



**higher education  
& training**

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

# **MARKING GUIDELINE**

**NATIONAL CERTIFICATE (VOCATIONAL)**

**NOVEMBER EXAMINATION 2011**

**MATHEMATICS  
(First Paper)  
NQF LEVEL 2**

**7 NOVEMBER 2011**

**This marking guideline consists of 8 pages.**



## QUESTION 1

✓ = 1 MARK    ✓ =  $\frac{1}{2}$  MARK

## QUESTION 1

1.1      1.1.1      0,22  
 $= \frac{22}{100}$  ✓  
 $= \frac{11}{50}$  ✓

(1)

1.1.2      0,2 $\dot{6}$

$x = 0,2666\dots$       (1)      ✓

(1)  $\times 10$      $10x = 2,666\dots$       (2)      ✓       $\frac{1}{2}$  mark for each step

(2)  $\times 10$      $100x = 26,666\dots$       (3)      ✓      **If incorrect, no further marks**

(3)  $-$  (2)     $90x = 24$       ✓

$x = \frac{24}{90}$       ✓

$= \frac{4}{15}$       ✓

**Answer only, FULL marks**

(3)

1.2       $\frac{3}{\sqrt{7}-2}$

$= \frac{3}{\sqrt{7}-2} \times \frac{\sqrt{7}+2}{\sqrt{7}+2}$       ✓      **If conjugate is incorrect, no marks**

$= \frac{3(\sqrt{7}+2)}{7-4}$       ✓

$= \frac{3(\sqrt{7}+2)}{3}$       ✓

$= \sqrt{7}+2$       ✓

(3)

1.3      1.3.1       $4x^3y^2 \times 2x^2y^2 \times \frac{1}{4}xy$

$= 2x^6y^5$       ✓

(3)



$$\begin{aligned}
 1.3.2 \quad & \frac{(2xy^2)^3 \times (4x^3y)^2}{4^2 x^{10} y^2 \times 2x^4 y^4} \\
 & \quad \quad \quad \checkmark \quad \quad \quad \checkmark \\
 & = \frac{2^3 x^3 y^6 \times 2^4 x^6 y^2}{2^4 x^{10} y^2 \times 2x^4 y^4} \\
 & = \frac{2^7 x^9 y^8}{2^5 x^{14} y^6} \quad \checkmark \\
 & = 2^2 x^{-5} y^2 \quad \checkmark \\
 & = \frac{4y^2}{x^5} \quad \checkmark
 \end{aligned}$$

Carry forward one mistake only

(3)

$$\begin{aligned}
 1.3.3 \quad & \frac{x^{\frac{1}{2}} \times \sqrt[4]{y^3} \times (xy)^{\frac{1}{4}}}{(x^3)^{\frac{1}{4}}} \\
 & \quad \quad \quad \checkmark \quad \checkmark \quad \checkmark \\
 & = \frac{x^{\frac{1}{2}} \times y^{\frac{3}{4}} \times x^{\frac{1}{4}} y^{\frac{1}{4}}}{x^{\frac{3}{4}}} \\
 & \quad \quad \quad \checkmark \quad \checkmark \quad \checkmark \\
 & = \frac{x^{\frac{3}{4}} y^1}{x^{\frac{3}{4}}} \\
 & = y \quad \checkmark
 \end{aligned}$$

(4)

1.4 LHS:

$$\begin{aligned}
 & \sqrt{\frac{\sqrt{27} + \sqrt{48} + \sqrt{75}}{3\sqrt{3}}} \\
 & = \sqrt{\frac{3\sqrt{3} + 4\sqrt{3} + 5\sqrt{3}}{3\sqrt{3}}} \quad \checkmark\checkmark\checkmark \\
 & = \sqrt{\frac{12\sqrt{3}}{3\sqrt{3}}} \quad \checkmark \\
 & = \sqrt{4} \quad \checkmark \\
 & = 2 \quad \checkmark \\
 & \therefore LHS = RHS
 \end{aligned}$$

Half mark for each surd simplified in the numerator  
Only one mistake allowed to be carried forward

