

MARKING GUIDELINES

EXAMINATION		NATIONAL SENIOR CERTIFICATE	
GRADE		12	
DATE		NOVEMBER 2025	
SUBJECT		MATHEMATICS	
PAPER		1	
MARK TOTAL		150	
DURATION (HOURS)		3	
NUMBER OF PAGES		13	



SOUTH AFRICAN COMPREHENSIVE ASSESSMENT INSTITUTE
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FINAL APPROVED MARKING GUIDELINES

DATE OF MEETING	
UMALUSI MODERATOR	
CHIEF MARKER	
INTERNAL MODERATOR	

NOTE:

- If a candidate answered a question **TWICE**, only mark the first attempt.
- If a candidate cancelled the first attempt and did not answer the question again, mark the cancelled attempt.
- The principle of consistent accuracy (**CA**) will be applied throughout the Marking Guideline.
- If a candidate has given the answer only, without showing any necessary working out, then only **ONE** mark will be awarded, unless directed otherwise by this marking guideline.

QUESTION 1

1.1.1	$(x - 9)(x + 1) = 0$ $x = 9$ or $x = -1$	✓ Factorise = 0 ✓ Answers (2)
1.1.2	$x = \frac{-7 \pm \sqrt{7^2 - 4(4)(1)}}{2(4)}$ $x = \frac{-7 \pm \sqrt{33}}{8}$ $x = -1,59$ or $x = -0,16$	✓ Substitute in formula ✓ $-1,59$ ✓ $-0,16$ (3)
1.1.4	$(x - 2)^2 \geq 0$ $x < 2$ or $x = 5$	✓ $(x - 2)^2 \geq 0$ ✓ $x < 2$ ✓ $x = 5$ (3)
1.2	$y = x - 2$ $x^2 - 3x(x - 2) + (x - 2)^2 + 4 = 0$ $x^2 - 3x^2 + 6x + x^2 - 4x + 4 + 4 = 0$ $x^2 - 2x - 8 = 0$ $(x - 4)(x + 2) = 0$ $x = 4$ or $x = -2$ $y = 2$ or $y = -4$ <p style="text-align: center;">OR</p> $x = y + 2$ $(y + 2)^2 - 3(y + 2)y + y^2 + 4 = 0$ $y^2 + 4y + 4 - 3y^2 - 6y + y^2 + 4 = 0$ $y^2 + 2y - 8 = 0$ $(y - 2)(y + 4) = 0$ $y = 2$ or $y = -4$ $x = 4$ or $x = -2$	✓ $y = x - 2$ ✓ Substitution ✓ Simplification ✓ Standard form ✓ Factorise ✓ Answers for x ✓ Answers for y <p style="text-align: center;">OR</p> ✓ $x = y + 2$ ✓ Substitution ✓ Simplification ✓ Standard form ✓ Factorise ✓ Answers for y ✓ Answers for x (7)
1.3	$2^{-2(x - \frac{1}{2})} = 2^{-3(2x)}$ $-2x + 1 = -6x$ $4x = -1$; $x = -\frac{1}{4}$	✓ 2^{-2} and 2^{-3} ✓ $\cos 60^\circ = \frac{1}{2}$ ✓ Equate exponents ✓ Answer (4)

1.4.1	$-3 \pm \sqrt{16+h} = 0$ $-3 = \pm \sqrt{16+h}$ $9 = 16+h$ $h = -7$	✓ Numerator = 0 ✓ Square both sides ✓ Answer (3)
1.4.2	$x = \frac{-3 \pm \sqrt{16+9}}{2}$ $x = \frac{-3 \pm 5}{2}$ $x = 1 \text{ or } x = -4$	✓ Set h = 9 ✓ Answers (2)
1.5	$\text{LHS} = \frac{\sqrt{x}}{x} + \frac{y}{\sqrt{x}}$ $= \frac{\sqrt{x}}{x} + \frac{y}{\sqrt{x}} \times \frac{\sqrt{x}}{\sqrt{x}}$ $\text{RHS} = \frac{\sqrt{x} + \sqrt{xy}}{x} = \frac{\sqrt{x}(1+y)}{x}$	✓ Same denominator ✓ Rationalise denominator ✓ Simplify (3)
[27]		

