higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

MARKING GUIDELINE

NATIONAL CERTIFICATE

MATHEMATICS N1

23 July 2021

This marking guideline consists of 9 pages.

INSTRUCTIONS TO MARKERS

1. Mark all the questions.
2. Follow the answers according to the numbering system used in this question paper.
3. Only use a red pen.
4. Make your ticks and crosses neatly and legibly.
5. Follow the instructions on how to allocate marks for each question.

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QUESTION 1

1.1 1.1.1

$(b^3)^{a+c} \times (b^3)^{-a-c}$
$= b^{3a+3c} \checkmark . b^{-3a-3c} \checkmark$
$= b^{3a-3a+3c-3c}$
$= b^0 \checkmark$
$= 1 \checkmark$

Instructions:
- Allocate marks as indicated

(4)

1.1.2

$x^3y^2 \div yx^2 \times \frac{xy}{2}$
$= \frac{x^3y^2}{x^2y} \times \frac{xy}{2}$
$= \frac{x^4y^3 \checkmark}{2x^2y \checkmark}$
$= \frac{x^2y^2}{2} \checkmark$

Instructions:
- 1 mark for the numerator x^4y^3
- 1 mark for the denominator $\frac{1}{2x^2y}$
- 1 mark for the final answer

Alternative answer:

$= \frac{x^3y^2}{x^2y} \times \frac{xy}{2}$
$= xy \checkmark\checkmark \times \frac{xy}{2}$
$= \frac{x^2y^2}{2} \checkmark$

Instructions for alternative answer:
- 2 marks for xy
- 1 mark for the final answer

(3)

1.2

$-5 \log_5 \frac{1}{25}$
$= -5 \log_5 5^{-2} \checkmark$
$= (-5)(-2) \log_5 5 \checkmark$
$= 10(1) \checkmark$
$= 10 \checkmark$

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

(4)

1.3

$\log_5(5x - 15) = 2$
$(5x - 15) = 5^2 \checkmark$
$5x = 25 + 15 \checkmark$
$5x = 40$
$\frac{5x}{5} = \frac{40}{5} \checkmark$
$\therefore x = 8 \checkmark$

Instructions:
- Allocate marks as indicated
- 1 mark for rewriting in exponential form
- 1 mark for moving 15
- 1 mark for dividing by 5
- 1 mark for the final answer

(4)
[15]

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QUESTION 2

2.1

$$x+2 \;\overline{)\; 8x^3+35x^2+26x-24\checkmark}$$

$8x^2\checkmark + 19x\checkmark - 12\checkmark$

$-(8x^3+16x^2)\checkmark$

$19x^2+26x$

$-(19x^2+38x)\checkmark$

$-12x-24$

$-(-12x-24)\checkmark$

0

Instructions:
- Allocate marks as indicated
- 1 mark for descending form of expression

(7)

2.2

$$\begin{array}{r} 7x^2 - 3xy + 9y^2 \\ -(-3x^2 - 17xy + 13y^2) \\ \hline 10x^2\checkmark + 14xy\checkmark - 4y^2\checkmark \end{array}$$

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

Alternative answer:

$= 7x^2 - 3xy + 9y^2 - (-3x^2 - 17xy + 13y^2)$
$= 7x^2 - 3xy + 9y^2 + 3x^2 + 17xy - 13y^2$
$= 7x^2 + 3x^2 - 3xy + 17xy + 9y^2 - 13y^2$
$= 10x^2\checkmark + 14xy\checkmark - 4y^2\checkmark$

(3)

2.3

$3(x+1)(x-2)$
$= (3x+3)(x-2)$
$= 3x^2 - 6x + 3x - 6$
$= 3x^2\checkmark - 3x\checkmark - 6\checkmark$

Instructions:
- 3 marks for the final answer

Alternative answer:

$= 3(x^2 - 2x + x - 2)$
$= 3(x^2 - x - 2)$
$= 3x^2\checkmark - 3x\checkmark - 6\checkmark$

Instructions for alternative answer:
- 3 marks for the final answer

(3)

[13]

QUESTION 3

3.1 3.1.1

$7a + 14 - 2b - ab$
$= (7a+14) + (-2b - ab)\checkmark$
$= 7(a+2) - b(2+a)\checkmark$
$= (a+2)(7-b)\checkmark$

Instructions:
- Allocate marks as indicated

Alternative answer:

$7a + 14 - 2b - ab$
$= (7a - ab) + (14 - 2b)\checkmark$
$= a(7-b) + 2(7-b)\checkmark$
$= (7-b)(a+2)\checkmark$

Instructions for alternative answer:
- Allocate marks as indicated

(3)

3.1.2

$9x^3y^4z^2 - 18x^2y^3z - 36xy^2$
$= 9xy^2\checkmark(x^2y^2z^2\checkmark - 2xyz\checkmark - 4\checkmark)$

