



higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

MARKING GUIDELINE

NATIONAL CERTIFICATE

MATHEMATICS N2

19 November 2024

This marking guideline consists of 8 pages.

QUESTION 1

1.1 Let k = the number

$$\Rightarrow 6k - 9 = -75 \checkmark$$

$$\Rightarrow 6k = -66$$

$$\Rightarrow k = -11 \checkmark$$

NOTE: Any variable should be accepted for the number.

(2)

1.2 $(3 - 5x)^2 = (2x + 2)^2$
 $\Rightarrow 21x^2 - 38x + 5 = 0 \checkmark$

$$\Rightarrow x = \frac{38 \pm \sqrt{(-38)^2 - 4(21)(5)}}{2(21)} \checkmark$$

$$\Rightarrow x = \frac{5}{3} = 1.667 \checkmark \text{ or } x = \frac{1}{7} = 0.143 \checkmark$$

(4)

1.3 $d + 2p = 1500$ ----- (Eq1)

ALTERNATIVE

$$4d + 3p = 4500$$
 ----- (Eq2) $\checkmark$

$$4d + 8p = 6000$$
 ----- (Eq1) $\times 4 \checkmark$

$$(Eq1) \Rightarrow p = 1500 - 2p$$
 ----- (Eq3) $\checkmark$

$$4d + 3p = 4500$$
 ----- (Eq2)

(Eq3) into (Eq2)

$$(Eq1) - (Eq2)$$

$$\Rightarrow 4(1500 - 2p) + 3p = 4500$$

$$\Rightarrow 5p = 1500 \checkmark$$

$$\Rightarrow p = R300.00 \checkmark$$

$$\Rightarrow p = \frac{1500}{5} = R300.00 \checkmark$$

$$(Eq3) \Rightarrow d = R900.00 \checkmark$$

$$(Eq2) \Rightarrow d = \frac{4500 - 3(300)}{4}$$

Note: Accept any other method

$$= R900.0 \checkmark$$

(4)

1.4 1.4.1 $\frac{T^2}{t} = \frac{x^2}{q} - \frac{y^2}{c}$

$$\Rightarrow \frac{y^2}{c} = \frac{x^2}{q} - \frac{T^2}{t} \checkmark$$

$$\Rightarrow y^2 = c \left(\frac{x^2}{q} - \frac{T^2}{t} \right) \checkmark$$

$$\Rightarrow y = \sqrt{c \left(\frac{x^2}{q} - \frac{T^2}{t} \right)} \checkmark$$

(3)

1.4.2

$$y = \sqrt{-5 \left(\frac{(1.2)^2}{5} - \frac{(5.2)^2}{7} \right)} = 4.228 \quad \checkmark$$

(1)

[14]

QUESTION 2

2.1

2.1.1

$$\begin{aligned} \frac{6x+3}{x^2-8x+16} \div \frac{4x^2-1}{x^2-5x+4} \times \frac{x-4}{6x-6} \\ = \frac{3(2x+1)\checkmark}{(x-4)(x-4)\checkmark} \times \frac{(x-4)(x-1)\checkmark}{(2x-1)(2x+1)\checkmark} \times \frac{x-4}{6(x-1)\checkmark} \\ = \frac{1}{2(2x-1)} \quad \checkmark \end{aligned}$$

(6)

2.1.2

$$\begin{aligned} \frac{a}{2a^2-3ab+b^2} - \frac{b}{2a^2+ab-b^2} + \frac{1}{a+b} \\ = \frac{a}{(2a-b)(a-b)\checkmark} - \frac{b}{(2a-b)(a+b)\checkmark} + \frac{1}{a+b} \\ = \frac{a(a+b) - b(a-b) + (2a-b)(a-b)\checkmark}{(2a-b)(a-b)(a+b)\checkmark} \\ = \frac{a^2+ab-ab+b^2+2a^2-2ab-ab+b^2\checkmark}{(2a-b)(a-b)(a+b)} \\ = \frac{3a^2-3ab+2b^2\checkmark}{(2a-b)(a-b)(a+b)} \end{aligned}$$

(6)

2.2

2.2.1

$$mn^2 + mn - 5n^2 - 5n = n(n+1)(m-5) \quad \checkmark \checkmark \checkmark$$

$$3m - 15 = 3(m-5) \quad \checkmark \checkmark$$

(5)