QUESTION 2

2.1	$a = 2$ and $d = 7$ $T_n = -5 + 7n$ $T_{100} = 5 + 7 \times 100 = 695$	✓ a and d ✓ Subst into correct formula ✓ Answer (3)
2.2	$T_n = 3 - 2n = -193$ $n = 98$ $S_{93} = \frac{98}{2}(1 - 193)$ $S_{93} = -9408$ <p style="text-align: center;">OR</p> $S_{93} = \frac{98}{2}[2(1) + 97(-2)]$ $S_{93} = 49(-192)$ $= -9408$ If only the correct substitution and correct answers are shown full marks must be awarded.	✓ -193 ✓ 98 ✓ Substitution ✓ Answer ✓ 98 ✓ Subst. into correct formula ✓ -192 ✓ Answer (4)
2.3	$S_\infty = 10 = \frac{a}{1-r} \quad (1)$ $\frac{25}{3} = \frac{a}{1-r^2} \quad (2)$ $(1) \div (2): \frac{6}{5} = \frac{(1-r)(1+r)}{1-r}$ $\frac{6}{5} = 1 + r$ $r = \frac{1}{5}$ $10 = \frac{a}{1-\frac{1}{5}}$ $a = 8$	✓ Sum to infinity ✓ r^2 ✓ Calculation ✓ Simplify ✓ Answer $r = \frac{1}{5}$ ✓ Answer a (6)
[13]		

QUESTION 3

3.1	$S_n = \frac{\frac{1}{3}(2^x - 1)}{2 - 1} > 84$ $2^x > 253$ $x > 7$	✓ a and r in correct formula ✓ $S_n > 84$ ✓ Simplify ✓ Answer (4)
3.2.1	$\begin{array}{ccc} 7 & 28 & 43 & 52 \\ & \vee & \vee & \vee \\ & 21 & 15 & 9 \\ & & \vee & \vee \\ & & -6 & -6 \end{array}$ $2a = -6; a = -3$ $3(-3) + b = 21; b = 30$ $-3 + 30 + c = 7; c = -20$	✓✓✓ a, b and c (3)
3.2.2	$\frac{d}{dn}(-3n^2 + 30n - 20) = -6n + 30 = 0$ $n = 5$ $T_5 = -3(5^2) + 30(5) - 20 = 55$	✓ Derivative = 0 ✓ Answer n ✓ Answer 55 (3)
3.2.3	$T_{10} = -3(100) + 30(10) - 20 = -20$ There can't be a negative number of people.	✓ $T_{10} = -20$ ✓ Reason (2)
[12]		

QUESTION 4

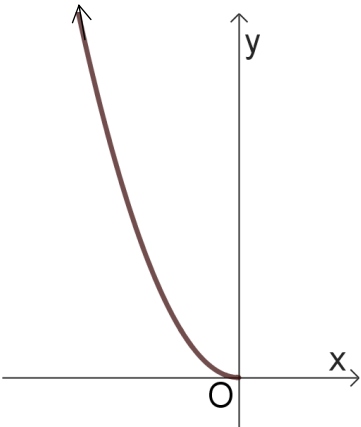
<p>4.1.1</p>	$\left(1 + \frac{8,619}{4000}\right)^4 = (1 + i)$ $\left(1 + \frac{8,619}{4000}\right)^4 - 1 = i_e$ $i_e = 0,08901..$ $\therefore r = 8,90\%$ <p style="text-align: center;">OR</p> $i_e + 1 = \left(1 + \frac{0,08619}{4}\right)^4$ $i_e = \left(1 + \frac{0,08619}{4}\right)^4 - 1$ $i_e = 0,08901 \dots$ $\therefore r = 8,90\%$	<p>✓ Correct subst in correct formula</p> <p>✓ Simplify</p> <p>✓ $r = 8,90\%$</p> <p>✓ Correct subst in correct formula</p> <p>✓ Simplify</p> <p>✓ $r = 8,90\%$</p> <p style="text-align: right;">(3)</p>
<p>4.2.1</p>	$2500000 = 26330 \cdot \frac{1 - \left(1 + \frac{12}{1200}\right)^{-n}}{\frac{12}{1200}}$ $0,01^{-n} = \frac{133}{2633} (0,050512\dots)$ $-n = \log_{1,01} \frac{133}{2633}$ $n = 300,04 \text{ months}$	<p>✓ Correct formula with correct substitution</p> <p>✓ Simplify</p> <p>✓ Correct use of Log</p> <p>✓ Answer</p> <p style="text-align: right;">(4)</p>
<p>4.2.2</p>	$OB \text{ at } T_{240} = 2500000 \left(1 + \frac{12}{1200}\right)^{240} - 26330 \left(\frac{\left(1 + \frac{12}{1200}\right)^{240} - 1}{\frac{12}{1200}}\right)$ $OB \text{ at } T_{240} = 2500000(1,01)^{240} - 26330(989,2553654)$ $= 27231384,13 - 26047093,77$ $= R1184290,36$ <p style="text-align: center;">OR</p>	<p>✓ $2500000 \left(1 + \frac{12}{1200}\right)^{240}$</p> <p>✓ $\left(\frac{\left(1 + \frac{12}{1200}\right)^{240} - 1}{\frac{12}{1200}}\right)$</p> <p>✓ correct i and n</p> <p>✓ Answer</p>

