



**higher education  
& training**

Department:  
Higher Education and Training  
**REPUBLIC OF SOUTH AFRICA**

# **MARKING GUIDELINE**

**NATIONAL CERTIFICATE (VOCATIONAL)**

**MATHEMATICS**

(First paper)

**NQF LEVEL 2**

**XX February 2024**

**This marking guideline consists of 9 pages.**

## QUESTION 1

**NOTE:** Full mark ✓  
Half mark ✓

$$1.1 \quad 1.1.1 \quad 0,032 = \frac{32}{1000} = \frac{4}{125} \quad \checkmark\checkmark \quad (2)$$

$$1.1.2 \quad 32.\dot{4}3\dot{5}$$

$$x = 32.\dot{4}3\dot{5} \dots \dots \dots (A)$$

$$1000x = 32435.\dot{4}3\dot{5} \dots \dots \dots (B) \quad \checkmark$$

$$(B) - (A): 999x = 32403 \quad \checkmark$$

$$x = \frac{32403}{999}$$

$$x = \frac{10801}{333} \quad \checkmark \quad (3)$$

$$1.2 \quad 1.2.1 \quad \frac{\sqrt{16p^4} \times (p^4q^4)^0}{(2p)^2}$$

$$= \frac{4p^2 \times 1}{4p^2}$$

$$= p^0$$

$$= 1 \quad \checkmark \quad (3)$$

$$1.2.2 \quad \frac{(p^2q^2)^{2r} \times (pq^3)^{3r}}{(p^3q^3)^{2r}}$$

$$= \frac{p^{4r}q^{4r} \times p^{3r}q^{9r}}{p^{6r}q^{6r}}$$

$$= \frac{p^{4r+3r}q^{4r+9r}}{p^{6r}q^{6r}}$$

$$= \frac{p^{7r}q^{13r}}{p^{6r}q^{6r}}$$

$$= p^{7r-6r}q^{13r-6r}$$

$$= p^r q^{7r} \quad \checkmark \quad (3)$$

$$1.3 \quad \frac{-\sqrt{125} + 6\sqrt{80} + \sqrt{20}}{21\sqrt{5}}$$

$$= \frac{-\sqrt{5 \times 25} + 6\sqrt{5 \times 16} + \sqrt{4 \times 5}}{21\sqrt{5}} \quad \checkmark$$

$$= \frac{-5\sqrt{5} + 24\sqrt{5} + 2\sqrt{5}}{21\sqrt{5}}$$

$$= \frac{21\sqrt{5}}{21\sqrt{5}} \quad \checkmark$$

$$= 1 \quad \checkmark \quad (4)$$

1.4

$$\frac{7}{1 - \sqrt{8}}$$

$$= \frac{7}{1 - \sqrt{8}} \times \frac{1 + \sqrt{8}}{1 + \sqrt{8}} \quad \checkmark$$

$$= \frac{7(1 + \sqrt{8})}{1 + \sqrt{8} - \sqrt{8} - 8} \quad \checkmark$$

$$= \frac{7(1 + \sqrt{8})}{-7} \quad \checkmark$$

$$= -1 - \sqrt{8} \quad \checkmark \tag{4}$$

1.5 1.5.1

$$S = \frac{r}{2} (a + b) \dots \dots \dots (b)$$

$$2S = r (a + b) \quad \checkmark$$

$$2S = ar + br \quad \checkmark$$

$$2S - ar = br \quad \checkmark$$

$$\therefore b = \frac{2S - ar}{r} \quad \checkmark \tag{3}$$

1.5.2

$$b = \frac{2S - ar}{r}$$

$$= \frac{2(10) - (2)(12)}{12} \quad \checkmark \quad \text{Student can substitute into any variation of the equation.}$$

$$= \frac{-4}{12} = -\frac{1}{3} \quad \checkmark \tag{2}$$

1.6 Given:  $T_6 = 38$  and  $d = 3$

$$T_n = a + (n - 1)d$$

$$T_6 = a + (6 - 1)d \quad \checkmark$$

$$38 = a + (5)(3) \quad \checkmark$$

$$38 = a + 15$$

$$a = 38 - 15 \quad \checkmark$$

$$a = 23 \quad \checkmark$$

$$T_{12} = 23 + (12 - 1)3 \quad \checkmark$$

$$= 23 + (11)(3)$$

$$= 56 \quad \checkmark$$

$\therefore$  The first term is 23 and 12th term is 56

(6)  
**[30]**

**QUESTION 2**

2.1      2.1.1       $x$ - intercepts: Let  $y = 0$   
 $0 = 12 - 3x^2$  ✓  
 $3x^2 = 12$   
 $x^2 = 4$  ✓  
 $x = \pm 2$  ✓✓      (Half mark for each  $x$ -value)      (3)

