 $n = 9,333 \text{ r/s}$

Instructions:

- Allocate marks as indicated

(2)
[16]**QUESTION 5**

5.1 5.1.1 $\frac{x}{2} + \frac{y}{3} = 1 \Rightarrow \frac{y}{3} = \frac{-x}{2} + 1 \Rightarrow y = \frac{-3}{2}x + 3$

Instructions:

- Allocate marks as indicated

(2)

5.1.2 $m = \frac{-3}{2}$

Instructions:

- Allocate marks as indicated

(1)

5.1.3 $(0; 3)$

Instructions:

- Allocate marks as indicated

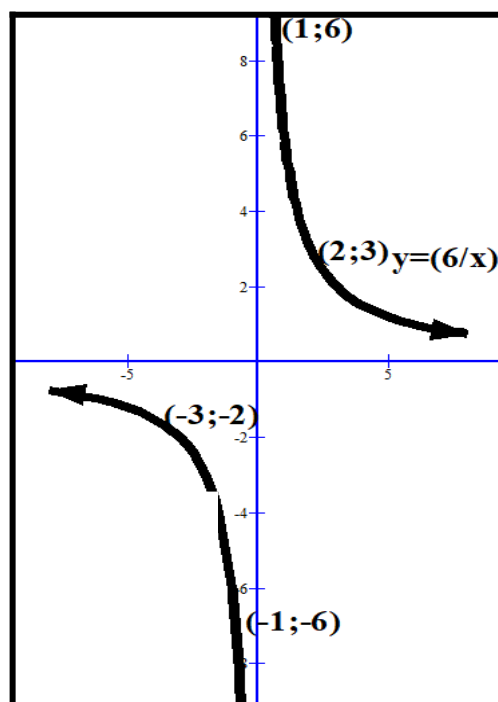
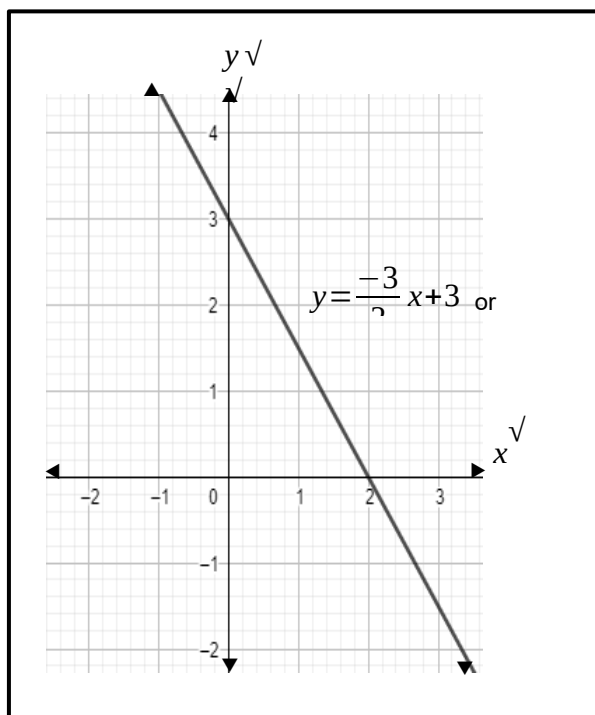
(2)

5.1.4

Instructions for straight line

- 1 mark for the correct x -intercept
- 1 mark for the correct y -intercept
- 1 mark for writing the equation, $\frac{x}{2} + \frac{y}{3} = 1$ or $y = \frac{-3}{2}x + 3$ next to the graph
- 1 mark for indicating the x -axis and y -axis

(4)



Instructions for hyperbola

- 2 marks for the correct shape, quadrant 1 and 3
- 1 mark for writing the equation next to the graph

(3)
[12]**QUESTION 6**6.1 The symbol is used to indicate **similar** triangles. (1)6.2 $\begin{pmatrix} S, S, S \\ A, A, A \end{pmatrix}$ (2)

6.3 $DE^2 = AD^2 - AE^2$
 $DE = \sqrt{8^2 + 6^2}$
 $DE = \sqrt{100}$
 $DE = 10\text{ m}$

Instructions:

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

(2)

6.4 $\frac{BC}{DE} = \frac{AB}{AD} \frac{BC}{10} = \frac{18}{8} \cdot 8 \cdot BC = 180 \quad DE = \frac{180}{8} \quad DE = 22,5\text{ m}$

Alternative answer:

$\frac{DE}{BC} = \frac{AD}{AB} \frac{10}{BC} = \frac{8}{18} \cdot 8 \cdot BC = 180 \quad BC = \frac{180}{8} \quad BC = 22,5\text{ m}$

Instructions:

- 1 mark for LH side $\frac{BC}{10}$
- 1 mark for RH side $\frac{18}{8}$
- 1 mark for final answer
- (2 marks for answer only)
- Do not penalise if the unit is not indicated

Instructions for alternative answer:

- 1 mark for LH side $\frac{10}{BC}$
 - 1 mark for RH side $\frac{8}{180}$
 - 1 mark for final answer
 - (2 marks for answer only)
 - Do not penalise if the unit is not indicated
- (3)

