



Education and Sport Development

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NORTH WEST PROVINCE

GRADE 11

MATHEMATICS P1 MEMORANDUM

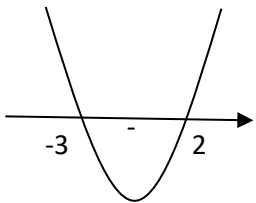
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MARKS: 100

This memorandum consists of 9 pages..

QUESTION 1

1.1.1	$2x^2 - 7x = 0$ $x(2x - 7) = 0$ $x = 0 \text{ or } x = \frac{7}{2}$	✓ factors ✓ $x = 0$ ✓ $x = \frac{7}{2}$ (3)
1.1.2.	$2x(x - 3) = 1$ $2x^2 - 6x - 1 = 0$ $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$ $x = \frac{-(-6) \pm \sqrt{(-6)^2 - 4(2)(-1)}}{2(2)}$ $x = \frac{6 \pm \sqrt{44}}{4}$ $x = 3,16 \text{ or } x = -0,16$	✓ $2x^2 - 6x - 1 = 0$ ✓ formula ✓ sub. into correct formula ✓ answer (4)
1.1.3	$\sqrt{1+x} + 5 = x$ $\sqrt{1+x} = x - 5$ Square both sides, $1 + x = x^2 - 10x + 25$ $x^2 - 11x + 24 = 0$ $(x - 8)(x - 3) = 0$ $x = 8 \text{ or } x = 3 \text{ N/A}$	✓ $\sqrt{1+x} = x - 5$ ✓ squaring ✓ standard form ✓ factors ✓ answer (5)
1.1.4	$x^2 + 3x - \frac{56}{x^2 + 3x} = 26$ Let $x^2 + 3x = k$ $k - \frac{56}{k} = 26$ $k^2 - 26k - 56 = 0$ $(k - 28)(k + 2) = 0$ $k = 28 \text{ or } k = -2$	✓ $x^2 + 3x = k$ ✓ std form in k ✓ factors ✓ vales of k

	$x^2 + 3x = 28 \quad \text{or} \quad x^2 + 3x = -2$ $x^2 + 3x - 28 = 0 \quad \text{or} \quad x^2 + 3x + 2 = 0$ $(x+7)(x-3) = 0 \quad \text{or} \quad (x+2)(x+1) = 0$ $x = -7 \quad \text{or} \quad x = 3 \quad \text{or} \quad x = -2 \quad \text{or} \quad x = -1$	$\checkmark$ 2 eqs. in x $\checkmark\checkmark$ 4 values of x (7)
1.1.5	$(x+3)(2-x) > 0$ $(x+3)(x-2) < 0$ $-3 < x < 2$ 	$\checkmark (x-3)(2-x) > 0$ $\checkmark$ end values $\checkmark$ notation (3)
1.1.6	$3x^{\frac{1}{2}} - 5x^{\frac{1}{4}} - 2 = 0$ $(3x^{\frac{1}{4}} + 1)(x^{\frac{1}{4}} - 2) = 0$ $x^{\frac{1}{4}} = -\frac{1}{3} \quad \text{or} \quad x^{\frac{1}{4}} = 2$ N/A $x = 16$	$\checkmark\checkmark$ factors $\checkmark x^{\frac{1}{4}} = -\frac{1}{3} \quad \text{or} \quad x^{\frac{1}{4}} = 2$ $\checkmark x = 16$ (4)
1.2	$x^2 - 2xy - 3y^2 \quad \text{and} \quad 3x + y - 2 = 0$ $y = 2 - 3x$ $x^2 - 2x(2-3x) - 3(2-3x)^2 = 0$ $x^2 - 4x + 6x^2 - 3(4 - 12x + 9x^2) = 0$ $x^2 - 4x + 6x^2 - 12 + 36x - 27x^2 = 0$ $-20x^2 + 32x - 12 = 0$ $5x^2 - 8x + 3 = 0$ $(5x-3)(x-1) = 0$ $x = \frac{3}{5} \quad \text{or} \quad x = 1$ $y = 2 - 3\left(\frac{3}{5}\right) \quad \text{or} \quad y = 2 - 3(1)$ $y = \frac{1}{5} \quad \text{or} \quad y = -1$	$\checkmark y = 2 - 3x$ $\checkmark$ sub. of y $\checkmark$ std form $\checkmark$ factors $\checkmark x = \frac{3}{5}$ $\checkmark x = 1$ $\checkmark y$ values (7)

