Education and Sport Development

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NORTH WEST PROVINCE

GRADE 11

MATHEMATICS P1- MEMORANDUM

MID YEAR EXAMINATION 2019
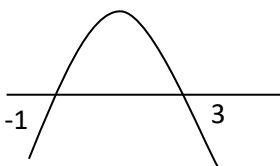
MARKS: 100

This memorandum consists of 9 pages.

QUESTION 1 [26]

1.1.1	$(2x+1)(x-2) = 0$ $x = -\dfrac{1}{2}$ or $x = 2$	✓ $x = -\dfrac{1}{2}$ ✓ $x = 2$ (2)
1.1.2.	$5x(x-3) = 2$ $5x^2 - 15x - 2 = 0$ $x = \dfrac{-b \pm \sqrt{b^2 - 4ac}}{2a}$ $x = \dfrac{-(-15) \pm \sqrt{(-15)^2 - 4(5)(-2)}}{2(5)}$ $x = \dfrac{15 \pm \sqrt{265}}{10}$ $x = 3,13$ or $x = -0,13$	✓$5x^2 - 15x - 2 = 0$ ✓ formula ✓sub. into correct formula ✓ $x = \dfrac{15 \pm \sqrt{265}}{10}$ ✓answers (5)
1.1.3	$2x - \sqrt{32-8x} = 0$ $2x = \sqrt{32-8x}$ $4x^2 = 32 - 8x$ $4x^2 + 8x - 32 = 0$ $x^2 + 2x - 8 = 0$ $(x-2)(x+4) = 0$ $x = 2$ or $x = -4$ N/A	✓$2x = \sqrt{32-8x}$ ✓ squaring ✓standard form ✓factors ✓answer (5)
1.1.4	$x^2 + 6x - \dfrac{35}{x^2 + 6x} = 2$ Let $x^2 + 6x = k$ $k - \dfrac{35}{k} = 2$ $k^2 - 2k - 35 = 0$	✓ $x^2 + 6x = k$ ✓std form in k

	$(k + 5)(k - 7) = 0$	✓factors
	$k = -5 \quad or \quad k = 7$	✓values of k
	$x^2 + 6x = -5 \quad or \quad x^2 + 6x = 7$	
	$x^2 + 6x + 5 = 0 \quad or \quad x^2 + 6x - 7 = 0$	✓ 2 eqs. in x
	$(x + 1)(x + 5) = 0 \quad or \quad (x - 1)(x + 7) = 0$	✓✓ 4 values of x (7)
	$x = -1 \quad or \quad x = -5 \quad or \quad x = 1 \quad or \quad x = -7$	
1.2	$2x - y = 8$ ....(1)	
	$y = x^2 + 4x - 23$ ....(2)	
	$y = 2x - 8$ ....(3)	✓ $y = 2x - 8$
	Sub. (3) in (2)	✓sub. of y
	$2x - 8 = x^2 + 4x - 23$	✓std form
	$x^2 + 2x - 15 = 0$	
	$(x + 5)(x - 3) = 0$	✓factors
	$x = -5 \quad or \quad x = 3$	✓ x values
	$y = 2(-5) - 8 = -18 \quad or \quad y = 2(3) - 8 = -2$	✓✓y values (7)

QUESTION 2[10]

2.1.1	$x = \dfrac{-4 \pm \sqrt{(k+1)(3-k)}}{2}$	
		✓sub. of k into Δ
	When $k = 2$,	✓$\Delta = 3$
	$\Delta = (2+1)(3-2) = 3$ *which is + ve and not a perfect square*	✓conclusion
		(3)
	Roots are unequal, irrational and real	
2.1.2	For non-real, $(k+1)(3-k) < 0$	✓(k+1)(3 − k) < 0
	$k < -1 \quad or \quad k > 3$	✓ $k < -1$
		✓ $k > 3$ (3)

2.2	$x^2 + 4mx + 8m + 12$	$\checkmark \left(\dfrac{4m}{2}\right)^2 = 8m + 12$
	Perfect square when $\left(\dfrac{4m}{2}\right)^2 = 8m + 12$	
	$4m^2 - 8m - 12 = 0$	$\checkmark$ Standard form
	$m^2 - 2m - 3 = 0$	
	$(m - 3)(m + 1) = 0$	$\checkmark$ factors
	$m = 3 \text{ or } m = -1$	$\checkmark$ values of m (4)

