



**higher education
& training**

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

MARKING GUIDELINE

**NATIONAL CERTIFICATE
NOVEMBER EXAMINATION
MATHEMATICS N1**

21 NOVEMBER 2016

This marking guideline consists of 7 pages.

QUESTION 1

1.1	1.1.1	3		
	1.1.2	-2		
	1.1.3	x		
	1.1.4	7		
	1.1.5	Constant		
			(5 × 1)	(5)
1.2	1.2.1	243✓		(1)
	1.2.2	3✓		(1)
	1.2.3	5✓		(1)
	1.2.4	$3^5 = 243$ ✓✓		(2)
				[10]

QUESTION 2

2.1	2.1.1	$-6(a^0b^2)^3 \times \sqrt[5]{\frac{32b^{15}}{b^5}}$ $= -6(b^6) \times \left(\frac{2^5b^{15}}{b^5}\right)^{\frac{1}{5}} \checkmark \checkmark$ $= -6b^6 \times \frac{2b^3}{b} \checkmark$ $= -6b^6 \times 2b^2$ $= -12b^8 \checkmark$		(4)
	2.1.2	$\left[\left(\frac{1}{3}\right)^3\right]^{-2}$ $= \left[\frac{1}{27}\right]^{-2} \checkmark$ $= [27]^2 \checkmark$ $= 729 \checkmark$		(3)
2.2		$2(x - y) - [2x + 2(x - y)]$ $= 2x - 2y - [2x + 2x - 2y] \checkmark$ $= 2x - 2y - [4x - 2y] \checkmark$ $= 2x - 2y - 4x + 2y \checkmark$ $= -2x \checkmark$		(3)

$$\begin{aligned}
 2.3 \quad & 8 \log_e \sqrt{e} + \log_2 16 - (\log_{10} 25 + \log_{10} 4) \\
 & = 8 \bullet \frac{1}{2} \log_e e + 4 \log_2 2 - \log_{10} (25 \times 4) \checkmark \\
 & = 4 \log_e e + 4 \log_2 2 - \log_{10} 100 \checkmark \\
 & = 4 \log_e e + 4 \log_2 2 - 2 \log_{10} 10 \checkmark \\
 & = 4(1) + 4(1) - 2(1) \\
 & = 6 \checkmark
 \end{aligned} \tag{4}$$

$$\begin{aligned}
 2.4 \quad & x = \frac{0,38 \times \sqrt{0,47}}{0,55} \\
 \log x & = \log \frac{0,38 \times \sqrt{0,47}}{0,55} \\
 & = \log 0,38 + \frac{1}{2} \log 0,47 - \log 0,55 \checkmark \\
 & = -0,420 + (-0,164) - (-0,259) \checkmark \\
 \log x & = -0,325 \checkmark \\
 x & = 0,473 \checkmark
 \end{aligned} \tag{4}$$

[18]

QUESTION 3

$$\begin{array}{r}
 3.1 \quad \quad \quad x^2 + 2x + 5 \checkmark \checkmark \checkmark \\
 \begin{array}{r}
 x^3 + 0x^2 + x - 5 \\
 \underline{x - 2x^3 - 2x^2 \checkmark} \\
 2x^2 + x \\
 \underline{2x^2 - 4x \checkmark} \\
 5x - 5 \\
 \underline{5x - 10 \checkmark} \\
 5 \checkmark
 \end{array} \\
 \therefore (x - 2)(x^2 + 2x + 5) \text{ remainder } 5
 \end{array} \tag{7}$$

$$\begin{aligned}
 3.2 \quad & 87pd - 64bc - 70qr \\
 & (-) - 68pd + 47bc + 94qr \\
 & \underline{155pd - 111bc - 164qr \checkmark \checkmark \checkmark}
 \end{aligned} \tag{3}$$

$$\begin{aligned}
 3.3 \quad 3.3.1 \quad & 24x^3 y^4 z^2 - 16x^2 y^3 z - 8xy^2 \\
 & = 8xy^2 (3x^2 y^2 z^2 - 2xyz - 1) \checkmark \checkmark \checkmark \checkmark
 \end{aligned} \tag{4}$$

