



LIMPOPO
PROVINCIAL GOVERNMENT
REPUBLIC OF SOUTH AFRICA

DEPARTMENT OF
EDUCATION

**NATIONAL
SENIOR CERTIFICATE**

GRADE 12

**MATHEMATICS TERM3 TEST
MARKING GUIDELINES**

MARKS: 100

These marking guidelines consist of 8 pages.

NOTE:

- If a candidate answered a question TWICE, mark only the FIRST attempt.
- If a candidate crossed out an answer and did not redo it, mark the crossed-out answer.
- Consistent accuracy applies to ALL aspects of the marking guidelines.
- Assuming values/answers in order to solve a problem is unacceptable.

QUESTION 1

1.1	1.1.1	$x^2 - 4x = 0$ $x(x - 4) = 0$ $x = 0 \text{ or } x = 4$	✓ factors ✓✓ each answer	(3)
	1.1.2	$x^2 - 7x + 6 \leq 0$ $(x - 6)(x - 1) \leq 0$ $1 \leq x \leq 6$	✓ Factorization ✓ Critical values ✓✓ answer	(4)
1.2		Let the son's age be x and the father's age will be $3x$. In 10 years the father will be $3x + 10$ and the son will be $x + 10$ $3x + 10 = 2(x + 10)$ $3x + 10 = 2x + 20$ $x = 10$ The son is 10 years now and the father is 30 years	✓ $3x + 10$ ✓ $x + 10$ ✓ $3x$ $+10 = 2(x + 10)$ ✓ answer	(4)

[11]**QUESTION 2**

2.1		$P(A \text{ and } B) = P(A) \times P(B)$ $0,135 = 0,45 \times P(B)$ $P(B) = 0,3$	✓ Substitution into the independent rule ✓ answer	(2)
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2.2	2.2.1		✓ 0,21 ✓ 0,14 ✓ 0,15 ✓ 0,1 ✓ x ✓ $\frac{x}{3}$	(6)
	2.2.2	$x + x + x + \frac{x}{3} + 0,6 = 1$ $10x = 1,2$ $x = 0,12$ $\therefore P(C)_{\text{only}} = 0,12$ $P(A)_{\text{only}} = \frac{0,12}{3} = 0,04$	✓ Equation ✓ $x = 0,12$ ✓ $P(A)_{\text{only}}$	(3)
	2.2.3	$P(A) = 0,1 + 0,04 + 0,12 + 0,14$ $= 0,4$ $P(A \text{ and } B) = 0,1 + 0,14 = 0,24$ $P(A) \times P(B) = 0,6 \times 0,4 = 0,24$ $P(A \text{ and } B) = P(A) \times P(B)$ $\therefore A \text{ and } B \text{ are independent}$	✓ $P(A)$ ✓ $P(A \text{ and } B)$ ✓ $P(A) \times P(B)$ ✓ Conclusion	(4)
2.3	2.3.1	$8 \times 8 \times 8 = 8^3 = 512$	✓ answer	(1)
	2.3.2	$8 \times 7 \times 6 = 336$	✓ answer	(1)

2.3.3	$start\ with\ 3:1 \times 6 \times 3 = 18$ $4:1 \times 6 \times 4 = 24$ $5:1 \times 6 \times 3 = 18$ $6:1 \times 6 \times 4 = 24$ $7:1 \times 6 \times 3 = 18$ $8:1 \times 6 \times 4 = 24$ Answer = 126	✓✓ Starting with 3; 5 and 7 ✓✓ Starting with 4; 6 and 8 ✓ answer	(5)
			[22]
QUESTION 3			
3.1	$1 + i_{eff} = \left(1 + \frac{i_{nom}}{n}\right)^n$ $1 + i_{eff} = \left(1 + \frac{0,14}{12}\right)^{12}$ $i_{eff} = 0,1493$ $i_{eff} = 14,93\%$	✓ Substitution in correct ✓ formula simplification ✓ answer	(3)
3.2	$A = P(1+i)^n$ $2x = x \left(1 + \frac{0,13}{4}\right)^n$ $2 = \left(\frac{413}{400}\right)^n$ $n = \log_{\left(\frac{413}{400}\right)}(2)$ $n = 21,67 months \approx 22 months$	✓ Correct substitution ✓ Simplification ✓ Correct use of logs ✓ answer	(4)

3.3		Kholo $f_v = \frac{x(1+i)[(1+i)^n - 1]}{i}$ $f_v = \frac{300\left(1 + \frac{0,09}{12}\right)\left[\left(1 + \frac{0,09}{12}\right)^{7 \times 12} - 1\right]}{\frac{0,09}{12}}$ $= R35190,04$ OR $f_v = \frac{x[(1+i)^{n+1} - 1]}{i} - x$ $= \frac{300\left[\left(1 + \frac{0,09}{12}\right)^{7 \times 12 + 1} - 1\right]}{\frac{0,09}{12}} - 300$ $= R35190,04$ Kagiso $f_v = \frac{x[(1+i)^n - 1]}{i} - x$ $= \frac{300\left[\left(1 + \frac{0,09}{12}\right)^{7 \times 12} - 1\right]}{\frac{0,09}{12}}$ $= R34928,08$	✓ i and n ✓ Correct substitution ✓ ✓ answer ✓ n + 1 ✓ Correct substitution ✓ -300 ✓ answer ✓ i and n ✓ Correct substitution ✓ answer	(7)
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3.4	3.4.1	$P_v = \frac{x[1-(1+i)^{-n}]}{i}$ $120000 = \frac{x \left[1 - \left(1 + \frac{0,125}{12} \right)^{-4 \times 12} \right]}{\frac{0,125}{12}}$ $x = \frac{120000 \times \frac{0,125}{12}}{\left[1 - \left(1 + \frac{0,125}{12} \right)^{-48} \right]}$ $x = 3189,60$	✓n ✓i ✓Correct Substitution ✓answer	(4)
	3.4.2	$Balance = \frac{x[1-(1+i)^{-n}]}{i}$ $= \frac{3189,6 \left[1 - \left(1 + \frac{0,125}{12} \right)^{-1 \times 12} \right]}{\frac{0,125}{12}}$ $= 35804,87$ OR $Balance = A - f_v$ $= 120000 \left(1 + \frac{0,125}{12} \right)^{3 \times 12} - \left[\frac{3189,6 \left(1 + \frac{0,125}{12} \right)^{3 \times 12} - 1}{\frac{0,125}{12}} \right]$ $= 174260,6342 - 138455,775$ $= 35804,86$	✓n ✓i ✓Correct Substitution ✓answer ✓n ✓i ✓Correct Substitution ✓answer	(4)
	3.4.3	$interest = xn - (pv - balance)$ $= 3189,6 \times 12 \times 3 - (120000 - 35804,87)$ $= R30630,47$	✓Formula ✓Substitution ✓answer	(3)
				[25]