Instructions:
- Allocate marks as indicated

(4)

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3.2 $\frac{3}{4x^2}+\frac{1}{x}-\frac{5}{8x}$

$=\frac{3(2)+1(8x)-5(x)}{8x^2}$

$=\frac{6\checkmark+8x\checkmark-5x\checkmark}{8x^2\checkmark}$

$=\frac{6+3x}{8x^2}\checkmark$

Instructions:
- 1 mark for denominator/ LCM $8x^2$
- 1 mark for numerator 6
- 1 mark for numerator $8x$
- 1 mark for numerator $-5x$
- 1 mark for the final answer

(5)

3.3 3.3.1 $30x^7y^2z^5 = 2\times3\times5\times x^7y^2z^5\checkmark$

$105x^3y^4z = 3\times5\times7\times x^3y^4z\checkmark$

Alternative answer:

$= 2\times3\times5\times xxxxxxxyyzzzzz\checkmark$

$= 3\times5\times7\times xxxyyyyz\checkmark$

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

Instructions for alternative answer:
- Allocate marks as indicated

(2)

3.3.2 LCM $= 2\times3\times5\times7\times x^7y^4z^5$

LCM $= 210\checkmark x^7y^4z^5\checkmark$

Instructions:
- 1 mark for 210
- 1 mark for $x^7y^4z^5$
- (2 marks for answer only)

(2)

3.3.3 HCF $= 3\times5\times x^3y^2z$

HCF $= 15\checkmark x^3y^2z\checkmark$

Instructions:
- 1 mark for 15
- 1 mark for x^3y^2z
- (2 marks for answer only)

(2)

[18]

QUESTION 4

4.1 $12(y-3)-3(y-9)=-5(y+6)$

$12y-36\checkmark-3y+27\checkmark=-5y-30\checkmark$

$12y-3y+5y=36-27-30$

$14y=-21\checkmark$

$14y=\frac{-21}{14}$

$\therefore y=\frac{-3}{2}\checkmark$ or $\therefore y=-1{,}5$

Instructions:
- Allocate marks as indicated

(5)

4.2 $ax+y^2=c$

$y^2=c-ax\checkmark$

$y=\sqrt{c-ax}\checkmark$

Instructions:
- Allocate marks as indicated
- Do not penalise if the subject is on the RH side $\sqrt{x-ax}=y$

(2)

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4.3 $y = \sqrt{c - ax}$
$y = \sqrt{33 - (-2)33}$ ✓
$y = 9{,}950$ ✓

Instructions:
- 1 mark for substitution
- 1 mark for the answer
- (1 mark for answer only) (2)

4.4 $v = \frac{s}{t}$ ✓
$v = \frac{9000}{8}$ ✓
$v = 1125$ km/h ✓

Alternative answer:
$v = \frac{s}{t}$ ✓
$v = \frac{9000 \times 1000}{8 \times 60 \times 60}$ ✓
$v = 312{,}5$ m/s ✓

Instructions:
- 1 mark for formulae
- 1 mark for substitution
- 1 mark for the answer

Instructions for alternative answer:
- 1 mark for formulae
- 1 mark for substitution
- 1 mark for the answer (3)

4.5 Let the number be x.
$15x - 3000 = 0$ ✓
$15x = 3000$ ✓
$15x = \frac{3000}{15}$ ✓
$\therefore x = 200$ ✓

Instructions:
- 1 mark for equation
- 1 mark for moving 3000
- 1 mark for dividing by 15
- 1 mark for the answer
- (2 marks for answer only) (4)

QUESTION 5

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

Instructions:
- Allocate marks as indicated (do not penalise if answer is written as $y = \frac{3x}{2} + 3$)
- (2 marks for answer only) (2)

5.1.2 $m = \frac{3}{2}$ ✓

Instructions:
- Do not penalise if answer is written as $m = 1{,}5$ (1)

5.1.3 $c = 3$ ✓

Alternative answer:
$c = (0; 3)$ ✓ (1)

