



education
MPUMALANGA PROVINCE
REPUBLIC OF SOUTH AFRICA

FURTHER EDUCATION AND TRAINING

GRADE 12

MATHEMATICS

PRE TRIAL P1

AUGUST 2026

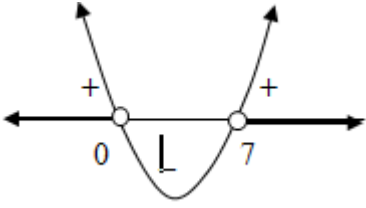
MARKING GUIDELINES

MARKS: 150

These marking guidelines consist of 12 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	$(2x + 1)(x - 3) = 0$ $x = -\frac{1}{2}$ OR $x = 3$	✓ factors ✓ answers (2)
1.1.2	$(x - 3)(x - 4) \geq 12$ $x^2 - 7x + 12 \geq 12$ $x^2 - 7x \geq 0$ $x(x - 7) \geq 0$ $x = 0$ or $x = 7$ c.v.  $x \leq 0$ or $x \geq 7$	✓ standard form ✓ critical values ✓ answer (3)
1.2.1	$5x - \frac{3}{x} = 1$ LCD : x $5x^2 - 3 = x$ $5x^2 - x - 3 = 0$ $x = \frac{-(-1) \pm \sqrt{(-1)^2 - 4(5)(-3)}}{2(5)}$ $x = \frac{1 \pm \sqrt{61}}{10}$ $x = -0,68$ or $x = 0,88$	✓ equation with fraction ✓ standard form ✓ substitution into correct formula ✓ both answers (4)
1.2.2	$2y + 1 = x$ $2y + 1 = 0,88$ OR $2y + 1 = -0,68$ $y = -0,06$ OR $y = -0,84$	✓ $2y + 1 = x$ ✓✓ answers (3)
1.3	$\sqrt{2x - 1} = 2x - 3$ $(2x - 1) = (2x - 3)^2$ $2x - 1 = 4x^2 - 12x + 9$ $4x^2 - 14x + 10 = 0$ $2x^2 - 7x + 5 = 0$ $(2x - 5)(x - 1) = 0$ $x = \frac{5}{2}$ or $x = 1$ <i>na</i> $\therefore x = \frac{5}{2}$	✓ square both sides ✓ simplification ✓ standard form ✓ factors ✓ x-values with rejection (4)

1.4	$2^{x+y} = 4$ $2^{x+y} = 2^2$ $x + y = 2$ $x = 2 - y \dots (1)$ $x^2 = 52 - y^2 \dots (2)$ $(2 - y)^2 = 52 - y^2$ $4 - 4y + y^2 = 52 - y^2$ $2y^2 - 4y - 48 = 0$ $y^2 - 2y - 24 = 0$ $(y - 6)(y + 4) = 0$ $y = 6 \text{ or } y = -4$ $x = 2 - (6) \quad \text{or} \quad x = 2 - (-4)$ $x = -4 \quad \quad \quad x = 6$ $(-4; 6) \quad \quad \quad (6; -4)$	✓ linear equation ✓ substitution ✓ simplification ✓ standard form ✓ both y values ✓ both x values (6)
1.5	$\frac{14}{\sqrt{63} - \sqrt{28}} = a\sqrt{b}$ $\frac{14}{\sqrt{9 \times 7} - \sqrt{4 \times 7}} = a\sqrt{b}$ $\frac{14}{3\sqrt{7} - 2\sqrt{7}} = a\sqrt{b}$ $\frac{14}{\sqrt{7}} = a\sqrt{b}$ $\frac{14}{\sqrt{7}} \times \frac{\sqrt{7}}{\sqrt{7}} = a\sqrt{b}$ $2\sqrt{7} = a\sqrt{b}$ $a = 2; b = 7$	✓ 9×7 ✓ 4×7 ✓ simplification ✓ rationalising (4)
		[26]
QUESTION 2		
2.1.1	$20; 23; 26; 29; \dots; 101$ $T_n = a + (n - 1)d$ $101 = 20 + (n - 1)(3)$ $101 = 20 + 3n - 3$ $3n = 84$ $n = 28$ $\therefore 28 \text{ terms}$	✓ substitution ✓ answer (2)
2.1.2	$23; 29; 35; \dots; 101$ $S_n = \frac{n}{2}[2a + (n - 1)d]$ $S_{14} = \frac{14}{2}[2(23) + (14 - 1)(6)]$ $S_{14} = 868$	✓ sequence ✓ $n = 14$ ✓ ✓ substitution ✓ answer (5)
2.2.1	$\sum_{i=5}^{105} \frac{2^i}{(-1)^i} = -2^5 \checkmark + 2^6 \checkmark + \dots - 2^{105}$	✓ -2^5 ✓ 2^6 (2)
2.2.2	$r = -2 \checkmark$ $n = 105 - 5 + 1$ $= 101 \checkmark$	✓ $r = -2$ ✓ $n = 101$

