Education and Sport Development
Department of Education and Sport Development
Departement van Onderwys en Sportontwikkeling
Lefapha la Thuto le Tlhabololo ya Metshameko
NORTH WEST PROVINCE

GRADE 11

MATHEMATICS P1 MEMORANDUM

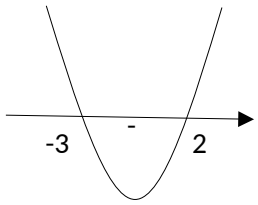
JUNE 2017

MARKS: 100

This memorandum consists of 9 pages..

QUESTION 1

1.1.1	$2x^2 - 7x = 0$ $x(2x - 7) = 0$ $x = 0$ or $x = \frac{7}{2}$	✓factors ✓ $x = 0$ ✓ $x = \frac{7}{2}$ (3)
1.1.2.	$2x(x - 3) = 1$ $2x^2 - 6x - 1 = 0$ $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$ $x = \frac{-(-6) \pm \sqrt{(-6)^2 - 4(2)(-1)}}{2(2)}$ $x = \frac{6 \pm \sqrt{44}}{4}$ $x = 3{,}16$ 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, $1 + x = x^2 - 10x + 25$ $x^2 - 11x + 24 = 0$ $(x - 8)(x - 3) = 0$ $x = 8$ or $x = 3$ 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 $x2 + 3x = k$ $k - \frac{56}{k} = 26$ $k2 - 26k - 56 = 0$	✓ $x2 + 3x = k$ ✓std form in k ✓factors ✓vales of k

	$(k - 28)(k + 2) = 0$ $k = 28$ or $k = -2$ $x2 + 3x = 28$ *or* $x2 + 3x = -2$ $x2 + 3x - 28 = 0$ or $x2 + 3x + 2 = 0$ $(x + 7)(x - 3) = 0$ or $(x + 2)(x + 1) = 0$ $x = -7$ or $x = 3$ or $x = -2$ or $x = -1$	✓ 2 eqs. in x ✓✓ 4 values of x (7)
1.1.5	$(x + 3)(2 - x) > 0$ $(x + 3)(x - 2) < 0$ $-3 < x < 2$  	✓$(x - 3)(2 - x) > 0$ ✓end values ✓notation (3)
1.1.6	$3x^{\frac{1}{2}} - 5x^{\frac{1}{4}} - 2 = 0$ $\left(3x^{\frac{1}{4}} + 1\right)\left(x^{\frac{1}{4}} - 2\right) = 0$ $x^{\frac{1}{4}} = -\frac{1}{3}$ *or* $x^{\frac{1}{4}} = 2$ $x = 16$	✓✓ factors ✓ $x^{\frac{1}{4}} = -\frac{1}{3}$ *or* $x^{\frac{1}{4}} = 2$ ✓ $x = 16$ (4)
1.2	$x^2 - 2xy - 3y^2$ and $3x + y - 2 = 0$ $y = 2 - 3x$ $x^2 - 2x(2 - 3x) - 3(2 - 3x)^2 = 0$ $x^2 - 4x + 6x^2 - 3(4 - 12x + 9x^2) = 0$ $x^2 - 4x + 6x^2 - 12 + 36x - 27x^2) = 0$ $-20x^2 + 32x - 12 = 0$ $5x^2 - 8x + 3 = 0$	✓ $y = 2 - 3x$ ✓sub. of y ✓std form

	$(5x-3)(x-1)=0$ $x=\frac{3}{5}$ or $x=1$ $y=2-3\left(\frac{3}{5}\right)$ or $y=2-3(1)$ $y=\frac{1}{5}$ $y=-1$	✓factors ✓$x=\frac{3}{5}$ ✓ $x=1$ ✓y values (7)
1.3.1	$x=\frac{4\pm\sqrt{25-5k}}{2}$ When k = 5, $\Delta=25-5(5)$ $=0$ Roots 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	$\frac{10^{n+3}.5^{n-1}}{50^{n+2}}$ $= \frac{(5\times2)^{n+3}.5^{n-1}}{(5^2\times2)^{n+2}}$ $= \frac{5^{n+3}.2^{n+3}.5^{n-1}}{5^{2n+4}.2^{n+2}}$ $= 5^{n+3+n-1-2n-4}.2^{n+3-n-2}$ $= 5^{-2}.2$ $= \frac{2}{25}$	✓Convert base into prime numbers ✓removing the bracket ✓apply the law ✓answer (4)