2.2.2

$$\text{HCF} = m - 5 \quad \checkmark$$

$$\text{LCM} = 3n(n+1)(m-5) \quad \checkmark \checkmark$$

(3)

[20]

QUESTION 3

3.1 3.1.1 $\frac{1}{8} = \left(\frac{1}{16}\right)^{3-2n} \times (32)^{4-2n}$
 $\Rightarrow 2^{-3} = (2^{-4})^{3-2n} \times (2^5)^{4-2n} \checkmark$
 $\Rightarrow 2^{-3} = 2^{-12+8n+20-10n} \checkmark$
 $\Rightarrow -3 = -12 + 8n + 20 - 10n \checkmark$
 $\Rightarrow n = \frac{11}{2} = 5.5 \checkmark$ (4)

3.1.2 $1 + (\log n)^3 = 9$
 $\Rightarrow (\log n)^3 = 8 \checkmark$
 $\Rightarrow \log n = 2 \checkmark$
 $\Rightarrow n = 10^2 = 100 \checkmark$ (3)

3.2 $\log \frac{6}{25} = \log 6 - \log 25 \checkmark$
 $= \log(3 \times 2) - \log 5^2 \checkmark$
 $= \log 3 + \log 2 - 2 \log 5 \checkmark$
 $= 0.477 + 0.301 - 2(0.699) \checkmark$
 $= -0.62$ (4)

3.3 $\log m = 5 \log 9.18 + \log 3.89 - \frac{1}{3} \log 237.4 \checkmark$
 $= 4.8142 + 0.5899 - 0.7918$
 $= 4.6123 \checkmark$
 $\Rightarrow m = 10^{4.6123} = 40954.346 \checkmark$ (3)

[14]

