Education and Sport Development

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NORTH WEST PROVINCE

GRADE 10

MARKS: 75

This memorandum consists of 6 pages

QUESTION 1[9]

1.1.1	$v = \sqrt{\dfrac{2E}{m}}$ $= \sqrt{\dfrac{2 \times 132}{12}}$ $= \sqrt{22}$	✓substitution ✓answer (2)
1.1.2	irrational	✓answer (1)
1.1.3	$\sqrt{16} < \sqrt{22} < \sqrt{25}$ $4 < \sqrt{22} < 5$ $\therefore$ it lies between integers 4 and 5	✓ $\sqrt{16} < \sqrt{22} < \sqrt{25}$ ✓answer (2)
1.2	$0,5\dot{2} = 0,5222222222.$ let $x = 0,5\dot{2}$ $\therefore 10x = 5,\dot{2}$ $-------(1)$ $\therefore 100x = 52,\dot{2}$ $------(2)$ equation $(2) - (1)$ $90x = 47$ $\therefore x = \dfrac{47}{92}$	✓equation 1 ✓equation 2 ✓ $90x = 47$ ✓answer (4)

QUESTION 2[18]

2.1.1	$a^2 - 2a - ax + 2x = a(a - 2) - x(a - 2)$ $\qquad\qquad\qquad = (a - 2)(a - x)$	✓ $a(a - 2)$ ✓ $-x(a - 2)$ ✓answer (3)
2.1.2	$\dfrac{x^3 - 27}{x^2 + 3x + 9} = \dfrac{(x - 3)(x^2 + 3x + 9)}{x^2 + 3x + 9}$ $\qquad\qquad = x - 3$	✓✓factors ✓answer (3)
2.2.1	$(2y - 3)(6y^2 + 4y - 8)$ $= 2y(6y^2 + 4y - 8) - 3(6y^2 + 4y - 8)$ $= 12y^3 + 8y^2 - 16y - 18y^2 - 12y + 24$ $= 12y^3 - 10y^2 - 28y + 24$	✓ $12y^3 + 8y^2 - 16y$ ✓ $-18y^2 - 12y + 24$ ✓answer (3)

| 2.2.2 | $\dfrac{2^{2n} \times 4^n \times 2}{16^n} = \dfrac{2^{2n}2^{2n}.2}{2^{4n}}$ $= \dfrac{2^{4n}2}{2^{4n}}$ $= 2$ | ✓changing 4^n to 2^{2n} ✓changing 16^n to 2^{4n} ✓answer (3) |
| 2.2.3 | $\dfrac{3x^3 - 7x^2 - 6x}{x^2 - 9} \div \dfrac{3x^2 + 2x}{3x + 9} = \dfrac{x(3x^2 - 7x - 6)}{(x-3)(x+3)} \div \dfrac{x(3x+2)}{3(x+3)}$ $= \dfrac{x(3x+2)(x-3)}{(x-3)(x+3)} \times \dfrac{3(x+3)}{x(3x+2)}$ $= 3$ | ✓ $x(3x^2 - 7x - 6)$ ✓ $(x-3)(x+3)$ ✓ $x(3x+2)$ ✓ $3(x+3)$ ✓ $(3x+2)(x-3)$ ✓answer (6) |

QUESTION 3[17]