QUESTION 4																			
4.1		<table><tr><td>a</td><td>b</td><td>c</td><td>d</td><td>e</td><td>f</td><td>g</td></tr><tr><td>9</td><td>15</td><td>24</td><td>35</td><td>58</td><td>58</td><td>81</td></tr></table>	a	b	c	d	e	f	g	9	15	24	35	58	58	81	Range = Maximum – minimum $72 = 81 - a$ $a = 9$ median $d = 35$ $Position\ of\ Q_1 = \frac{1}{4}(8) = 2$ $\therefore Q_1 = b = 15$ $IQR = Q_3 - Q_1$ $43 = Q_3 - 15$ $\therefore Q_3 = 58 = f$ mod = 58 $\therefore e = 58$ $\frac{c + 256}{7} = 40$ $c + 256 = 280$ $\therefore c = 24$	✓✓ Value of a ✓✓ Value of d ✓✓ Value of b ✓✓ Value of f ✓ Value of e ✓✓✓ Value of c	(12)
		a	b	c	d	e	f	g											
9	15	24	35	58	58	81													
4.2	4.2.1	$y = a + bx$ $y = 1,76 + 0,75x$	✓ Value of a ✓ Value of b ✓ equation	(3)															
	4.2.2	Mean = 11,33	✓ answer	(1)															
	4.2.3	$r = 0,8$. The correlation co-efficient is strong positive. The judges are consistent.	✓ Value of r ✓ motivation	(2)															
	4.2.4	$y = 1,76 + 0,75(19)$ $= 16,01 \approx 16$	✓ Correct substitution ✓ answer	(2)															
				[20]															

QUESTION 5				
5.1		$f(x) = -x^2 + 3x$ $= \lim_{h \rightarrow 0} \left[\frac{f(x+h) - f(x)}{h} \right]$ $= \lim_{h \rightarrow 0} \left[\frac{-(x+h)^2 + 3(x+h) - (-x^2 + 3x)}{h} \right]$ $= \lim_{h \rightarrow 0} \left[\frac{-x^2 - 2xh - h^2 + 3x + 3h + x^2 - 3x}{h} \right]$ $= \lim_{h \rightarrow 0} \left[\frac{-2xh - h^2 + 3h}{h} \right]$ $= \lim_{h \rightarrow 0} [-2x - h + 3]$ $= -2x + 3$	$\checkmark f(x+h)$ $\checkmark f(x+h) - f(x)$ $\checkmark$ Expansion $\checkmark$ Simplification $\checkmark$ answer	(5)
5.2		$y = \frac{x^3}{3} + \frac{3}{x^3}$ $= \frac{x^3}{3} + 3x^{-3}$ $\frac{dy}{dx} = x^2 - 9x^{-4}$	$\checkmark 3x^{-3}$ $\checkmark x^2$ $\checkmark -9x^{-4}$	(3)
5.3		$f(x) = -2x^2 + 3x + 5$ $-4x + 3 = -5$ $-4x = -8$ $x = 2$ $y = -2(2)^2 + 3(2) + 5$ $= 3$ $y = -5x + c$ $3 = -5(2) + c$ $c = 13$ $y = -5x + 13$	$\checkmark 4x + 3 = -5$ $\checkmark x$ $\checkmark y$ $\checkmark c$	(4)
5.4	5.4.1	$f(x) = x^3 + ax^2 + bx + 4$ $f'(x) = 3x^2 - 6x$ $6x - 6 > 0$ $6x > 6$ $x > 1$	$\checkmark 6x - 6 > 0$ $\checkmark x > 1$	(2)

	5.4.2	$f(x) = x^3 + ax^2 + bx + 4$ $f'(x) = 3x^2 + 2ax + b = 3x^2 - 6x$ $\therefore 2a = -6$ $a = -3$ $b = 0$	$\checkmark f'(x)$ $\checkmark a$ $\checkmark b$	(3)
5.5		$P = 2x + 2y = 80$ $x + y = 40$ $y = 40 - x$ $A = xy$ $= x(40 - x)$ $= 40x - x^2$ $A'(x) = 0$ $40 - 2x = 0$ $x = 20$ $y = 40 - 20 = 20$	$\checkmark$ Perimeter $\checkmark x + y = 40$ $\checkmark A = x(40 - x)$ $\checkmark 40 - 2x = 0$ $\checkmark$ Both x and y	(5)
				[22]

TOTAL: 100