Answer only, NO marks

(3)

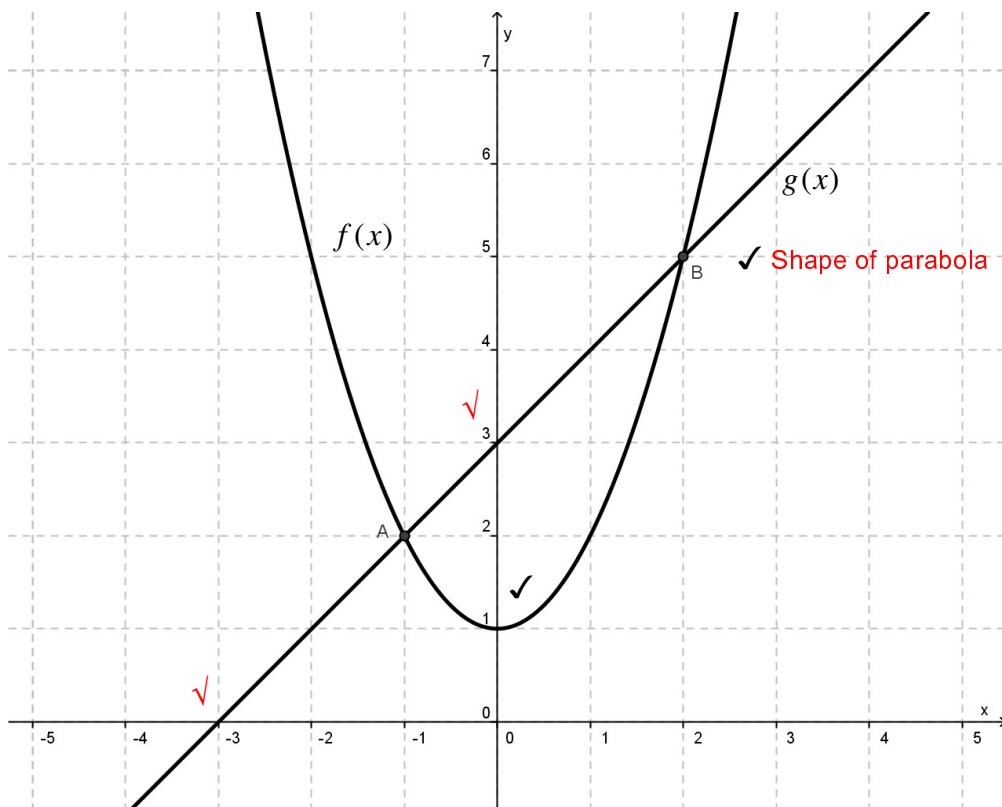


**QUESTION 2**

- 2.1 2.1.1  $(-4; 2)$  ✓ (No Half marks) (1)
- 2.1.2  $y = 2$  ✓ (1)
- 2.1.3  $x \in [-4; 5]$  ✓ or  $-4 \leq x \leq 5$  (1)
- 2.1.4  $y \in [-4; \infty)$  ✓ or  $-4 \leq y \leq \infty$  (Accept  $[-4; 3]$ ) (1)
- 2.1.5  $x \in (-\infty; \infty)$  ✓ or  $-\infty \leq x \leq \infty$  or  $x \in R$   
(Accept  $[-\infty; \infty]$  or accept the domain as coincides with range of 2.1.4) (1)
- 2.2 2.2.1  $f(x)$ : parabola ✓  
 $g(x)$ .: exponential graph (Accept hyperbola) ✓ (2)
- 2.2.2 Function ✓ (1)
- 2.2.3 Continuous (If  $g(x)$ . in 2.2.1 is identified as hyperbola, accept discontinuous) ✓ (1)
- 2.2.4  $y = 0$  or x-axis ✓ (1)
- 2.2.5  $y = ax^2 + c$  ✓  
 $1 = a(-1)^2 + c$  ✓  
 $1 = 1a + c$  (1)  
 $-2 = a(2)^2 + c$  ✓  
 $-2 = 4a + c$  (2)  
(2) - (1)  
 $-3 = 3a$  ✓  
 $a = -1$   
 $1 = 1(-1) + c$  ✓  
 $c = 2$   
✓  
 $y = -x^2 + 2$  (5)