	$S_{101} = \frac{(-2)^5[(-2)^{101}-1]}{-2-1}$ $= \frac{-2^{106} + 2^5}{-3}$ $= 2,7 \times 10^{31}$	✓ Substitution ✓ Answer (4)
2.3.1	$r = \frac{s-1}{s}$	✓ Answer (1)
2.3.2	$T_3 = \frac{s-1}{s} \times s - 1$ $T_3 = \frac{(s-1)^2}{s}$	✓ Substitution ✓ Answer (2)
2.3.3	$T_n = ar^{n-1}$ $T_n = (s)\left(\frac{s-1}{s}\right)^{n-1}$	✓ Substitution into correct formula ✓ Answer (2)
2.4	$T_3 + T_4 = 72$ $ar^2 + ar^3 = 72$ $ar^2(1+r) = 72 \dots\dots\dots(1)$ $T_5 - T_3 = 144$ $ar^4 - ar^2 = 144$ $ar^2(r^2 - 1) = 144 \dots\dots\dots(2)$ $(2) \div (1): \frac{ar^2(r^2-1)}{ar^2(1+r)} = r - 1 = \frac{144}{72} = 2$ $r = 3$ $a = 2$	✓ writing in terms of formula and factorising ✓ writing in terms of formula and factorising ✓ method ✓ simplifying ✓ answer r ✓ answer a (6)
		[24]

QUESTION 3

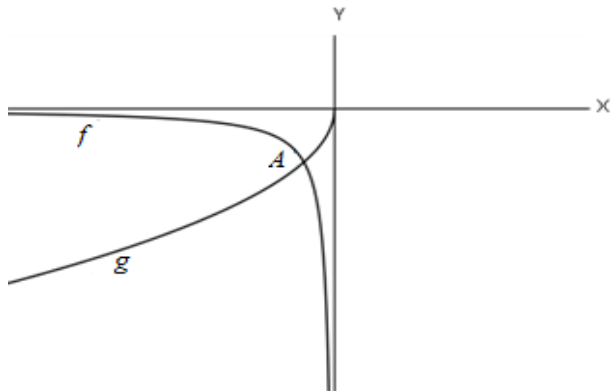
3.1	$x = 4$ $y = 3$	✓ answer ✓ answer (2)
3.2		✓ shape ✓ asymptotes both ($x = 4$ & $y = 3$) ✓ x – intercept $x = 5$ ✓ y – intercept $y = 3,75$ (4)

3.3	$g(x) = \frac{-3}{x-1} + 2$	✓✓ answer (2)
3.4	$m = 1$ $y = x + c$ $3 = 4 + c$ $c = -1$ $y = x - 1$	✓substitution (4;3) ✓equation (2)
		[10]

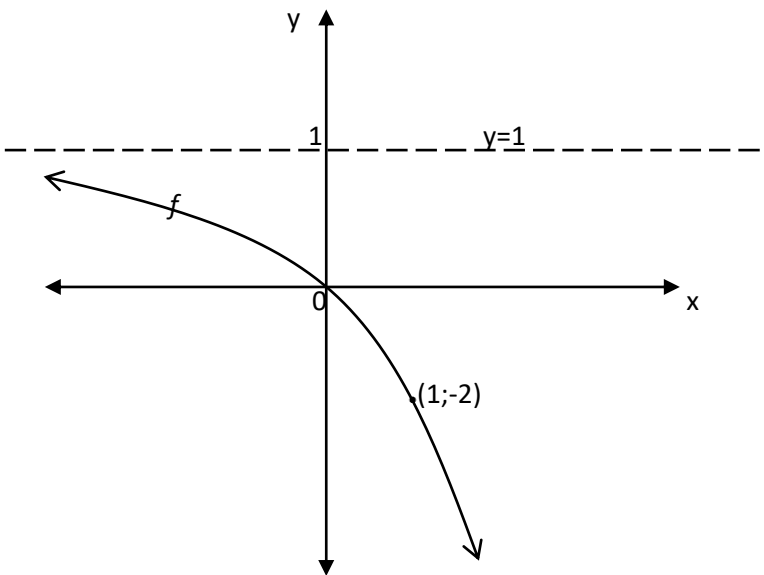
QUESTION 4

4.1	$y = 3^{x-p} + 9$ $18 = 3^{1-p} + 9$ $9 = 3^{1-p}$ $3^2 = 3^{1-p}$ $2 = 1 - p$ $p = -1$ $\therefore f(x) = 3^{x+1} + 9$	✓ substitution ✓ correct application of exponential laws ✓ value of p (3)
4.2	$y = 3^x \cdot 3 + 9$ $y = 3^{-x} \cdot 3 + 9$ $y = 3\left(\frac{1}{3}\right)^x + 9$	✓ $y = 3^{-x} \cdot 3 + 9$ ✓ answer (2)
4.3	$y \in (4; \infty)$	✓ answer (1)
		[6]