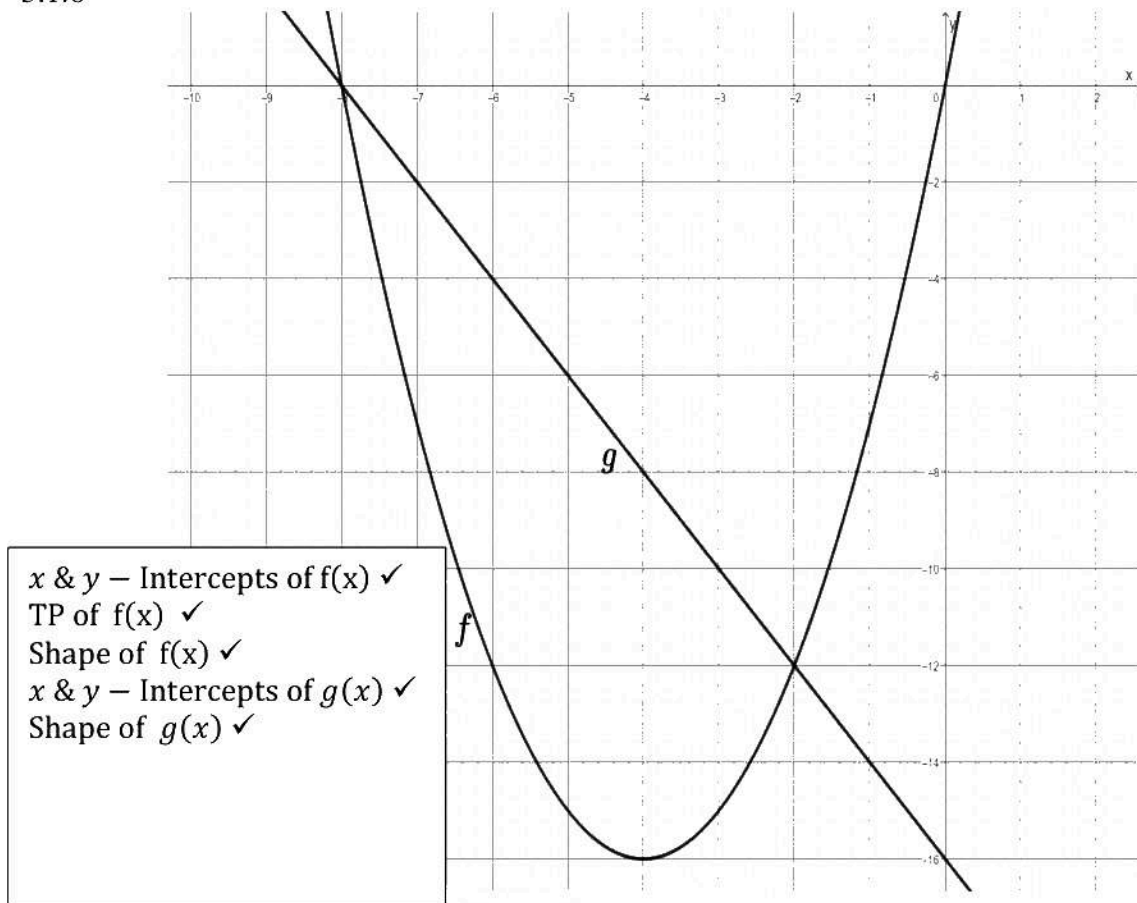
QUESTION 4

- 4.1 4.1.1 $V_l = \frac{2}{3}\pi r^3$
 $\Rightarrow V_l = \frac{2}{3}\pi(16)^3 \quad \checkmark$
 $\Rightarrow V_l = \frac{8192}{3}\pi = 8578.642 \text{ cm}^3 \quad \checkmark$
- 4.1.2 $V_c = \pi r^2 h$
 $\Rightarrow V_c = \pi(16)^2 \times 50 \quad \checkmark$
 $\Rightarrow V_c = 12800\pi = 40212.386 \text{ cm}^3 \checkmark$
- 4.1.3 $V = 8578.642 \text{ cm}^3 + 40212.386 \text{ cm}^3 \quad \checkmark$
 $= 48791.028 \text{ cm}^3 \quad \text{OR} \quad \frac{46592}{3}\pi \text{ cm}^3 \quad \checkmark$
- 4.1.4 $SA = 2\pi r^2 + \pi r^2 + 2\pi r h$
 $SA = 2\pi(16)^2 + \pi(16)^2 + 2\pi(16)(50) \quad \checkmark$
 $SA = 2368\pi \text{ cm}^2 \quad \text{OR} \quad 7439.291 \text{ cm}^2 \checkmark$
- (4 × 2) (8)
- 4.2 $\text{Area} = \left[\frac{4+9}{2} + 6 + 8 + 11 + 17 + 12 + 10 \right] \times 2.5 \quad \checkmark$
 $= \frac{705}{4} \quad \text{OR} \quad 176.25(\text{units})^2 \quad \checkmark$
- (4)
[12]

QUESTION 5

- 5.1 5.1.1 No, $\checkmark$ since $-6 \neq (-3)^2 + 8(-3) = -15 \checkmark$ (2)
- 5.1.2 $y = 0 \quad \checkmark$ (1)
- 5.1.3 $x^2 + 8x = 0$
 $\Rightarrow x = 0 \checkmark \quad \text{OR} \quad x = -8 \quad \checkmark$ (2)
- 5.1.4 $x = \frac{-(8)}{2(1)} = -4 \quad \checkmark$ (1)
- 5.1.5 $y = (-4)^2 + 8(-4) = -16 \quad \checkmark$ (1)

5.1.6



(3)

5.2 5.2.1 See 5.1.6 above

(2)

5.2.2 $(-8; 0)$ ✓ and $(-2; -12)$ ✓

(2)

