



**higher education
& training**

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

MARKING GUIDELINE

NATIONAL CERTIFICATE

MATHEMATICS N1

27 Junie 2022

This marking guideline consists of 9 pages.

QUESTION 1

1.1 1.1.1 $\left(\frac{5x^2}{3}\right)^2$
 $\div \frac{25x^4}{9}$ (2)

Instructions:

- 1 mark for the numerator
- 1 mark for the denominator

1.1.2 $\frac{\sqrt{25}x^4y^3}{125x^2y^4}$
 $\div \frac{x^2}{5y}$ (3)

Instructions:

- 1 mark for the numerator
- 2 marks for the denominator

1.2 1.2.1 $\log_9 3 + \log_9 27$
 $\div \log_9 (3 \times 27)$
 $\div \log_9 81$
 $\div \log_9 9^2$
 $\div 2 \log_9 9$
 $\div 2(1)$
 $\div 2$ (4)

Instructions:

- Allocate marks as indicated
- (1 mark for answer only – question states without a calculator)

1.2.2 $\frac{\log 9}{\log 3}$
 $\div \frac{\log 3^2}{\log 3}$
 $\div \frac{2 \log 3}{\log 3}$
 $\div 2$ (3)

Instructions:

- Allocate marks as indicated
- (1 mark for answer only – question states without a calculator)

1.3 $\log_4 0,25 = -14^{-1} = 0,25$ (2)

Instructions:

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

[14]**QUESTION 2**

2.1 $12x^2 + 14x + 5$
 $x - 4 \overline{) 12x^3 - 34x^2 - 51x - 20}$
 $\quad - (12x^3 - 48x^2)$
 $\quad \quad 14x^2 - 51x$
 $\quad \quad - (14x^2 - 56x)$
 $\quad \quad \quad 5x - 20$
 $\quad \quad \quad - (5x - 20)$
 $\quad \quad \quad \quad 0$ (6)

Instructions:

- Allocate marks as indicated

$$2.2 \quad 20x^2 - 12xy + 10y^2$$

$$14x^2 - 4xy - 16y^2$$

$$34x^2 - 16xy - 6y^2$$

Instructions:

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

(3)

$$2.3 \quad (x-3)^2$$

$$\textcolor{red}{\downarrow} (x-3)(x-3)$$

$$\textcolor{red}{\downarrow} x^2 - 3x - 3x + 9$$

$$\textcolor{red}{\downarrow} x^2 - 6x + 9$$

Instructions:

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

(3)
[12]**QUESTION 3**

$$3.1 \quad 3.1.1 \quad (x+y) - 5xy - 5x^2$$

$$\textcolor{red}{\downarrow} (x+y) - 5x(y+x)$$

$$\textcolor{red}{\downarrow} (x+y) - 5x(x+y)$$

$$\textcolor{red}{\downarrow} (x+y)(1-5x)$$

Alternative answer:

$$(x+y) - 5xy - 5x^2$$

$$\textcolor{red}{\downarrow} x+y - 5xy - 5x^2$$

$$\textcolor{red}{\downarrow} (x-5x^2) + (y-5xy)$$

$$\textcolor{red}{\downarrow} x(1-5x) + y(1-5x)$$

$$\textcolor{red}{\downarrow} (1-5x)(x+y)$$

Instructions:

- 1 mark for grouping and factorising $-5x(y+x)$
- 2 marks for final answer

(3)

$$3.1.2 \quad \frac{1}{4}x^2y - \frac{1}{4}xy^3 + \frac{1}{4}x^3y^2$$

$$\textcolor{red}{\downarrow} \frac{1}{4}xy(x - y^2 + x^2y)$$

Instructions:

- Allocate marks as indicated

(4)

$$3.2 \quad \frac{3}{x} - \frac{5xy-4}{x^2y}$$

$$\textcolor{red}{\downarrow} \frac{3(xy) - (5xy-4)}{x^2y}$$

$$\textcolor{red}{\downarrow} \frac{3xy - 5xy + 4}{x^2y}$$

$$\textcolor{red}{\downarrow} \frac{-2xy + 4}{x^2y}$$

Instructions:

- 1 mark for LCM of x^2y
- 1 mark for numerator $3xy$
- 1 mark for numerator $-5xy$
- 1 mark for numerator $(+4)$
- 1 mark for final answer