2.3 2.3.1



(3)

2.3.2

$x^2 + 1 = x + 3$  ✓

$x^2 - x - 2 = 0$

$(x - 2)(x + 1) = 0$  ✓ Carry forward one mistake only

$x = 2$  ✓      $x = -1$  ✓

$y = 5$  ✓      $y = 2$  ✓

Points of intersection:

A(-1 ; 2)     B(2 ; 5)

(3)

2.3.3

✓ ✓  
 $-1 < x < 2$

(2)

[23]

**QUESTION 3**

3.1 3.1.1

$(x + 2)(x - 3)$

$= x^2 + 2x - 3x - 6$  ✓ Carry forward one mistake only

$= x^2 - x - 6$  ✓

(2)

3.1.2

$(2x - 4)^2 + 2(3x + 3)$

✓     ✓  
 $= 4x^2 - 16x + 16 + 6x + 6$  Carry forward one mistake only

$= 4x^2 - 10x + 22$  ✓

(3)



- 3.2 3.2.1  $6x^2yz + 78x^2y^2z - 36x^2yz^2$   
 $= 6x^2yz(1+13y-6z)$  (Subtract ONE mark for incorrect HCF) (4)
- 3.2.2  $20x^2y^3 + 15xy^3 - 6p^2 - 8xp^2$   
 $= 20x^2y^3 - 8xp^2 + 15xy^3 - 6p^2$   
 $= 4x(5xy^3 - 2p^2) + 3(5xy^3 - 2p^2)$   
 $= (5xy^3 - 2p^2)(4x + 3)$  (3)
- 3.2.3  $x^4 - 1$   
 $= (x^2 + 1)(x^2 - 1)$   
 $= (x^2 + 1)(x - 1)(x + 1)$  (3)
- 3.2.4  $2y^2 - y - 21$   
 $= (2y - 7)(y + 3)$  (2)
- 3.3 3.3.1  $2x + 4 = -3(x + 2)$   
 $2x + 4 = -3x - 6$  ✓ Carry forward one mistake only  
 $2x + 3x = -6 - 4$  ✓  
 $5x = -10$  ✓  
 $x = -2$  ✓ (4)
- 3.3.2  $x^{\frac{3}{4}} = 8$   
 $x^{\frac{3}{4}} = 2^3$  ✓ Carry forward one mistake only  
 $\left(x^{\frac{3}{4}}\right)^{\frac{4}{3}} = \left(2^3\right)^{\frac{4}{3}}$  ✓  
 $x = 2^4$  ✓  
 $= 16$  (3)
- [24]**

## QUESTION 4

- 4.1 Define the following terms:
- 4.1.1 Variance: it is the difference between the budgeted amount and the actual amount. (2)
- 4.1.2 Stokvels; this is a money savings club where a number of people contribute a certain amount of money each month and each person gets a turn to collect the lump sum (2)
- 4.1.3 Mashonisa: this is a type of micro lender that lends money at a high rate of interest. (accept loan shark for 2 marks and cash loan for one mark) (2)
- 4.1.4 Fixed deposits: this is where you put your money into a special account for a fixed period of time usually at a fixed rate of interest. (2)
- 4.1.5 Budget: a plan / projected summary of monthly income and expenditure. (2)
- 4.2 4.2.1 R 8999 (1)
- 4.2.2  $500 \times 24 = R12000$  (2)
- 4.3.3  $A = P(1 + in)$   
 $= 8999(1 + 0,16 \times 2)$   
 $= R11878,68$   
 $\frac{11878,68}{24} = R494,95$  per month
- 4.2.4  $A = P(1 + i)^n$   
 $= 8999(1 + 0,18)^2$   
 $= R12530,21$   
 $\frac{12530,21}{24} = R522,09$
- 4.2.5 Option B / local bank simple interest

**TOTAL: 100**