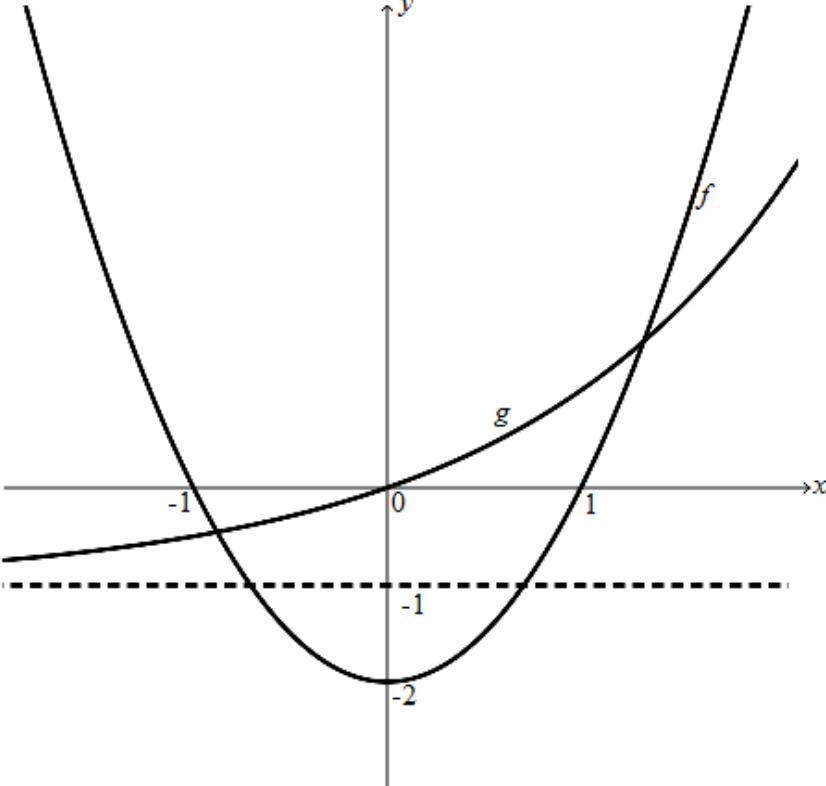| 3.1.1 | $9x = 4 - 5(2x - 3)$ $9x = 4 - 10x + 15$ $9x + 10x = 4 + 15$ $18x = 18$ $\therefore x = 1$ | ✓removing brackets ✓adding like terms ✓answer (3) |
| 3.1.2 | $4^x = \dfrac{1}{256}$ $2^{2x} = \dfrac{1}{2^8}$ $2^{2x} = 2^{-8}$ $\therefore 2x = -8$ $\therefore x = -4$ | ✓expressing both 4 and 256 as the base of 2 ✓answer (2) |
| 3.2 | $10 < x + 4 < 12$ $10 - 4 < x < 12 - 4$ $6 < x < 8$ | ✓transposing 4 ✓critical values ✓notation ✓graphical representation (4) |
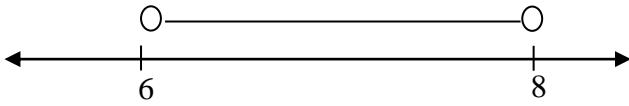
3.3	$A = \pi R^2 - \pi r^2$ $A - \pi R^2 = -\pi r^2$ $\dfrac{A - \pi R^2}{-\pi} = r^2$ $\therefore r = \sqrt{R^2 - \dfrac{A}{\pi}}$	✓ r^2 subj. of formula ✓ r subj. of formula NB: DO NOT PANELISE IF WRITE $\pm\sqrt{R^2 - \dfrac{A}{\pi}}$ (2)
3.4.1	$x^2 - 9y^2 = 99$ $(x - 3y)(x + 3y) = 99$ $\therefore x + 3y = \dfrac{99}{x - 3y}$	✓ factors ✓ answer (2)
3.4.2	$x + 3y = \dfrac{99}{x - 3y}$ $x + 3y = \dfrac{99}{3}$ $x + 3y = 33 ----$ *equation*1 $x - 3y = 3 ----$ *equation*2 $2x = 36$ $\therefore x = 18$ $\therefore 18 + 3y = 33$ $3y = 15$ $\therefore y = 5$	✓ substituting 3 ✓ $2x = 36$ ✓ value of x ✓ value of y (4)

QUESTION 4[10]

4.1.1	$-11; -16$	✓✓ each term (2)
4.1.2	Pattern is linear, $T_n = dn + c$ To solve for c, substitute $n = 1$ and $T_1 = 4$ $4 = -5(1) + c$ $\therefore c = 9$ $\therefore T_n = -5n + 9$	✓ substitution ✓ value of c ✓ answer (3)
4.1.3	$T_n = -5n + 9$ $T_{27} = -5(27) + 9$ $\quad = -126$	✓ substitution ✓ answer (2)
4.1.3	$T_n = -5n + 9$ $-71 = -5n + 9$ $5n = 80$ $\therefore n = 16$	✓ substitution ✓ answer (2)
4.2	111111X111111	✓ answer (1)

QUESTION 5[10]

5.1	$y = -1$	✓ answer (1)
5.2		Parabola ✓x – intercepts ✓Turning point ✓concave up Exponential ✓intercepts at (0;0) ✓asymptote ✓increasing function (6)
5.3	$y > -1$ OR $y \in (-1; \infty)$	✓answer (1)
5.4	reflection about the x axis	✓reflection ✓x axis (2)

QUESTION 6[11]

6.1	$m = \dfrac{y_2 - y_1}{x_2 - x_1}$	✓formula
	$= \dfrac{-1 - 4}{3 + 2}$	✓substitution
	$= -1$	✓-1
	$y = mx + c$	
	$4 = -1(-2) + c$	
	$\therefore c = 2$	
	$\therefore y = -x + 2$	✓equation
	$\therefore a = -1 \quad q = 2$	(4)
6.2	$h(x) = p(x)$	✓equating
	$-\dfrac{2}{x} + 1 = -x + 2$	
	$-\dfrac{2}{x} = -x + 1$	
	$-2 = -x^2 + x$	
	$x^2 - x - 2 = 0$	✓standard form
	$(x - 2)(x + 1) = 0$	✓factors
	$\therefore x = 2 \text{ or } x = -1$	✓both values of x
		(4)
6.3	$-1 \le x < 0 \quad \text{or} \quad x \ge 2$	✓ end points ✓notation for $-1 \le x < 0$ ✓ $x \ge 2$
		(3)