(5)

3.3 3.3.1 $120 x^6 y^3 z^2 = 2^3 \times 3 \times 5 \times x^6 y^3 z^2$

Alternative answer:

$$120 x^6 y^3 z^2 = 2 \times 2 \times 2 \times 3 \times 5 \times x^6 y^3 z^2$$

$$45 x^3 y^4 z^3 = 3^2 \times 5 \times x^3 y^4 z^3$$

Alternative answer:

$$45 x^3 y^4 z^3 = 3 \times 3 \times 5 \times x^3 y^4 z^3$$

Instructions:

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

(2)

3.3.2 $LCM = 2^3 \times 3 \times 5 \times x^6 y^4 z^3$
 $LCM = 120 x^6 y^4 z^3$

Instructions:

- 1 mark for $120 \vee 2^3 \times 3 \times 5$
- 1 mark for $x^6 y^4 z^3$
- (2 marks for answer only)

(2)

3.3.3 $HCF = 3 \times 5 \times x^3 y^3 z^2$
 $HCF = 15 x^3 y^3 z^2$

Instructions:

- 1 mark for $15 \vee 3 \times 5$
- 1 mark for $x^3 y^3 z^2$
- (2 marks for answer only)

(2)

[18]

QUESTION 4

4.1 $-4(x-1) = -5(2x-1) - 19$
 $-4x + 4 = -10x + 5 - 19$
 $-4x + 10x = -14 - 4$
 $6x = -18$
 $x = \frac{-18}{6}$
 $x = -3$

Instructions:

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

(6)

4.2 $V = \pi r^2 h \pi r^2 h = V r^2 = \frac{V}{\pi h} r = \sqrt{\frac{V}{\pi h}}$

Instructions:

- Allocate marks as indicated
- **Do not** penalise if the subject is on the RHS
- **Do not** penalise if $\pm$ is not in front of square root

$$\sqrt{\frac{V}{\pi h}} = r$$

(2)

4.3

$$r = \sqrt{\frac{V}{\pi h}}$$

$$r = \sqrt{\frac{33}{\pi \times 9}}$$

$$r = 1,08$$

Instructions:

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

(2)

4.4

$$1 \text{ h } 15 \text{ min} = 1 \frac{15}{60} \text{ h} = 1,25 \text{ h}$$

$$\text{Speed} = \frac{\text{distance}(s)}{\text{time}(t)}$$

$$\text{Speed} = \frac{120}{1,25}$$

$$\text{Average speed} = 96 \text{ km/h}$$

$$\text{Speed} \times \text{time} = \text{distance}$$

$$\therefore \text{time} = \frac{\text{distance}}{\text{speed}}$$

$$\text{time} = \frac{250}{96}$$

$$\text{time} = 2,604 \text{ h}$$

$$\therefore 2 \text{ h } 0,604 \times 60$$

$$\therefore 2 \text{ h } 36 \text{ min}$$

Instructions:

- 1 mark for converting into hours
- 1 mark for average speed
- 2 marks for calculating time
- 1 mark for answer in hours and minutes

(5)

[15]**QUESTION 5**

5.1

5.1.1

$$4x + 2y + 3 = 0 \quad y = -4x - 3$$

$$y = -2x - \frac{3}{2}$$

Instructions:

- 1 mark for gradient or slope
- 1 mark for y-intercept
- y must be the subject

(2)

5.1.2

$$m = -2$$

(1)

5.1.3

$$c = \frac{-3}{2}$$

Alternative answer:

$$(0; -1,5)$$

(1)

5.2

5.2.1

$$xy - 6 = 0 \quad xy = 6 \quad y = \frac{6}{x}$$

Instructions:

- 1 mark for answer only

(1)

5.2.2 1st and 3rd quadrant (2)