QUESTION 3 [9]

3.1.1	$\left(\sqrt{8x} - \sqrt{12x}\right)\left(\sqrt{8x} + \sqrt{12x}\right)$	
	$= (8x)^2 - (12x)^2$	
	$= 8x - 12x$	$\checkmark$ $8x - 12x$
		$\checkmark$ answer (2)
	$= -4x$	
3.1.2	$\dfrac{5^n . 10^{2n-1} . 2^{4n+1}}{20^{3n}}$	
	$= \dfrac{5^n . (5.2)^{2n-1} . 2^{4n+1}}{(5.2^2)^{3n}}$	$\checkmark$ convert base in terms of prime numbers
	$= \dfrac{5^n . 5^{2n-1} \, 2^{2n-1} . 2^{4n+1}}{5^{3n} . 2^{6n}}$	$\checkmark$ applying the laws
	$= 5^{n+2n-1-3n} . 2^{2n-1+4n+1-6n}$	$\checkmark$ simplification
	$= 5^{-1} . 2^0$	
	$= \dfrac{1}{5}$	$\checkmark$ answer (4)
3.2	$\dfrac{2.3^{n+1} + 3^{n+2}}{2.3^{n+3} + 3^n}$	
		$\checkmark$ Taking common factor outside
	$= \dfrac{3^n(2.3^1 + 3^2)}{3^n(2.3^3 + 1)}$	
	$= \dfrac{15}{55}$	$\checkmark$ simplification
	$= \dfrac{3}{11}$	$\checkmark$ answer (3)

QUESTON 4 [17]

4.1.1	5 ; 10 ; 17 ; 26 37 50
	
	     5 7 9 11 13
	
	          2 2
		✓ ✓answers 37; 50
		
		(2)

4.1.2	$2a = 2$ $3a + b = 5$ $a + b + c = 5$
	
	  $a = 1$; $b = 2$; $c = 2$
	
	$T_n = an^2 + bn + c$
	
	   $= n^2 + 2n + 2$
		✓ value of a
		✓value of b
		✓value of c
		
		✓ answer (4)

4.1.3	$n^2 + 2n + 2 = 1765$
	
	$n^2 + 2n - 1763 = 0$
	
	   $n = \dfrac{-2 \pm \sqrt{4 - 4(1)(-1763)}}{2}$
	
	     $= 41 \ or -43$
	
	     $n = 41$
		✓ equating to 1765
		
		✓ standard form
		
		✓ sub. into correct formula
		
		✓ values of n
		
		✓ answer (5)

4.2	x ; 6 ; 9 ; y ; 24;...
	
	   6 -x 3 y - 9 24 - y
	
	     x - 3 y - 12 33 -2y
	
	 $y - 12 = 33 - 2y$ or $x - 3 = y - 12$
	
	$3y = 55$
	
	$y = 15$
	
	 $x - 3 = 15 - 12$
	
	$x = 6$
	
	$x + y = 15 + 6 = 21$
		✓ first difference
		
		✓ $y - 12 = 33 - 2y$
		
		✓value of y
		
		✓ $x - 3 = y - 12$
		
		✓value of x
		
		✓ answer (6)

QUESTION 5 [6]

5.1	$A = P(1+i)^n$ $$36000 = P(1+0,095)^5$$ $$P = \frac{36000}{(1+0,095)^5}$$ $$= R222868,20$$	✓formula ✓sub. into the formula ✓answer (3)
5.2	$A = 20000(1+0,11)^6 - 4000(1+0,11)^2$ $$= R\ 32479,89$$	✓ ✓ $20000(1+0,11)^6$ $-4000(1+0,11)^2$ ✓answer (3)

QUESTION 6 [15]