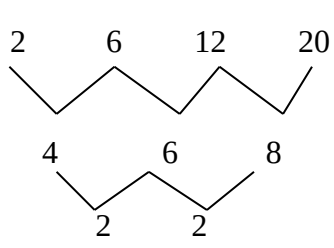
1.3.1	$x = \frac{4 \pm \sqrt{25 - 5k}}{2}$ When $k = 5$, $\Delta = 25 - 5(5)$ $= 0$ Roses are real and equal	✓ sub of k in Δ ✓ equal and real (2)
1.3.2	For non-real roots, $\Delta < 0$ $25 - 5k < 0$ $k > 5$	✓ $\Delta < 0$ ✓ $k > 5$ (2)

QUESTION 2

2.1.1	$\sqrt{\frac{2^{399} + 2^{396}}{2^{396}}} = \sqrt{\frac{2^{396}(2^3 + 1)}{2^{396}}}$ $= \sqrt{9}$ $= 3$	✓ taking common factor outside ✓ ans (2)
2.1.2	$(\sqrt{6x} - \sqrt{2x})(\sqrt{6x} + \sqrt{2x}) = (\sqrt{6x})^2 - (\sqrt{2x})^2$ $= 6x - 2x$ $= 4x$	✓ $(\sqrt{6x})^2 - (\sqrt{2x})^2$ ✓ ans (2)
2.1.3	$\frac{10^{n+3} \cdot 5^{n-1}}{50^{n+2}}$ $= \frac{(5 \times 2)^{n+3} \cdot 5^{n-1}}{(5^2 \times 2)^{n+2}}$ $= \frac{5^{n+3} \cdot 2^{n+3} \cdot 5^{n-1}}{5^{2n+4} \cdot 2^{n+2}}$ $= 5^{n+3+n-1-2n-4} \cdot 2^{n+3-n-2}$ $= 5^{-2} \cdot 2$ $= \frac{2}{25}$	✓ Convert base into prime numbers ✓ removing the bracket ✓ apply the law ✓ answer (4)

2.2.1	$4.3^{1-x} + 3^{2-x} = 4.3^1.3^{-x} + 3^2.3^{-x}$ $= 3^{-x}(4.3 + 3^2)$ $= 3^{-x}(21)$ $= \frac{21}{3^x}$	$\checkmark 4.3^1.3^{-x} + 3^2.3^{-x}$ $\checkmark \text{taking common factor outside}$ $\checkmark \text{answer} \quad (3)$
2.2.2	$4.3^{1-x} + 3^{2-x} = 63$ $\frac{21}{3^x} = 63$ $3^{-x} = \frac{63}{21}$ $3^{-x} = 3$ $x = -1$	$\checkmark \frac{21}{3^x} = 63$ $\checkmark 3^{-x} = \frac{63}{21}$ $\checkmark \text{answer} \quad (3)$

QUESTION 3

3.1	 $T_5 = 30$ $T_6 = 42$	$\checkmark T_5 = 30$ $\checkmark T_6 = 42 \quad (2)$
3.2	$2a = 2; \quad 3a + b = 4;$ $a = 1 \quad 3(1) + b = 4$ $b = 1$ $a + b + c = 2$ $1 + 1 + c = 2$ $c = 0$ $T_n = n^2 + n$	$\checkmark 3a + b = 4;$ $\checkmark a + b + c = 2$ $\checkmark \text{value of } a$ $\checkmark \text{Value of } b$ $\checkmark \text{value of } c \quad (5)$