2.2.1	$4.3^{1-x}+3^{2-x}=4.3^{1}.3^{-x}+3^{2}.3^{-x}$ $=3^{-x}(4.3+3^{2})$ $=3^{-x}(21)$ $=\frac{21}{3^{x}}$	$4.3^{1}.3^{-x}+3^{2}.3^{-x}$ ✓ ✓taking common factor outside ✓answer (3)
2.2.2	$4.3^{1-x}+3^{2-x}=63$ $\frac{21}{3^{x}}=63$ $3^{-x}=\frac{63}{21}$ $3^{-x}=3$ $x=-1$	$\frac{21}{3^{x}}=63$ ✓ $3^{-x}=\frac{63}{21}$ ✓ ✓answer (3)

QUESTION 3

3.1	2 6 12 20 4 6 8 2 2 $T_5 = 30$ $T_6 = 42$	✓ $T_5 = 30$ ✓$T_6 = 42$ (2)
3.2	2a = 2 ; 3a + b = 4; a + b + c = 2 a = 1 3(1) + b = 4 1 +1 + c = 2 b = 1 c = 0 $T_n = n^2 + n$	✓3a + b = 4; ✓ a + b + c = 2 ✓value of a ✓Value of b ✓value of c (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... Rate = 8,77%	✓ formula ✓correct sub. into formula ✓answer (3)

4.1.2	$A = P(1+i)^n$ $=12000\left(1+\frac{0,085}{4}\right)^{4\times5}$ = R 18273,54	✓formula ✓sub. into the formula ✓answer (3)
4.2	$A = P(1-i)^n$ $= 150000(1- 0,124)^5$ = R77376,98	✓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 = R5671,95	✓i ✓ equation ✓ $x(3,52612449) = 20000$ ✓answer (4)

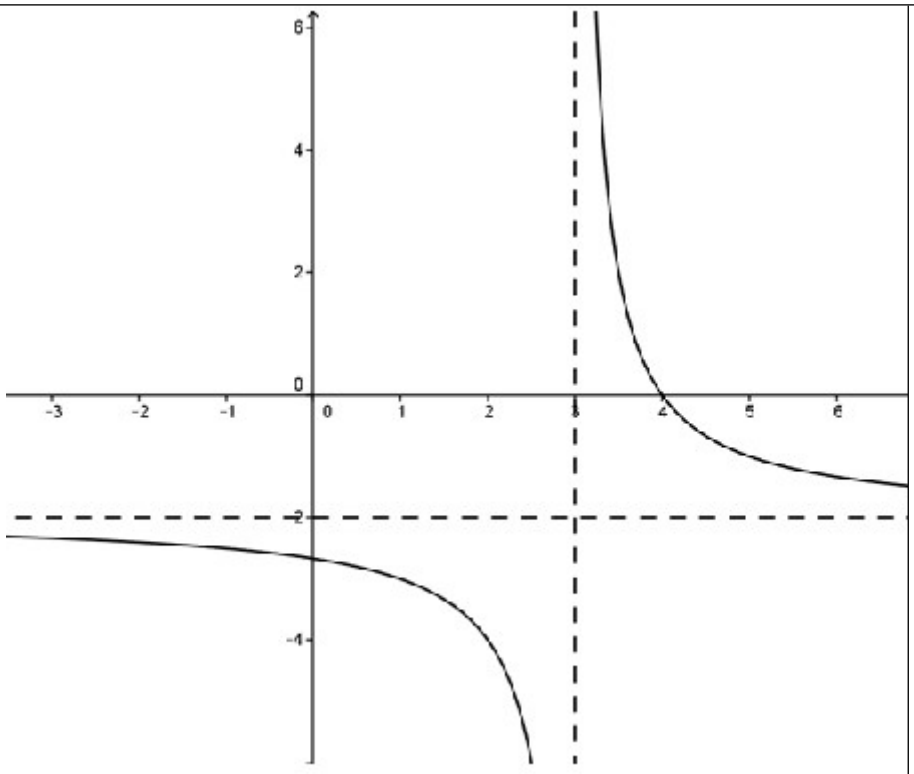
QUESTION 5

5.1	$f(x)=2(x+2)(x-6)$ $0=2(x+2)(x-6)$ x = -2 or x = 6 OA = 2 and OB = 6	✓ OA = 2 ✓ OB = 6 (2)
5.2	$f(x)=2(x+2)(x-6)$ $f(x)=2(0+2)(0-6)$ = -24 C(0; -24)	✓ x =0 ✓y = -24 (2)
5.3	Axis of symmetry is x = 1 $f(1)=2(1+2)(1-6)$ = -30 TP(1 ; -30) Range is y $y \geq -30$	✓ 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) $o = m(6) - 24$ 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 $x \in R, but\ x \neq 3$	✓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)