6.5 $\hat{A} + \hat{B} + \hat{C} = 180^\circ$ ($\sum$ of interior angles of Δ)
 $\hat{C} = 180^\circ - 90^\circ - 63^\circ$
 $\hat{D} = 27^\circ$

Instructions:

- 1 mark for theorem/reason
- 1 mark for final answer
- No marks are allocated for calculations

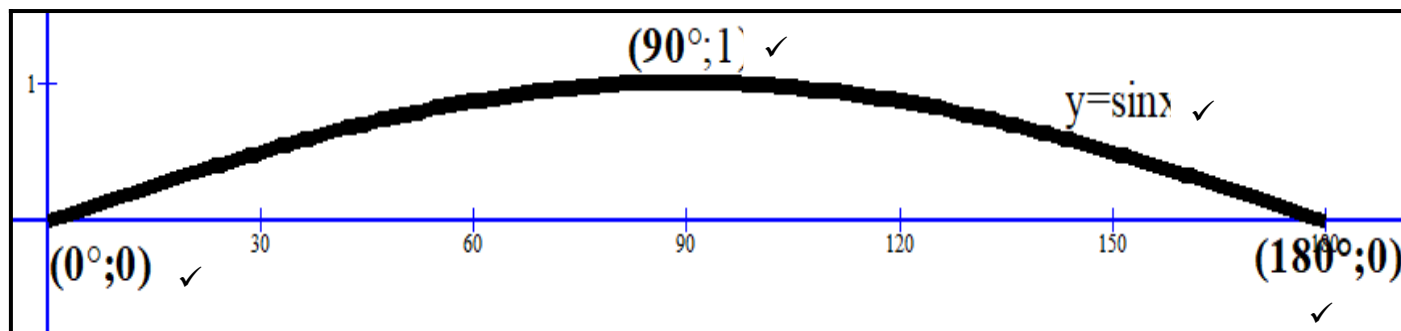
(2)
[10]

QUESTION 7

7.1 Instructions:

- 1 mark for each of the following coordinates indicated on the graph:
(0°;0) (90°;1) (180°;0)
- 1 mark for indicating the equation next to the graph

(4)



7.2 $\frac{AC}{12} = \tan 20^\circ$ $AC = 12 \tan 20^\circ$
 $AC = 4,368 \text{ cm}$

Alternative answer:

$$\frac{12}{AC} = \cot 20^\circ$$

$$AC \cot 20^\circ = 12 \quad AC = \frac{12}{\cot 20^\circ} \quad AC = 12 \tan 20^\circ$$

$$AC = 4,368 \text{ cm}$$

Instructions:

- 1 mark for $\frac{AC}{12}$
- 1 mark for $\tan 20^\circ$
- 1 mark for final answer
- Do not penalise if the unit is not indicated

Instructions for alternative answer:

- 1 mark for $\frac{12}{AC}$
- 1 mark for $\cot 20^\circ$
- 1 mark for final answer
- Do not penalise if the unit is not indicated

(3)
[7]

QUESTION 8

8.1 $BF^2 = BD^2 - DF^2$
 $BF = \sqrt{10^2 - 8^2}$
 $BF = 6 \text{ cm}$

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

$$V = (0,5)(8)(6)(2)$$

Instructions:

(4)

- 1 mark for calculating BF
($h=6$ or $BF=6$)
- 1 mark for formula
- 1 mark for substitution
- 1 mark for final answer
- (2 marks for answer only)
- Do not penalise if the unit is not indicated

$$V = 48 \text{ cm}^3$$

8.2	8.2.1	$A = L \times B$ $7\text{ m} \times 3\text{ m} = 21\text{ m}^2$ Area of floor	<u>Instructions:</u> 1 mark for substituting values 1 mark for answer
	8.2.2	$A = L \times B$ $0,3 \times 0,3 = 0,09\text{ m}^2$ Area of 1 tile	<u>Instructions:</u> 1 mark for substituting values 1 mark for answer
		Alternative answer: $300\text{ mm} \times 300\text{ mm} = 90\,000\text{ mm}^2$ $90\,000\text{ mm}^2 \div 1\,000\,000 = 0,09\text{ m}^2$	<u>Instructions for alternative answer:</u> 1 mark for substituting values 1 mark for final answer
	8.2.3	Tiles needed $\frac{21}{0,09} = 233,333\text{ tiles} \therefore 234\text{ tiles}$	<u>Instructions:</u> - Allocate marks as indicated - Mark 233,333 or 234
	8.2.4	$234 \times \frac{2}{100}$ $4,68 \vee 5\text{ tiles}$	<u>Instructions:</u> - Allocate marks as indicated - Mark 4,68 or 5
		Alternative answer: $233 \times \frac{2}{100}$ $4,66 \vee 5\text{ tiles}$	<u>Instructions for alternative answer:</u> - Allocate marks as indicated - Mark 4,66 or 5
			(4 × 2) (8)
8.3		$2\,500\,000\text{ mm}^3$ to m^3 $2\,500\,000 \div 1\,000^3$ $0,0025$ or $\frac{1}{400}\text{ m}^3$	<u>Instructions:</u> - Allocate marks as indicated - Only answer: full marks
			(2)
			[14]

TOTAL: 100