	<p>Number of payments that still need to be made: $n = 300,0432926 \dots - 240 = 60,04329256 \dots$</p> $OB = P = \frac{26330(1-1,01^{-60,04})}{0,01}$ <p>OB = R1184290,36</p>	<p>✓ $\frac{26330(1-1,01^{-60,04})}{0,01}$</p> <p>✓ correct n</p> <p>✓ correct i</p> <p>✓ Answer</p> <p>(4)</p>
4.3	<p>After 5 years: $\frac{500\left(\left(1+\frac{9}{1200}\right)^{60} - 1\right)}{\frac{9}{1200}}$</p> <p>= R37712,07</p> <p>After 10 Years: $37712,07 \left(1 + \frac{9,6}{1200}\right)^{60} + \frac{500\left(\left(1+\frac{9,6}{1200}\right)^{60} - 1\right)}{\frac{9,6}{1200}}$</p> <p>= 60829,23 + 38311,93</p> <p>= R99141,16</p>	<p>✓ Substitute in correct formula</p> <p>✓ 60829,23</p> <p>✓ Formula for next 5 years</p> <p>✓ Answer</p> <p>(4)</p>
[15]		

QUESTION 5

5.1	$3^{-x+2} - 1 = 0$ $3^{-x+2} = 1$ $3^{-x+2} = 3^0$ $-x + 2 = 0$ $x = 2$	✓ Equal to 0 ✓ 3^0 ✓ Answer (3)
5.2	$q = -3$ $p = 2$ $(0; -6): \frac{a}{0-2} - 3 = -6$ $a = 6$	✓ q ✓ p ✓ Subst (0; -6) ✓ a (4)
5.3	$\frac{6}{x-2} - 3 = 0$ $6 = 3x - 6$ $x = 4$	✓ Equal to 0 ✓ Simplify ✓ Answer (3)
5.4	$2 < x \leq 4$	✓ Correct end points ✓ Correct notation (2)
5.5	A Transforms 1 unit up B Transforms 2 units to the left	✓ 1 unit up ✓ 2 units left (2)
5.6	$x = 3^{-y}$ $h^{-1}(x) = -\log_3 x$ <p style="text-align: center;">OR</p> $x = 3^{-y}$ $h^{-1}(x) = \log_3 \frac{1}{x}$	✓ Change x and y ✓ Correct answer (2)
[16]		

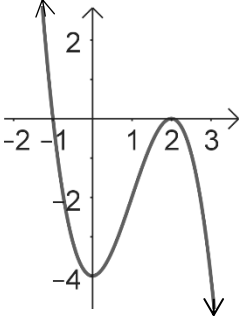
QUESTION 6

6.1.1	(1; -2)	✓✓ Coordinates (2)
6.1.2	$y = -(0 - 1)^2 - 2$ $y = -3$	✓ Subst $x = 0$ ✓ Answer Answer only full marks (2)
6.1.3	$f(x) = -x^2 + 2x - 3$ $m = f'(x) = -2x + 2$ $m = 2$ $y + 3 = 2x$ $2x = 3$ $x = \frac{3}{2}$	✓ Std. form ✓ $m = f'(x)$ ✓ Differentiate ✓ $m=2$ ✓ Equation tangent ✓ Answer (6)
6.1.4	$2 < k < 3$	✓✓ 2 and 3 ✓ Notation (3)
6.2.1	$x = -\sqrt{y}$ $y = x^2$	✓ Swop x and y ✓ Answer (2)
6.2.2	Domain: $x \leq 0$ Range: $y \geq 0$	✓ Domain ✓ Range (2)
6.2.3		✓ Sketch in correct quadrant ✓ correct shape (2)
		[19]