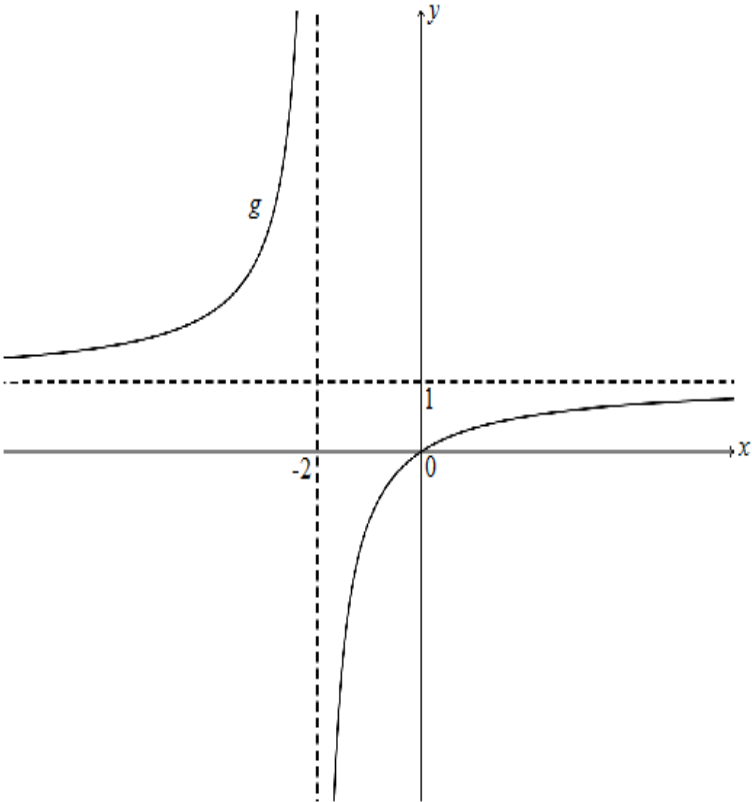| 6.1	$y = a(x - x_1)(x - x_2)$ $y = a(x + 3)(x - 1)$ $(0 \ ; \ 6)$ $6 = a(0+ 3)(0 - 1)$ $6 = -3a$ $a = -2$ $y = -2(x + 3)(x - 1)$ $= -2(x^2 +2x - 3)$ $= -2x^2 - 4x + 6$ $a = -2 \ ; \ b = -4 \ ; \ c = 6$	✓ formula ✓ sub. into correct formula ✓ value of a ✓ value of b ✓ value of c (5)
6.2	$x = \dfrac{-b}{2a}$ $= \dfrac{4}{2(-2)}$ $= -1$ $y = -2(-1)^2 - 4(-1) + 6$ $= 8$ $\therefore Range\ is\ \ y \leq 8$	✓ $x = -1$ ✓y - value of T.P ✓ answer (3)

6.3	$y = d^x + q$		
	$\quad (0; 0)$		
	$0 \ = d^0 \ + q$		
	$\ 0 = 1 \ + q$		
	$q \ = \ -1$	✓ value of q	
	$y \ = \ d^x - 1$		
	$2 \ = \ d^1 - 1$	✓ value of d	
	$d \ = \ 3$		
	Equation is $\ y \ = \ 3^x \ - \ 1$	✓ equation	(3)
6.4	$y \ = \ -1$	✓ answer	(1)
6.5	$x \le 0$	✓ answer	(1)
6.6	$(-1; -8)$	✓✓ answer	(2)

QUESTION 7 [8]

7.1	$g(x) = \dfrac{a}{x+2} + 1$	✓ $g(x) = \dfrac{a}{x+2} + 1$	
	$0 = \dfrac{a}{0+2} + 1$		
	$a = \ -2$	✓ value of a	
	$g(x) = \dfrac{-2}{x+2} + 1$	✓ Equation of g	(3)

Demo

7.2		✓Asymptotes ✓ Passing through (0;0) ✓correct quadrant and shape (3)
7.3	$y = -x + c$ passing $(-2 ; 1)$ $1 = -(-2) + c$ $c = -1$ $y = -x - 1$	✓ $y = -x + c$ ✓answer (2)

Demo

QUESTION 8 [9]

8.1	$$36 - x + x + 50 - x = 60$$ $$x = 26$$	✓ Diagram ✓ 26 ✓ 10 ✓ 24 ✓ 20 (5)
8.2.1	P (W and B) $= \dfrac{26}{80} = \dfrac{13}{40}$	✓ $\dfrac{26}{80}$ ✓ answer (2)
8.2.2	P (W or B) $= \dfrac{60}{80} = \dfrac{3}{4}$	✓ 60 ✓ answer in simplified form (2)

In the diagram: n(s)=50, W circle contains 36-x, 10; intersection x, 26; B circle contains 50-x, 24; outside 20.