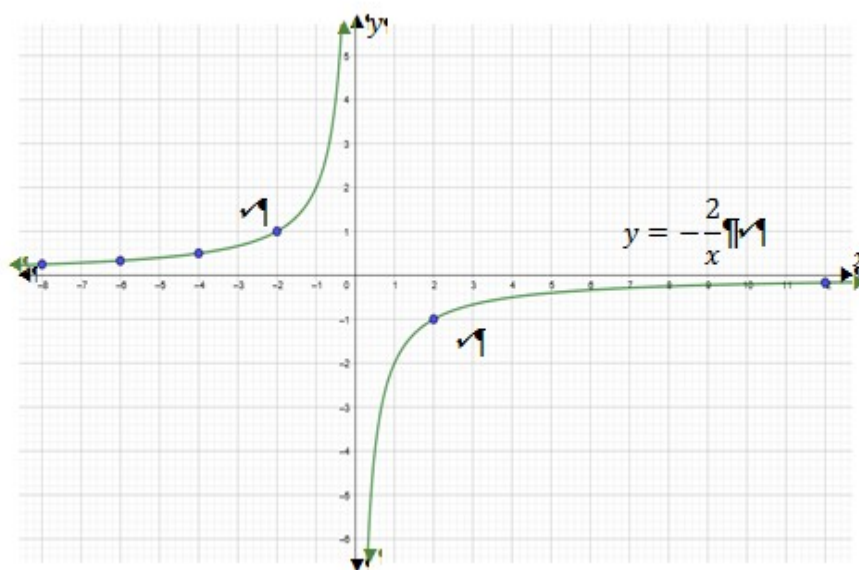
5.3 5.3.1 $A=0,5$
 $B=-1$
 $C=4$ (3)

Instructions:

- Allocate marks as indicated

5.3.2 Instructions:

- 1 mark for the correct shape of the graph in the 2nd quadrant
- 1 mark for the correct shape of the graph in the 4th quadrant
- 1 mark for writing the equation



(3)
[13]

QUESTION 6

6.1 $BC^2 = AB^2 - AC^2$
 $BC = \sqrt{10^2 - 8^2}$
 $BC = \sqrt{36}$
 $BC = 6 \text{ m}$

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)

6.2 $\frac{DE}{AB} = \frac{DF}{AC} \frac{DE}{10} = \frac{20}{8} 8 DE = 200 DE = \frac{200}{8} DE = 25 \text{ m}$

Instructions:

- 1 mark for LH side $\frac{DE}{10}$
- 1 mark for RH side $\frac{20}{8}$
- 1 mark for final answer
- (2 marks for answer only)
- Do not penalise if the unit is not indicated

Alternative answer:

$$\frac{AB}{DE} = \frac{AC}{DF} \frac{10}{DE} = \frac{8}{20} \quad DE = 200 \quad DE = \frac{200}{8} \quad DE = 25 \text{ m}$$

Alternative answer:

$$\sin 53,13^\circ = \frac{20}{DE}$$

$$\therefore DE = \frac{20}{\sin 53,13^\circ}$$

$$\therefore DE = 25 \text{ m}$$

Instructions for alternative answer:

- 1 mark for LH side $\frac{10}{DE}$
- 1 mark for RH side $\frac{8}{20}$
- 1 mark for final answer
- (2 marks for answer only)
- Do not penalise if the unit is not indicated

Instructions for alternative answer:

- Allocate marks as indicated

(3)

6.3 $\hat{D} + \hat{E} + \hat{F} = 180^\circ$ ($\sum$ of interior angles of Δ)

$$\hat{D} = 180^\circ - 90^\circ - 53,13^\circ$$

$$\hat{D} = 36,87^\circ$$

Instructions:

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

(2)
[7]**QUESTION 7**

7.1 $\sin 49^\circ = \frac{5,283}{x} \quad x \sin 49^\circ = 5,283 \quad x = \frac{5,283}{\sin 49^\circ} \quad x = 7 \text{ m}$

Alternative answer:

$$\operatorname{cosec} 49^\circ = \frac{x}{5,283} \quad x = 5,283 \operatorname{cosec} 49^\circ \quad x = \frac{5,283}{\sin 49^\circ}$$

$$x = 7 \text{ m}$$

Instructions:

- 1 mark for $\sin 49^\circ$
- 1 mark for $\frac{5,283}{x}$
- 1 mark for final answer
- Do not penalise if the unit is not indicated

Instructions:

- 1 mark for $\operatorname{cosec} 49^\circ$
- 1 mark for $\frac{x}{5,283}$
- 1 mark for final answer
- Do not penalise if the unit is not indicated

(3)

7.2 $\sin 45^\circ \times \tan 30^\circ$

$$\textcolor{red}{\cdot} \frac{1}{\sqrt{2}} \times \frac{1}{2}$$

$$\textcolor{red}{\cdot} \frac{1}{2\sqrt{2}}$$

Instructions:

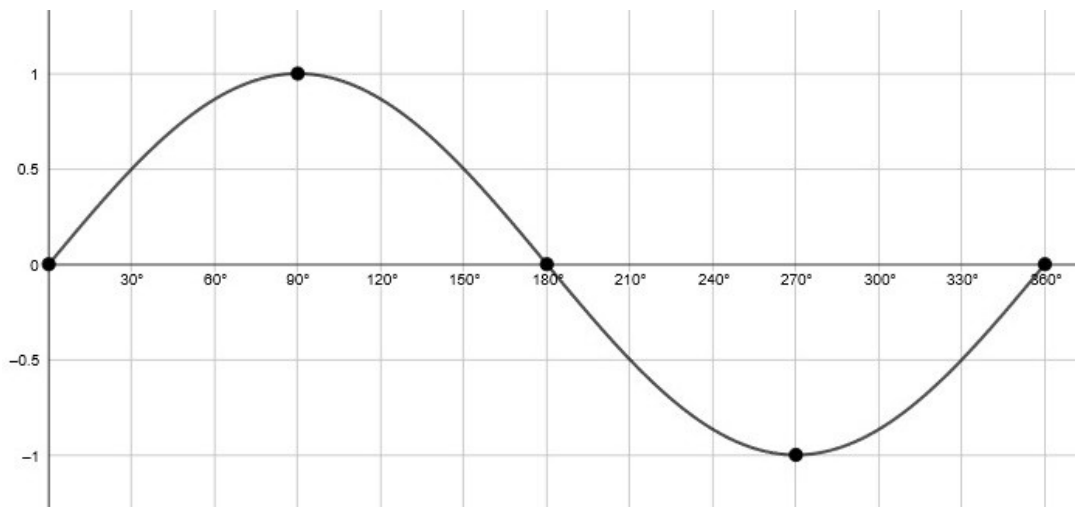
- 1 mark for correct fractions
(Do not allocate the mark if $\sin 45^\circ$ is substituted with $\frac{\sqrt{2}}{2}$ as it is done with a calculator; question clearly indicates without a calculator)
- 1 mark for final answer

(2)

7.3

Instructions:

- 1 mark for each of the coordinates indicated on the graph

(5)
[10]**QUESTION 8**

8.1 Number of puzzle pieces already built :

$$\hat{=} \frac{5}{12} \times 1500$$

$$\hat{=} 625$$

Number of puzzle pieces that still need to be built :

$$\hat{=} 1500 - 625$$

$$\hat{=} 875 \text{ pieces}$$

Instructions:

- 1 mark calculating the number of puzzle pieces Sammy has already built
- 1 mark for subtracting
- 1 mark for final answer

(3)

8.2 8.2.1 $P = 2(l + b)$
 $P = 2(12 + 8)$
 $P = 40 \text{ m}$

Alternative answer:

$$P = l + b + l + b$$

$$P = 12 + 8 + 12 + 8$$

$$P = 40 \text{ m}$$

Instructions:

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

(2)

8.2.2 $V = \frac{\pi r^2 h}{3}$
 $V = \frac{\pi (2)^2 (4)}{3}$
 $V = 16,755 \text{ m}^3$

Instructions:

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

(2)

8.2.3 Area of rectangle:

$$A = l \times b$$

$$A = 12 \times 8$$

$$A = 96 \text{ m}^2$$

Area of circle:

$$A = \pi r^2$$

$$A = \pi (2)^2$$

$$A = 12,566 \text{ m}^2$$

Area where grass must be planted:

A = Area of rectangle – area of circle

$$A = 96 - 12,566$$

$$A = 83,434 \text{ m}^2$$

Alternative answer:

$$A = (l \times b) - (\pi r^2)$$

$$A = (12 \times 8) - (\pi \times 2^2)$$

$$A = 96 - 12,566$$

$$A = 83,434 \text{ m}^2$$

Instructions:

- 1 mark for area of rectangle
- 1 mark for area of circle
- 1 mark for subtracting
- 1 mark for final answer
- Do not penalise if the unit is not indicated

Instructions for alternative answer:

- 1 mark for area of rectangle
- 1 mark for area of circle
- 1 mark for subtracting
- 1 mark for final answer
- Do not penalise if the unit is not indicated

(4)

[11]

TOTAL: 100