$$\begin{aligned}
 3.3.2 \quad & x^3 - xy - 2x^2 + 2y \\
 & = (x^3 - 2x^2) + (-xy + 2y) \checkmark \checkmark \\
 & = x^2(x - 2) - y(x - 2) \checkmark \\
 & = (x^2 - y)(x + 2) \checkmark \checkmark
 \end{aligned} \tag{5}$$

$$\begin{aligned}
 3.4 \quad 36x^6y^3z^2 &= 2 \times 2 \times 3 \times 3x^6y^3z^2 \checkmark \\
 70x^2y^2z &= 2 \times 5 \times 7x^2y^2z \checkmark \\
 20x^4yz^3 &= 2 \times 2 \times 5x^4yz^3 \checkmark
 \end{aligned}
 \tag{3}$$

$$\begin{aligned}
 3.4.1 \quad 2 \times 2 \times 3 \times 3 \times 5 \times 7x^6y^3z^3 \\
 1260x^6y^3z^3 \checkmark \checkmark
 \end{aligned}
 \tag{2}$$

$$\begin{aligned}
 3.4.2 \quad 2x^2yz \checkmark \checkmark
 \end{aligned}
 \tag{2}$$

[26]**QUESTION 4**

$$\begin{aligned}
 4.1 \quad -4(x-3) - 5 &= 3(x-7) \\
 &= -4x + 12 - 5 = 3x - 21 \checkmark \checkmark \\
 -4x - 3x &= -21 - 7 \checkmark \\
 -7x &= -28 \checkmark \\
 x &= 4 \checkmark
 \end{aligned}
 \tag{5}$$

$$\begin{aligned}
 4.2 \quad T &= 2\pi \sqrt{\frac{p}{g}} \\
 \frac{T}{2\pi} &= \sqrt{\frac{p}{g}} \checkmark \\
 \left(\frac{T}{2\pi}\right)^2 &= \frac{p}{g} \checkmark \\
 \frac{T^2}{4\pi^2} &= \frac{p}{g} \\
 4p\pi^2 &= gT^2 \checkmark \\
 \therefore p &= \frac{gT^2}{4\pi^2} \checkmark
 \end{aligned}
 \tag{4}$$

$$\begin{aligned}
 4.3 \quad x + 18 &= 3x - 8 \checkmark \\
 x - 3x &= -18 - 8 \checkmark \\
 -2x &= -26 \\
 x &= 13 \checkmark \\
 \text{The number is } &13
 \end{aligned}
 \tag{3}$$

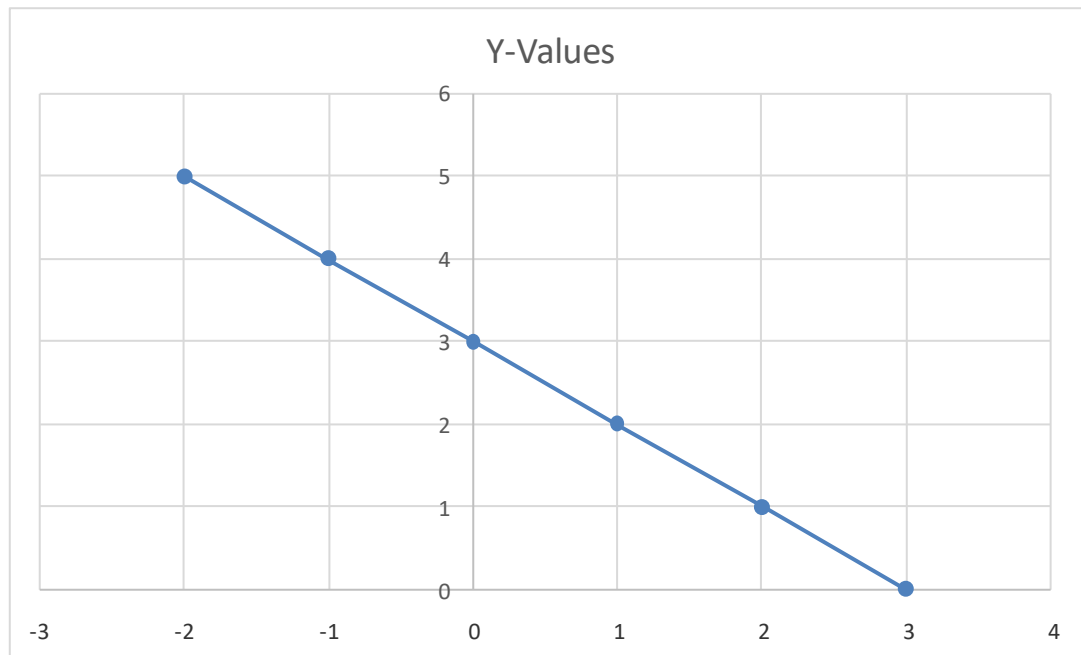
[12]