QUESTION 5

	$g(x) = -\sqrt{-x}; x \leq 0$ and $f(x) = \frac{1}{x}$ for $x < 0$	
		
5.1	$-\sqrt{-x} = \frac{1}{x}$ $(-\sqrt{-x})^2 = \left(\frac{1}{x}\right)^2$	✓ squaring both sides

	$-x = \frac{1}{x^2}$ $x^3 + 1 = 0$ $(x + 1)(x^2 - x + 1) = 0$ $\therefore x = -1$ $y = \frac{1}{-1}$ $y = -1$ $\therefore A(-1; -1)$	✓ simplification ✓ Factorisation ✓ x value ✓ y value (5)
5.2	$g(x) = -\sqrt{-x}$ $x = -\sqrt{-y}$ $-x = \sqrt{-y}$ $(-x)^2 = (\sqrt{-y})^2$ $x^2 = -y$ $y = -x^2$ $g^{-1}(x) = -x^2; x \leq 0$	✓ swop x and y ✓ squaring ✓ answer with restriction (3)
5.3	$y \in (-\infty; 0]$	✓ ✓ (2)
		[10]

QUESTION 6		
6.1		✓ shape ✓ asymptotes ✓ O(0;0) (3)
6.2	$y \in (-\infty; 1)$	✓ answer (1)
6.3	$g(x) = -(-3^x + 1)$ $g(x) = 3^x - 1$ $\therefore y = -1$	✓ ✓ answer (2)
6.4	$h(x) = 3^x$ $x = 3^y$ $y = \log_3 x$	✓ equation of g ✓ answer (2)
		[8]

QUESTION 7		
7.1.1	$\frac{R800000}{50} = R16000$	✓ answer (1)
7.1.2	$A = P(1 - i)^n$ $A = 16000(1 - 0.18)^3$ $A = R8821,89$	✓ substitution into the correct formula ✓ answer (2)
7.1.3	$A = P(1 + i)^n$ $21200 = 16000(1 + 0,058)^n$ $\frac{21200}{16000} = (1,058)^n$ $n = \log_{1,058} \frac{21200}{16000}$ $n = 4,99 \approx 5 \text{ years}$	✓ substitution into the correct formula ✓ using logs ✓ answer (3)
7.2.1	$A = P(1 + i)^n$ $A = 250000(1 + \frac{0,15}{12})^2$ $A = R256289,06$	✓ $n = 2$ ✓ correct substitution in correct formula ✓ Answer (3)
7.2.2	$P_v = \frac{x[1 - (1 + i)^{-n}]}{i}$ $256289,06 = \frac{x[1 - (1 + \frac{0,15}{12})^{-46}]}{\frac{0,15}{12}}$ $x = \frac{256289,06 \times \frac{0,15}{12}}{[1 - (1 + \frac{0,15}{12})^{-46}]}$ $x = R7359,79$	✓ $n = 46$ ✓ correct substitution in correct formula ✓ Equating to 256289.06 ✓ Answer (4)
		[13]

QUESTION 8

8.1	$f'(x) = \lim_{h \rightarrow 0} \frac{f(x+h) - f(x)}{h} \quad f(x+h) = \frac{-3}{x+h}$ $f'(x) = \lim_{h \rightarrow 0} \frac{\frac{-3}{x+h} + \frac{3}{x}}{h}$ $f'(x) = \lim_{h \rightarrow 0} \frac{\frac{-3x + 3x + 3h}{x(x+h)}}{h}$ $f'(x) = \lim_{h \rightarrow 0} \frac{3h}{x(x+h)} * \frac{1}{h}$ $f'(x) = \lim_{h \rightarrow 0} \frac{3}{x(x+h)}$ $f'(x) = \frac{3}{x(x+0)}$ $f'(x) = \frac{3}{x^2}$	✓ $f(x+h)$ ✓ substitution ✓ Simplification ✓ simplification ✓ use of lim concept/ replace h by 0 ✓ Answer (6)
8.2.1	$y = \frac{x^2 - 3x + 1}{x^3}$ $y = \frac{x^2}{x^3} - \frac{3x}{x^3} + \frac{1}{x^3}$ $y = x^{-1} - 3x^{-2} + x^{-3}$ $\frac{dy}{dx} = -x^{-2} + 6x^{-3} - 3x^{-4}$ $\frac{dy}{dx} = -\frac{1}{x^2} + \frac{6}{x^3} - \frac{3}{x^4}$	✓ Simplification ✓✓✓ Each term (4)
8.2.2	$y = \frac{1}{2}t^{\frac{1}{2}} - \frac{4}{7}t^{-5}$ $\frac{dy}{dt} = \frac{1}{4}t^{-\frac{1}{2}} + \frac{20}{7}t^{-6}$ $\frac{dy}{dt} = \frac{1}{4\sqrt{t}} + \frac{20}{7t^6}$	✓ $\frac{1}{2}t^{\frac{1}{2}}$ ✓ $-\frac{4}{7}t^{-5}$ ✓ $\frac{1}{4}t^{-\frac{1}{2}} +$ ✓ $\frac{20}{7}t^{-6}$ (4)
		[14]