QUESTION 7

ONLY PENALISE ONCE for notation in this QUESTION.		
7.1	$f(x+h) = 2(x+h)^2 - 7(x+h)$ $= 2x^2 + 4xh + 2h^2 - 7x - 7h$ $f'(x) = \lim_{h \rightarrow 0} \frac{f(x+h) - f(x)}{h}$ $f'(x) = \lim_{h \rightarrow 0} \frac{2x^2 + 4xh + 2h^2 - 7x - 7h - 2x^2 + 7x}{h}$ $f'(x) = \lim_{h \rightarrow 0} \frac{4xh + 2h^2 - 7h}{h}$ $f'(x) = \lim_{h \rightarrow 0} \frac{h(4x + 2h - 7)}{h}$ $f'(x) = 4x - 7$	<p>✓ $f(x+h)$</p> <p>✓ Correct substitution</p> <p>✓ Simplify</p> <p>✓ has common factor</p> <p>✓ Answer</p> <p>(5)</p>
7.2.1	$f'(x) = 20x^3$	<p>✓✓ $20x^3$</p> <p>(2)</p>
7.2.2	$g(x) = 3x \cdot \sqrt{x} + 3x - 2\sqrt{x} - 2$ $= 3x^{\frac{3}{2}} + 3x - 2x^{\frac{1}{2}} - 2$ $g'(x) = \frac{9}{2}x^{\frac{1}{2}} + 3 - x^{-\frac{1}{2}}$	<p>✓ $g(x) = 3x \cdot \sqrt{x} + 3x - 2\sqrt{x} - 2$</p> <p>✓ $\frac{9}{2}x^{\frac{1}{2}}$</p> <p>✓ $+3$</p> <p>✓ $-x^{-\frac{1}{2}}$</p> <p>(4)</p>
7.3.1	<p>AC = $8t$ and CB = $12 - 8t$</p> <p>BD = $12t$</p> $CD^2 = (12 - 8t)^2 + 64t^2 - 2(12 - 8t)(8t) \cos 120^\circ$ $CD^2 = 144 - 192t + 64t^2 + 64t^2 + 96t - 64t^2$ $CD^2 = 64t^2 - 96t + 144$ <p>Min when $128t - 96 = 0$</p> <p>After 0.75 hours ($\frac{3}{4}$)</p>	<p>✓ AC and CB and BD</p> <p>✓ Subst in correct formula</p> <p>✓✓ Simplify</p> <p>✓ Derivative = 0</p> <p>✓ Answer</p> <p>(6)</p>
7.3.2	$CD = 6\sqrt{3} \approx 10,39 \text{ km}$	<p>(1)</p>
[18]		

QUESTION 8

<p>8.1</p>	<p>$(x + 1)$ is a factor</p> $g(x) = (x + 1)(-x^2 + 4x - 4) = 0$ $-(x + 1)(x - 2)(x - 2) = 0$ $x = -1 \text{ and } x = 2$	<p>✓ $x + 1$ is a factor ✓ quadratic factor $-x^2 + 4x - 4$ ✓ Factorise = 0 ✓ Answers (4)</p>
<p>8.2</p>	$g'(x) = -3x^2 + 6x = 0$ $-x(x - 2) = 0$ $x = 0 \text{ and } x = 2$ $y = -4 \text{ and } y = 0$ $(0; -4) \text{ and } (2; 0)$	<p>✓ Differentiate=0 ✓ Factorise ✓ $(0; -4)$ ✓ $(2; 0)$ (4)</p>
<p>8.3</p>		<p>✓ Intercepts ✓ Turning Points ✓ Form (3)</p>
<p>8.4</p>	$m = f'(x) = -3x^2 + 6x$ <p>At $x = -1$: $m = -3(-1)^2 - 6 = -9$</p> $-3x^2 + 6x = -9$ $x^2 - 2x - 3 = 0$ $(x - 3)(x + 1) = 0$ $x = 3$	<p>✓ $m = f'(x)$ ✓ $m = -9$ ✓ Set differential = -9 ✓ Standard form ✓ Factorise ✓ Answer (6)</p>
<p>[17]</p>		

QUESTION 9

9.1	No	✓ Answer (1)
9.2	$3x + 4x^2 = 1$ $4x^2 + 3x - 1 = 0$ $(4x - 1)(x + 1) = 0$ $x = \frac{1}{4}$ Probability = $\frac{3}{4}$ (0,75)	✓ $3x + 4x^2$ ✓ Set = 1 ✓ Factorise ✓ Answer x ✓ Probability (5)
9.3.1	Total: $12 + 8 = 20$ $20 \times 19 \times 18 \times 17 \times 16$ = 1860480	✓ Total ✓ Calculation ✓ Answer (3)
9.3.2	3 Girls: $12 \times 11 \times 10 = 1320$ 8 Boys: $8 \times 7 = 56$ Total: $1320 \times 56 = 73920$ Probability = $\frac{73920}{1860480} = \frac{77}{1938}$ (0,04)	✓ Girls ✓ Boys ✓ Total ✓ Probability (4)
		[13]

GRAND TOTAL: [150]