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.

Copyright reserved

QUESTION 1

1.1 Let $k =$ the number

$\Rightarrow 6k - 9 = -75$ ✓

$\Rightarrow 6k = -66$

$\Rightarrow \ k = -11$ ✓

NOTE: Any variable should be accepted for the number. (2)

1.2 $(3 - 5x)^2 = (2x + 2)^2$

$\Rightarrow 21x^2 - 38x + 5 = 0$ ✓

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

$$\Rightarrow x = \frac{5}{3} = 1.667 \checkmark \ or \ \ x == \frac{1}{7} = 0.143 \checkmark$$ (4)

1.3

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

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

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

$(Eq3) \ into \ (Eq2)$

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

$\Rightarrow p =$ R300.00 ✓

$(Eq3) \ \Rightarrow d =$ R900.00 ✓

Note: Accept any other method

ALTERNATIVE

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

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

$(Eq1) - (Eq2)$

$\Rightarrow 5p = 1500$ ✓

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

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

$=$ R900.0✓ (4)

1.4 1.4.1

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

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

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

$$\Rightarrow y = \sqrt{c\left(\frac{x^2}{q} - \frac{\mathrm{T}^2}{t}\right)}$$ ✓ (3)

1.4.2 $y = \sqrt{-5\left(\frac{(1.2)^2}{5} - \frac{(5.2)^2}{7}\right)} = 4.228$ ✓ (1)

[14]

QUESTION 2

2.1 2.1.1 $\frac{6x+3}{x^2-8x+16} \div \frac{4x^2-1}{x^2-5x+4} \times \frac{x-4}{6x-6}$

$= \frac{3(2x+1)✓}{(x-4)(x-4)✓} \times \frac{(x-4)(x-1)✓}{(2x-1)(2x+1)✓} \times \frac{x-4}{6(x-1)✓}$

$= \frac{1}{2(2x-1)}$ ✓ (6)

2.1.2 $\frac{a}{2a^2-3ab+b^2} - \frac{b}{2a^2+ab-b^2} + \frac{1}{a+b}$

$= \frac{a}{(2a-b)(a-b)✓} - \frac{b}{(2a-b)(a+b)✓} + \frac{1}{a+b}$

$= \frac{a(a+b)-b(a-b)+(2a-b)(a-b)✓}{(2a-b)(a-b)(a+b)✓}$

$= \frac{a^2+ab-ab+b^2+2a^2-2ab-ab+b^2✓}{(2a-b)(a-b)(a+b)}$

$= \frac{3a^2-3ab+2b^2✓}{(2a-b)(a-b)(a+b)}$ (6)

2.2 2.2.1 $mn^2 + mn - 5n^2 - 5n = \mathrm{n(n+1)(m-5)}$ ✓✓✓

$3\,m - 15 = 3(m-5)$ ✓✓ (5)

2.2.2 $\mathrm{HCF} = m - 5$ ✓

$\mathrm{LCM} = 3\mathrm{n(n+1)(m-5)}$ ✓✓ (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

$$1 + (\log n)^3 = 9$$

$$\Rightarrow (\log n)^3 = 8 \checkmark$$

$$\Rightarrow \log n = 2 \checkmark$$

$$\Rightarrow \text{n} = 10^2 = 100 \checkmark$$ (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 $V_l = \frac{2}{3}\pi r^3$

$\Rightarrow V_l = \frac{2}{3}\pi(16)^3$ ✓

$\Rightarrow V_l = \frac{8192}{3}\pi = 8578.642\ cm^3$ ✓

4.1.2 $V_c = \pi r^2 h$

$\Rightarrow V_c = \pi(16)^2 \times 50$ ✓

$\Rightarrow V_c = 12800\,\pi = 40212.386\ cm^3$ ✓

4.1.3 $V = 8578.642\ cm^3 + 40212.386\ cm^3$ ✓

$= 48791.028\ cm^3$ **OR** $\frac{46592}{3}\pi cm^3$ ✓

4.1.4 $SA = 2\pi r^2 + \pi r^2 + 2\pi rh$

$SA = 2\pi(16)^2 + \pi(16)^2 + 2\pi(16)(50)$ ✓

$SA = 2368\pi cm^2$ **OR** $7439.291\ cm^2$ ✓

(4 × 2) (8)