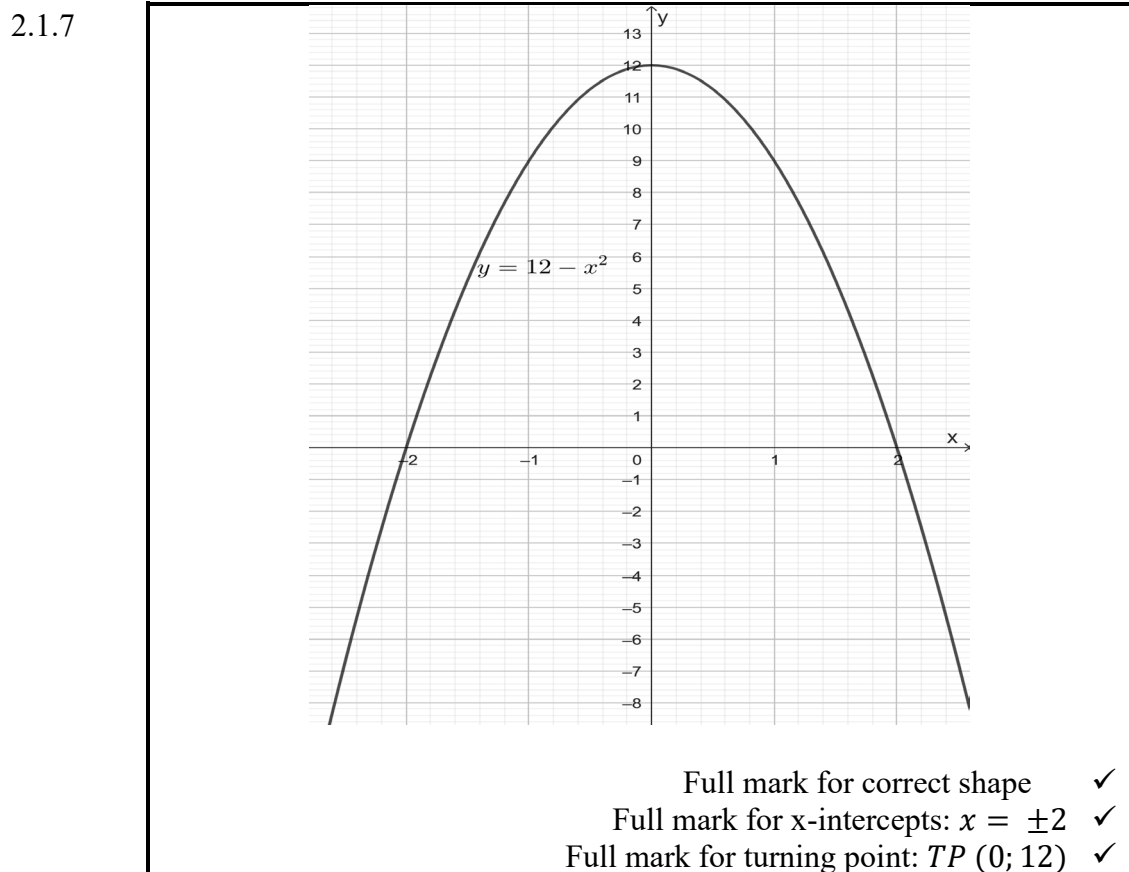
2.1.2       $y$ - intercept: Let  $x = 0$   
 $y = 12 - 3(0)^2$  ✓  
 $= 12$  ✓      (2)

2.1.3       $x = -\frac{b}{2a}$  ✓  
 $= -\frac{0}{2(-3)}$  ✓  
 $= 0$  ✓      (2)