QUESTION 4

4.1.1	$i_{eff} = \left(1 + \frac{i}{m}\right)^m - 1$ $= \left(1 + \frac{0,085}{4}\right)^4 - 1$ $= 0.087747961...$ $\text{Rate} = 8,77\%$	$\checkmark \text{formula}$ $\checkmark \text{correct sub. into formula}$ $\checkmark \text{answer} \quad (3)$
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4.1.2	$A = P(1+i)^n$ $= 12000 \left(1 + \frac{0,085}{4}\right)^{4 \times 5}$ $= \text{R } 18273,54$	✓ formula ✓ sub. into the formula ✓ answer (3)
4.2	$A = P(1-i)^n$ $= 150000(1 - 0,124)^5$ $= \text{R } 77376,98$	✓ formula ✓ sub. into the formula ✓ answer (3)
4.3	$x\left(1 + \frac{0,08}{12}\right)^{36} + x\left(1 + \frac{0,08}{12}\right)^{24} + x\left(1 + \frac{0,08}{12}\right)^{12} = 20000$ $x(3,52612449) = 20000$ $x = \text{R } 5671,95$	✓ i ✓ equation ✓ $x(3,52612449) = 20000$ ✓ answer (4)

QUESTION 5

5.1	$f(x) = 2(x+2)(x-6)$ $0 = 2(x+2)(x-6)$ $x = -2 \text{ or } x = 6$ $\text{OA} = 2 \text{ and } \text{OB} = 6$	✓ OA = 2 ✓ OB = 6 (2)
5.2	$f(x) = 2(x+2)(x-6)$ $f(x) = 2(0+2)(0-6)$ $= -24$ $\text{C}(0; -24)$	✓ $x=0$ ✓ $y = -24$ (2)
5.3	Axis of symmetry is $x = 1$ $f(1) = 2(1+2)(1-6)$ $= -30$ $\text{TP}(1; -30)$ $\text{Range is } y \geq -30$	✓ $x = 1$ ✓ TP(1 ; -30) ✓ ans (3)

5.4	$0 < x < 6$	✓ Notation ✓ end values (2)
5.5	$c = -24$ $y = mx - 24$ Passing through (6 ;0) $0 = m(6) - 24$ $m = 4$	✓ $c = -24$ ✓ sub. of (6;0) ✓ $m = 4$ (3)
5.6	T.P of $h(x)$ is (1 ; 30)	✓ x value ✓ y value (2)

QUESTION 6

6.1.1	Asymptotes are $x = 3$ and $y = -2$	✓ $x = 3$ ✓ $y = -2$
6.1.2	$f(x) = \frac{2}{x-3} - 2$ x -intercepts: $0 = \frac{2}{x-3} - 2$ $2 = \frac{2}{x-3}$ $2(x-3) = 2$ $2x = 8$ $x = 4$ y -intercepts $y = \frac{2}{0-3} - 2$ $= \frac{-8}{3}$	✓ making $y = 0$ ✓ $x = 4$ ✓ making $x = 0$ ✓ $y = \frac{-8}{3}$ (4)
6.1.3		✓ x-int ✓ y-int ✓ shape

6.1.4	Domain is $x \in R, \text{ but } x \neq 3$	✓ answer (1)
6.1.5	$y = (x - 3) - 2$ $= x - 5$	✓ $m = 1$ ✓ $c = -5$ (2)
6.2	$g(x) = a.b^x + q$ $q = -1$ $y = a.b^x - 1$ Passing through (0; -2) $-2 = a.b^0 - 1$ $-1 = a.(1)$ $a = -1$ (-1; -4) $-4 = (-1).b^{-1} - 1$ $-3 = b^{-1}$ $b = \frac{1}{3}$	✓ value of q ✓ Sub. of (0;-2) ✓ value of a ✓ sub. of (-1;-4) ✓ value of b (5)