4.2 $\text{Area} = \left[\frac{4+9}{2}\checkmark + 6 + 8 + 11 + 17 + 12 + 10\checkmark\right] \times 2.5$ ✓

$= \frac{705}{4}$ **OR** $176.25(units)^2$ ✓

(4)
[12]

QUESTION 5

5.1 5.1.1 No, ✓ since $-6 \neq (-3)^2 + 8(-3) = -15$ ✓ (2)

5.1.2 $y = 0$ ✓ (1)

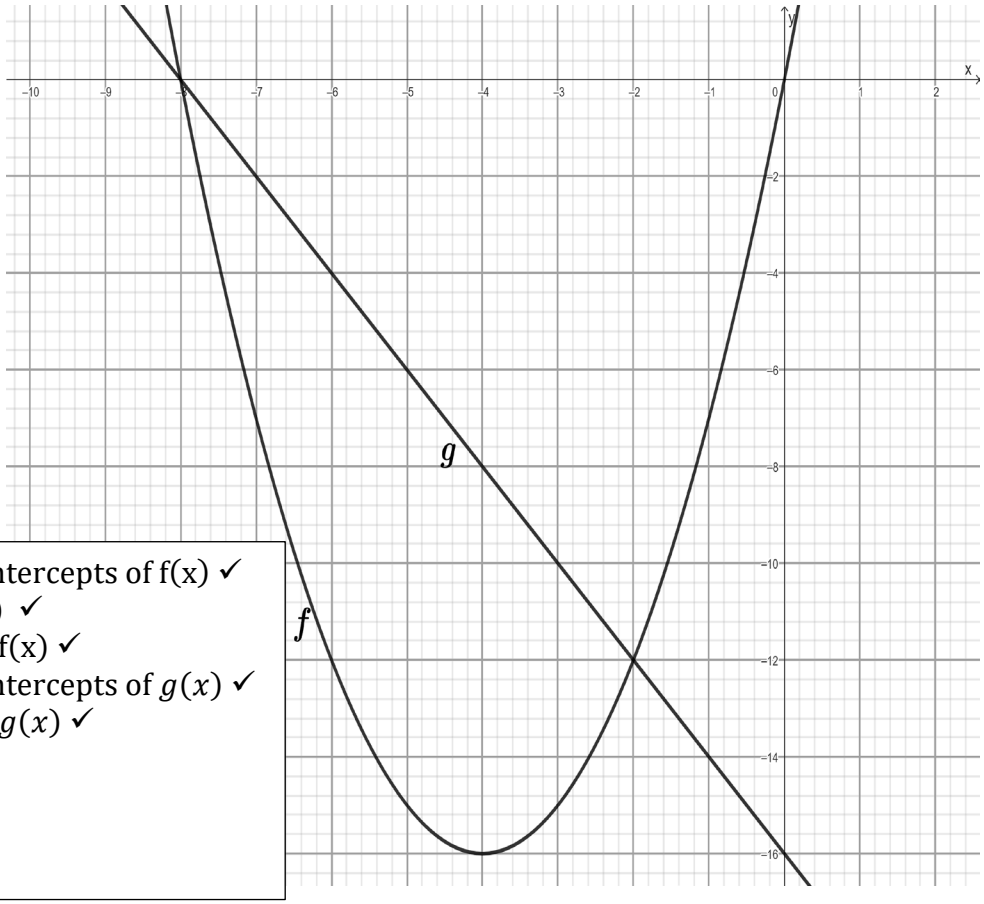
5.1.3 $x^2 + 8x = 0$

$\Rightarrow x = 0$ ✓ **OR** $x = -8$ ✓ (2)

5.1.4 $x = \frac{-(8)}{2(1)} = -4$ ✓ (1)

5.1.5 $y = (-4)^2 + 8(-4) = -16$ ✓ (1)

5.1.6



x & $y-$ Intercepts of f(x) ✓
TP of f(x) ✓
Shape of f(x) ✓
x & $y-$ Intercepts of $g(x)$ ✓
Shape of $g(x)$ ✓

(3)

5.2 5.2.1 See 5.1.6 above (2)