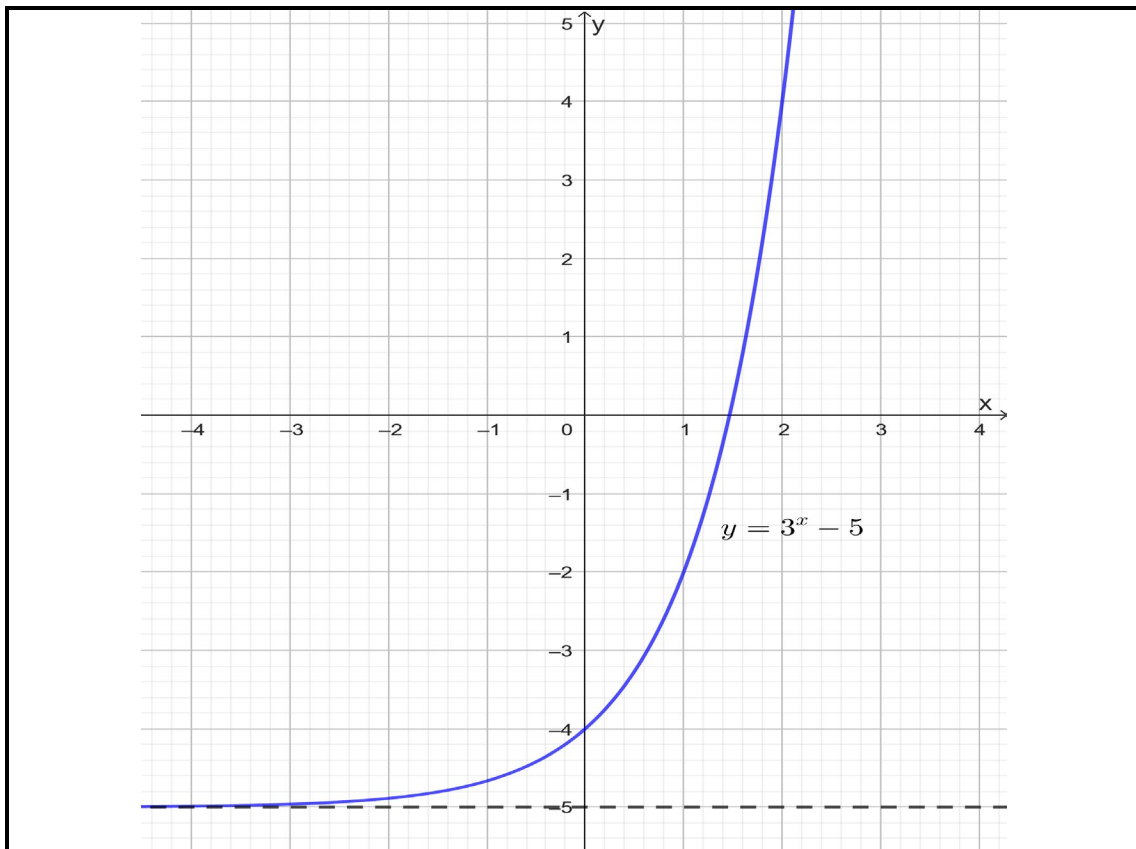
2.1.4       $y = 12 - 3(0)^2$   
 $= 12$  ✓  
 $\sqrt{\quad} \sqrt{\quad}$   
 $\therefore TP (0; 12)$       (2)

2.1.5       $(-\infty ; 12]$  ✓ or  $-\infty < y \leq 12$  ✓ or  $\{y: -\infty < y \leq 12 : y \in R\}$  ✓      (1)

2.1.6       $(-\infty ; \infty)$  ✓ or  $-\infty < x < \infty$  ✓ or  $\{x: -\infty < x < \infty : x \in R\}$  ✓      (1)



- 2.2    2.2.1    Hyperbola (1)
- 2.2.2    Domain:  $x \in (-\infty; \infty) \checkmark$  but  $x \neq 0 \checkmark$   
Range:  $y \in (-\infty; \infty) \checkmark$  but  $y \neq 3 \checkmark$  (2)
- 2.2.3    Discontinuous $\checkmark$  – the pencil cannot run over the whole graph as it has to be lifted to complete the graph. $\checkmark$  (2)
- 2.2.4    Function $\checkmark$
- It's a one-to-one function, or every x-value there is one y-value. $\checkmark$
  - The vertical line cut the graph at only one point. (Any ONE) (2)
- 2.3    One mark for the correct shape drawn  $\checkmark$   
One mark for horizontal asymptote  $\checkmark$   
One mark for intercepts  $\checkmark\checkmark$

(4)  
[25]