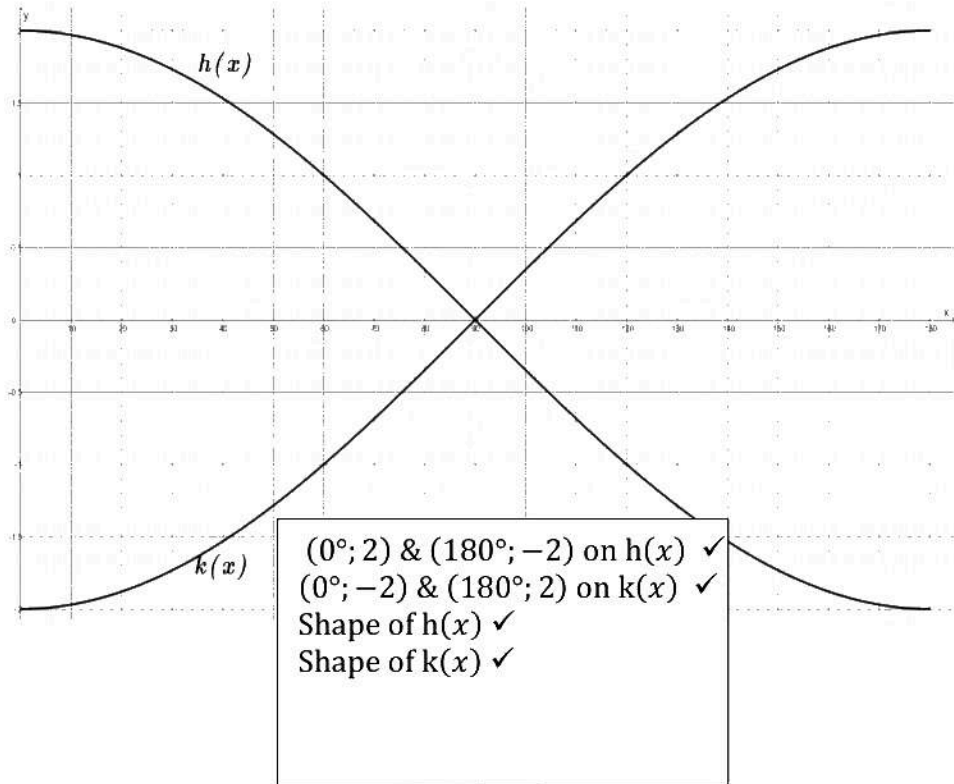
5.3 5.3.1

x	0°	30°	60°	90°	120°	150°	180°
$h(x)$	2	1.732	1	0	-1	-1.732	-2
$k(x)$	-2	-1.732	-1	0	1	1.732	2

NOTE: 1 mark for any 5 correct values ✓✓

(2)

5.3.2



(4)
[20]

QUESTION 6

6.1 One radian is the angle made at the centre of a circle by an arc whose length is equal to the radius of the circle.

(1)

6.2 6.2.1 $A = \frac{1}{2}r^2\theta$

$$\Rightarrow 64 = \frac{1}{2}r^2 \times 2r \checkmark$$

$$\Rightarrow 64 = r^3 \checkmark$$

$$\Rightarrow r = 4 \text{ cm} \checkmark$$

(3)

6.2.2 $\theta = 2r = 2 \times 4 = 8 \text{ rads}$

(1)

6.2.3 $l = r\theta = 4 \times 8 = 32 \text{ cm}$

(1)

6.3 6.3.1 $R = \frac{700}{2000} = 0.35 \text{ m} = \frac{7}{20} \text{ m} \checkmark$

$$\Rightarrow v = \omega R = 80 \times 0.35 = 28 \text{ m/s} \checkmark$$

(2)

6.3.2 $s = vt = 28(9 \times 60) = 15120 \text{ m}$

(1)

$$\begin{aligned}
 6.4 \quad D &= \frac{x^2}{4h} + h \\
 \Rightarrow 15 &= \frac{x^2}{4(10)} + 10 \quad \checkmark \\
 \Rightarrow 200 &= x^2 \quad \checkmark \\
 \Rightarrow x &= \sqrt{200} = 10\sqrt{2} \text{ cm} = 14.142 \text{ cm} \quad \checkmark
 \end{aligned} \tag{3}$$

$$\begin{aligned}
 6.5 \quad 6.5.1 \quad \cos 63^\circ &= \frac{BC}{72} \quad \checkmark \\
 \Rightarrow BC &= 72 \cos 63^\circ = 32.687 \text{ cm} \quad \checkmark
 \end{aligned}$$

$$\begin{aligned}
 6.5.2 \quad \sin 63^\circ &= \frac{AB}{72} \quad \checkmark \\
 \Rightarrow AB &= 72 \sin 63^\circ = 64.152 \text{ cm} \quad \checkmark
 \end{aligned}$$

$$\begin{aligned}
 \text{ALTERNATIVE} \\
 AB &= \sqrt{(72)^2 - (32.687)^2} \quad \checkmark \\
 &= 64.153 \text{ cm} \quad \checkmark
 \end{aligned}$$

$$\begin{aligned}
 6.5.3 \quad \hat{A} &= 180^\circ - 63^\circ - 90^\circ = 27^\circ \quad \checkmark \\
 \therefore \tan \hat{A} &= \frac{32.687}{64.153} = 0.510 \quad \checkmark
 \end{aligned}$$

(3 × 2) (6)

$$\begin{aligned}
 6.6 \quad y &= \sqrt{5^2 - (\sqrt{3})^2} = \sqrt{22} \quad \checkmark \\
 \Rightarrow \tan \theta &= \frac{\sqrt{22}}{\sqrt{3}} \quad \checkmark
 \end{aligned}$$

(2)
[20]

TOTAL: 100