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5.2 5.2.1 $xy = -3$

$y = -\frac{3}{x}$ ✓

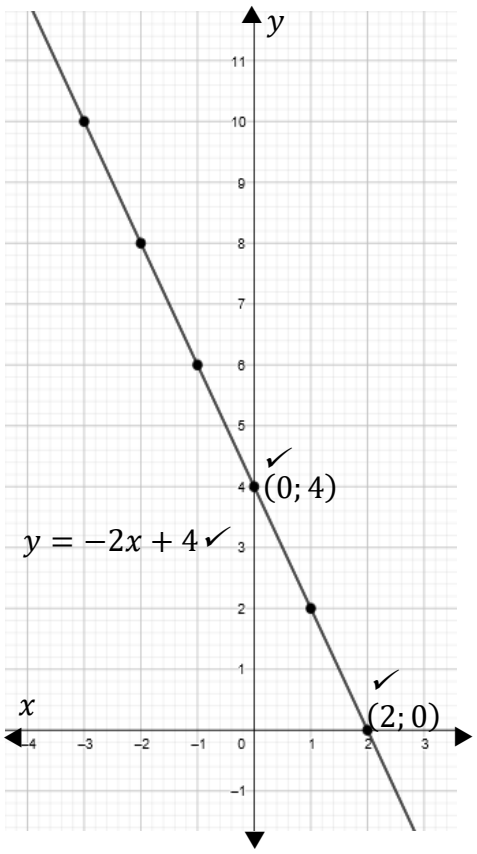
Instructions:
- 1 mark for answer only

(1)

5.2.2 2nd ✓ and 4th ✓ quadrant (2)

5.2.3 Hyperbola ✓ (1)

5.3



Instructions:
Table:

	✓					✓
x	-3	-2	-1	0	1	2
y	**10**	8	6	4	2	**0**

- 1 mark for the correct starting values on the table $(-3; 10)$
- 1 mark for the correct ending values on the table $(2; 0)$

Graph:
- 1 mark for writing the equation standard next to the graph
- 1 mark for the correct x-intercept drawn $(2; 0)$
- 1 mark for the correct y-intercept drawn $(0; 4)$

(5)
[13]

QUESTION 6

6.1
- Side, side, side (S, S, S)
- Side, included angle, side (S, ∠, S)
- Angle, side angle or angle, angle, side (∠, ∠, S)
- Right angle, hypotenuse, side (90°, hypotenuse, S)

Instructions:
- 2 marks for any TWO answers

(2)

6.2 $AC^2 = AB^2 - BC^2$ ✓

$AC^2 = (60)^2 - (20)^2$ ✓

$AC = \sqrt{(60)^2 - (20)^2}$

$AC = 56{,}569$ cm ✓

Instructions:
- 1 mark for theorem
- 1 mark for substitution
- 1 mark for the answer
- (2 marks for answer only)

(3)

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6.3 Two sides are equal. ✓
Two angles are equal. ✓

Instructions:
- Allocate marks as indicated

(2)
[7]

QUESTION 7

7.1
$$\cos 3° \checkmark = \frac{6}{x} \checkmark$$
$$x \cos 3° = 6$$
$$x = \frac{6}{\cos 3°} \checkmark$$
$$x = 6{,}008 \text{ m} \checkmark$$

Alternative answer:
$$\sec 3° \checkmark = \frac{x}{6} \checkmark$$
$$x = 6 \sec 3°$$
$$x = \frac{6}{\cos 3°} \checkmark$$
$$x = 6{,}008 \text{ m} \checkmark$$

Instructions:
- 1 mark for $\cos 3°$
- 1 mark for $\frac{6}{x}$
- 1 mark for $\frac{6}{\cos 3°}$
- 1 mark for the final answer
- Do not penalise if the unit is not indicated

Instructions for alternative answer:
- 1 mark for $\sec 3°$
- 1 mark for $\frac{x}{6}$
- 1 mark for $\frac{6}{\cos 3°}$
- 1 mark for the final answer
- Do not penalise if the unit is not indicated

(4)

7.2
$$\frac{\cos 30°}{\sin 60°}$$
$$= \cos 30° \div \sin 60°$$
$$= \frac{\sqrt{3}}{2} \checkmark \div \frac{\sqrt{3}}{2} \checkmark$$
$$= 1 \checkmark$$

Instructions:
- 2 marks for correct fractions
- 1 mark for the final answer
- (1 mark for answer only)

(3)
[7]

QUESTION 8

8.1
$$A = b \times \perp h$$
$$A = 2{,}5 \times 1{,}8 \checkmark$$
$$A = 4{,}5 \text{ m}^2 \checkmark$$

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

(2)

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8.2 8.2.1

$P = S + S + S$
$P = 4 + 20{,}616 + 21$ ✓
$P = 45{,}616\ m$ ✓

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

8.2.2

$A = l \times b$
$A = 12 \times 21$ ✓
$A = 252\ m^2$ ✓

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

8.2.3

$V = \frac{1}{2} b \times h \times l$
$V = \frac{1}{2}(20{,}616)(4)(12)$ ✓
$V = 494{,}784\ m^3$ ✓

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

(3 × 2) (6)

8.3 The amount of money saved:
$= R12\ 588 - R10\ 999$
$= R1\ 589$ ✓

The percentage of money saved:
$= \frac{1\ 589}{12\ 588} \times 100$ ✓
$= 12{,}623\%$ ✓

Instructions:
- 1 mark for R1 589
- 1 mark for calculation
- 1 mark for percentage
(do not allocate mark if the % symbol is not indicated)

(3)
[11]

TOTAL: 100

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