QUESTION 5

- 5.1 5.1.1 Straight line
 5.1.2 Negative
 5.1.3 Rectangular hyperbola
 5.1.4 No y -intercept
 5.1.5 Second and fourth

(5 × 1) (5)

5.2



x	-2	-1	0	1	2	3	4
y	5	4	3	2	1	0	-1

(Half a mark each)

(5)
[10]**QUESTION 6**

- 6.1 $68^\circ + x + \angle ACB = 180^\circ$ Sum of interior angle of a triangle = 180° ✓
 $68^\circ + x + x = 180^\circ$ $AB = BC$ isosceles triangles
 $68^\circ + 2x = 180^\circ$
 $2x = 180^\circ - 68^\circ$ ✓
 $\frac{2x}{2} = \frac{112^\circ}{2}$ ✓
 $\therefore x = 56^\circ$ ✓

(4)

$$\begin{aligned}
 6.2 \quad \frac{AB}{ED} &= \frac{AC}{EF} = \frac{BC}{DF} \\
 \frac{16}{24} &= \frac{12}{18} = \frac{14}{21} \checkmark \\
 &= \frac{2}{3} \checkmark \\
 \therefore \Delta ABC &\text{ /// } \Delta EDF \text{ as the sides are in the same ration} \checkmark
 \end{aligned}
 \tag{3}$$

$$\begin{aligned}
 6.3 \quad (26)^2 &= (20)^2 + x^2 \\
 \therefore x^2 &= (26)^2 - (20)^2 \checkmark \\
 &= 676 - 400 \\
 x &= 276 \\
 x &= 2\sqrt{69} \text{ or } 16,6 \checkmark
 \end{aligned}
 \tag{2}$$

[9]

QUESTION 7

$$\begin{aligned}
 7.1 \quad (\sqrt{2})^2 \sin^2 A \cdot \tan A - \sqrt{3} \cdot \tan D \\
 = (\sqrt{2})^2 \sin^2 45^\circ \cdot \tan 45^\circ - \sqrt{3} \cdot \tan 60^\circ \checkmark \checkmark \\
 = (\sqrt{2})^2 \cdot \left(\frac{1}{\sqrt{2}}\right)^2 \cdot \frac{1}{1} - \sqrt{3} \cdot \frac{\sqrt{3}}{1} \checkmark \checkmark \\
 = 2 \cdot \frac{1}{2} \cdot 1 - 3 \checkmark \\
 = 1 - 3 \\
 = -2 \checkmark
 \end{aligned}
 \tag{6}$$

$$\begin{aligned}
 7.2 \quad 7.2.1 \quad \text{Perimeter} &= AC^2 + BC + AB \checkmark \\
 AD^2 &= AC^2 - DC^2 \\
 &= 25 - 9 \\
 &= 16 \text{ cm}^2 \checkmark \\
 AD &= 4 \text{ cm} \\
 \text{If } AD &= 4 \text{ cm} \\
 \Delta ADB \quad BD &= 10 - 3 = 7 \text{ cm} \\
 AB^2 &= AD^2 + DB^2 \\
 &= (4)^2 + (7)^2 \\
 &= 16 + 49 \\
 &= 65 \text{ cm}^2 \checkmark \\
 AB &= 8,062 \text{ cm} \checkmark \\
 \text{Perimeter} &= 5 + 10 + 8,062 \\
 &= 23,062 \text{ cm} \checkmark
 \end{aligned}
 \tag{5}$$

7.2.2

$$\begin{aligned}\text{Area} &= \frac{1}{2}bh \checkmark \\ &= \frac{1}{2}(10) \times 4 \checkmark \checkmark \\ &= 20 \text{ cm}^2 \checkmark\end{aligned}$$

(4)
[15]**TOTAL: 100**