**QUESTION 3**

$$3.1 \quad 3.1.1 \quad 9a^2 - b^2$$

$$= (3a - b)(3a + b) \quad (2)$$

$$3.1.2 \quad -a^2 - a + 2$$

$$= -(a^2 + a - 2) \quad \text{Full mark for factoring out negative sign}$$

$$= -(a + 2)(a - 1)$$

Accept:

$$= (-a - 2)(a - 1) \quad (3)$$

$$3.1.3 \quad 2ab - 2a^2 + a - b$$

$$= -2a(a - b) + (a - b)$$

$$= (a - b)(-2a + 1) \quad (3)$$

$$3.2 \quad 3.2.1 \quad \frac{4p^2+4p}{4p} \times \frac{p-1}{1}$$

$$= \frac{4p(p+1)}{4p} \times \frac{p-1}{1} \quad \checkmark$$

$$= (p + 1)(p - 1) \quad \checkmark$$

$$= p^2 - 1 \quad \checkmark$$

Or

$$= \left(\frac{4p^2}{4p} + \frac{4p}{4p}\right) \times \frac{p-1}{1}$$

$$= (p + 1)(p - 1) \quad \checkmark$$

$$= p^2 - 1 \quad \checkmark \quad (3)$$

$$3.2.2 \quad (-2x + 3)(x^2 + 3x - 8)$$

$$= -2x^3 - 6x^2 + 16x \quad \checkmark + 3x^2 + 9x - 24 \quad \checkmark$$

$$= -2x^3 - 3x^2 + 25x - 24 \quad \checkmark \quad (3)$$

$$3.3 \quad 4.3^{x-3} = 108$$

$$3^{x-3} = 27 \quad \checkmark$$

$$3^{x-3} = 3^3 \quad \checkmark$$

$$x - 3 = 3$$

$$x = 6 \quad \checkmark \quad (3)$$

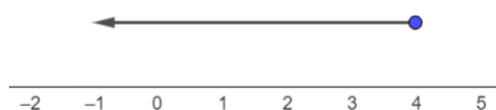
3.4  $4(x + 1) \leq 3x + 8$

$\sqrt{4x + 4 \leq 3x + 8}$

$4 \leq -x + 8 \checkmark$

$-4 \leq -x \checkmark$

$4 \geq x \checkmark \quad \text{or} \quad x \leq 4$



✓

(4)

3.5  $y = -2x + 4 \dots \dots \dots (A)$

$y = 2x + 8 \dots \dots \dots (B)$

$-2x + 4 = 2x + 8 \checkmark$

$-4x = 4 \checkmark$

$x = -1 \checkmark$

Substitute  $x = -1$  in (A)

$y = -2(-1) + 4 \checkmark$

$= 6 \checkmark$

(4)  
 [24]

**QUESTION 4**

4.1 4.1.1 H

4.1.2 D

4.1.3 A

4.1.4 B

4.1.5 C

(5 × 1) (5)

4.2 4.2.1  $R180 + (0,15 \times R180) \checkmark$   
 $= R180 + R27 \checkmark$   
 $= R207 \checkmark$

(2)

- 4.2.2  $R 60 \times 2 = R 120$  (1)
- 4.2.3  $C = R 12\ 184 - (R 7\ 150 + R 534) + R 1550 \checkmark = R 6\ 050 \checkmark$  (2)
- 4.3 4.3.1 Balance still owing =  $R 2\ 699,00 - (0,01 \times R 2\ 699,00) \checkmark$   
 $= R 2\ 699,00 - R 269,90 \checkmark$   
 $= R 2\ 429,10 \checkmark$  (2)
- 4.3.2 Total cost =  $R 269,90 + (24 \times R 177,53) \checkmark$   
 $= R 269,90 + R 4\ 260,72 \checkmark$   
 $= R 4\ 530,62 \checkmark$  (3)
- 4.4 4.4.1  $P = R 2\ 500$   
 $i = 12\ %$   
 $n = 5\ \text{years}$   
 $A = P(1 + in)$   
 $= 2\ 500[1 + (0,12 \times 5)] \checkmark$   
 $= R 4\ 000 \checkmark$  (2)
- 4.4.2  $P = R 2\ 500$   
 $i = 10\ %$   
 $n = 5\ \text{years}$   
 $A = P(1 + i)^n$   
 $= 2500(1 + 0,1)^5 \checkmark$   
 $= R 4\ 026,28 \checkmark$  (2)
- 4.4.3 Compound interest is better than simple interest because it yields more interests, which means that Bokamoso made more money than Boikgantsho.  $\checkmark$  (1)

**[20]****TOTAL: 100**