QUESTION 9		
9.1	$R(0; -1)$	$\checkmark x = 0$ $\checkmark y = -1$ (2)
9.2	$g(x) = x^3 - 6x - 1$ $g'(x) = 3x^2 - 6$ $3x^2 - 6 = 0$ $x = \pm\sqrt{2} = \pm 1,41$ $y = (-\sqrt{2})^3 - 6(-\sqrt{2}) - 1$ or $y = (\sqrt{2})^3 - 6(\sqrt{2}) - 1$ $y = -2\sqrt{2} + 6\sqrt{2} - 1$ or $y = -1 - 4\sqrt{2}$ $y = 4,66$ $y = -6,66$ $P(-1,41; 4,66)$ $Q(1,41, -6,66)$	$\checkmark 3x^2 - 6$ $\checkmark 3x^2 - 6 = 0$ $\checkmark x = \pm 1,41$ $\checkmark$ substitution $\checkmark P(-1,41; 4,66)$ $\checkmark Q(1,41; -6,66)$ (6)
9.3	$-\sqrt{2} \leq x \leq \sqrt{2}$	$\checkmark$ critical values $\checkmark$ notation (2)
9.4	$R(0; -1)$ $m = g'(x) = 3x^2 - 6$ $m = 3(0)^2 - 6 = -6$ $y = -6x - 1$	$\checkmark g'(0) = -6$ $\checkmark c = -1$ $\checkmark$ answer (3)
9.5	$x = -\sqrt{2}$	$\checkmark\checkmark x = -\sqrt{2}$ (2)
9.6	$x < -\sqrt{2}$ or $x > \sqrt{2}$	$\checkmark\checkmark$ answers (2)
		[17]

QUESTION 10		
	$V = \pi r^2 h$ $2000\pi = \pi r^2 h$ $h = \frac{2000}{r^2}$ $TSA = 2\pi r^2 + 2\pi r h$ $TSA = 2\pi r^2 + 2\pi r \left(\frac{2000}{r^2}\right)$ $TSA = 2\pi r^2 + \frac{4000\pi}{r}$ $TSA = 2\pi r^2 + 4000\pi r^{-1}$ $A' = 4\pi r - 4000\pi r^{-2}$ $0 = 4\pi r - 4000\pi r^{-2}$ for minimum surface area $4000\pi r^{-2} = 4\pi r$ $r^3 = 1000$ $r = 10cm$ $\therefore h = \frac{2000}{(10)^2}$ $h = 20cm$	✓ Substitution of V ✓ $h = \frac{2000}{r^2}$ ✓ Substitution of h in Area formula ✓ $A'(r) = 4\pi r - 4000\pi r^{-2}$ ✓ $A'(x) = 0$ ✓ $r = 10cm$ ✓ $h = 20cm$ (7)
		[7]

QUESTION 11		
11.1.1a)	$P(\text{neither}) = 1 - P(T \text{ or } C)$ $P(\text{neither}) = 1 - 0,8$ $P(\text{neither}) = 0,2$	✓ answer (1)
b)	$P(T \text{ or } C) = P(T) + P(C) - P(T \text{ and } C)$ $0,8 = 0,4 + 0,5 - P(T \text{ and } C)$ $P(T \text{ and } C) = 0,1$	✓ substitution ✓ answer (2)
11.1.2	No, they are not mutually exclusive because $P(T \text{ and } C) \neq 0$	✓ No ✓ Reason (2)
11.2	Letters: $26 - 6 = 20$ Digits: $0 - 9 = 10$ $20^4 \times 10^4$ $= 1\,600\,000\,000$	✓ 20^4 ✓ 10^4 ✓ answer (3)
11.3.1	Total arrangements = $7!$ $= 5040$ ways	✓✓5040 (2)
11.3.2	Arrangements together = $6! \times 2!$ $= 1440$ Arrangements not together = total arrangements – arrangements together Arrangements not together = $5040 - 1440$ $= 3600$	✓✓6! and 2! ✓1440 ✓3600 (4)
11.3.3	Probability = $\frac{1}{6}$	✓✓answer (2)
		[16]

TOTAL: 150