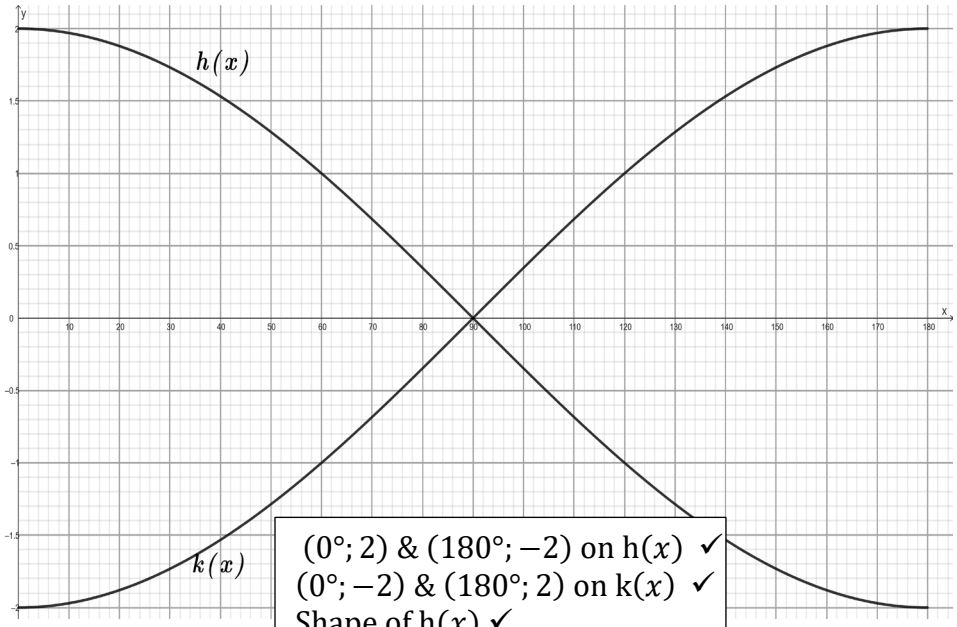
5.2.2 $(-8;0)$✓ and $(-2;-12)$✓ (2)

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



$(0°; 2)$ & $(180°; -2)$ on $h(x)$ ✓
$(0°; -2)$ & $(180°; 2)$ on $k(x)$ ✓
Shape of $h(x)$ ✓
Shape of $k(x)$ ✓

(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

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

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

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

$$\Rightarrow r = 4\,cm \checkmark$$ (3)

6.2.2 $\theta = 2r = 2 \times 4 = 8\,rads$ (1)

6.2.3 $l = r\theta = 4 \times 8 = 32\,cm$ (1)

6.3 6.3.1

$$R = \frac{700}{2000} = 0.35\,m = \frac{7}{20}m \checkmark$$

$$\Rightarrow v = \omega R = 80 \times 0.35 = 28\,m/s \checkmark$$ (2)

6.3.2 $s = vt = 28(9 \times 60) = 15120\,m$ (1)

6.4 $D = \frac{x^2}{4h} + h$

$\Rightarrow 15 = \frac{x^2}{4(10)} + 10$ ✓

$\Rightarrow 200 = x^2$ ✓

$\Rightarrow x = \sqrt{200} = 10\sqrt{2}\ cm = 14.142\ cm$ ✓ (3)

6.5 6.5.1 $\cos 63° = \frac{\text{BC}}{72}$ ✓

$\Rightarrow \text{BC} = 72 \cos 63° = 32.687 \text{ cm}$ ✓

6.5.2 $\sin 63° = \frac{\text{AB}}{72}$ ✓

$\Rightarrow \text{AB} = 72 \sin 63° = 64.152 \text{ cm}$✓

ALTERNATIVE

$\text{AB} = \sqrt{(72)^2 - (32.687)^2}$ ✓

$= 64.153 \text{ cm}$✓

6.5.3 $\hat{\text{A}} = 180° - 63° - 90° = 27°$ ✓

$\therefore tan\hat{\text{A}} = \frac{32.687}{64.153} = 0.510$ ✓

(3 × 2) (6)

6.6 $y = \sqrt{5^2 - \left(\sqrt{3}\right)^2} = \sqrt{22}$ ✓

$\Rightarrow tan\theta = \frac{\sqrt{22}}{\sqrt{3}}$ ✓

(2)
[20]

TOTAL: 100

Copyright reserved