Education and Sport Development

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NORTH WEST PROVINCE

GRADE 10

MATHEMATICS PAPER 1

MID YEAR EXAMINATION MEMORANDUM 2018

MARKS: 75

This memorandum consists of 6 pages

QUESTION 1[10]

1.1	$0,4\dot{3}$ and $\sqrt[3]{-\frac{1}{27}}$	✓ $0,4\dot{3}$ ✓ $\sqrt[3]{-\frac{1}{27}}$ (2)
1.2	9,87	✓answer (1)
1.3	$0,4\dot{3} = 0,433333333..$ let $x = 0,4\dot{3}$ $\therefore 10x = 4,\dot{3}$ $--------(1)$ $\therefore 100x = 43,\dot{3}$ $--------(2)$ equation (2) - (1) $90x = 39$ $\therefore x = \frac{13}{30}$	✓equation 1 ✓equation 2 ✓ $90x = 39$ ✓answer (4)
1.4	$7\sqrt{2} = \sqrt{98}$ $\sqrt{81} < \sqrt{98} < \sqrt{100}$ $9 < \sqrt{98} < 10$ $\therefore$ it lies between integers 9 and 10	✓ $7\sqrt{2} = \sqrt{98}$ ✓ $\sqrt{81} < \sqrt{98} < \sqrt{100}$ ✓answer (3)

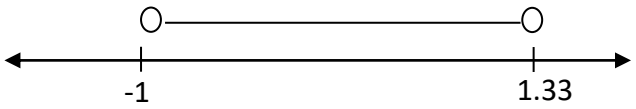
QUESTION 2[16]

2.1	$(2a-3b)(3a^2+2ab-3b^2)$ $= 2a(3a^2+2ab-3b^2) - 3b(3a^2+2ab-3b^2)$ $= 6a^3+4a^2b-6ab^2-9a^2b-6ab^2+9b^3$ $= 6a^3-5a^2b-12ab^2+9b^3$	✓ $6a^3+4a^2b-6ab^2$ ✓ $-9a^2b-6ab^2+9b^3$ ✓answer (3)
2.2.1	$3x+6y-ax-2ay = 3(x+2y)-a(x+2y)$ $= (x+2y)(3-a)$	✓common factor ✓answer (2)
2.2.2	$3x^2+17x-6 = (3x-1)(x+6)$	✓ $(3x-1)$ ✓ $(x+6)$ (2)

2.3.1	$\frac{2^{3n+2}.8^{n-3}}{4^{3n-2}} = \frac{2^{3n}2^2.2^{3(n-3)}}{2^{2(3n-2)}}$ $= \frac{2^{3n}2^2.2^{3n}2^{-9}}{2^{6n}2^{-4}}$ $= 2^{3n+3n-6n}.2^{2-9+4}$ $= 2^0.2^{-3}$ $= 1\times\frac{1}{8}$ $= \frac{1}{8}$	✓simplify numerator ✓simplify denominator ✓simplification ✓ 2^{-3} ✓answer (5)
2.3.2	$\frac{p^3+q^3}{6p^2}\times\frac{3p-3q}{p^2-q^2} = \frac{(p+q)(p^2-pq+q^2)}{6p^2}\times\frac{3(p-q)}{(p+q)(p-q)}$ $= \frac{p^2-pq+q^2}{2p^2}$	✓factor sum of two cubes ✓common factor ✓factor diff. of two squares ✓answer (4)

QUESTION 3[22]

3.1.1	$3x-5 = 2(3x-1)$ $3x-5 = 6x-2$ $3x-6x = -2+5$ $-3x = 3$ $\therefore x = -1$	✓removing brackets ✓simplify ✓answer (3)
3.1.2	$x(x-2) = 8$ $x^2-2x = 8$ $x^2-2x-8 = 0$ $(x-4)(x+2) = 0$ $\therefore x = 4$ or $x = -2$	✓removing brackets ✓standard form ✓factors ✓both answers (4)
3.1.3	$3^{2x+2} = \frac{1}{27}$ $3^{2x+2} = \frac{1}{3^3}$ $3^{2x+2} = 3^{-3}$ $\therefore 2x+2 = -3$ $2x = -5$ $\therefore x = -\frac{5}{2}$	✓ 3^{-3} ✓equating exponents ✓simplification ✓answer (4)

3.2	$-\frac{1}{3} < \frac{x-1}{6} < \frac{1}{18}$ $-2 < x-1 < \frac{1}{3}$ $-2+1 < x < \frac{1}{3}+1$ $-1 < x < \frac{4}{3}$  	✓simplification ✓critical values ✓notation ✓graphical representation (4)
3.3.1	let price of fruit yoghurt be x and of plain yoghurt be y $x = y + 4$ $5x + 3y = 84$	✓✓each equation (2)
3.3.2	let fruit yoghurt be x and plain yoghurt be y $x = y + 4$ $5x + 3y = 84$ substitute $5(y+4) + 3y = 84$ $5y + 20 + 3y = 84$ $8y = 64$ $\therefore y = 8$ $x = 8 + 4$ $= 12$ $\therefore$ each fruit yoghurt cost R12 and each plain yoghurt cost R8	✓substitution ✓removing brackets ✓simplification ✓ $y = 8$ ✓ $x = 12$ (5)

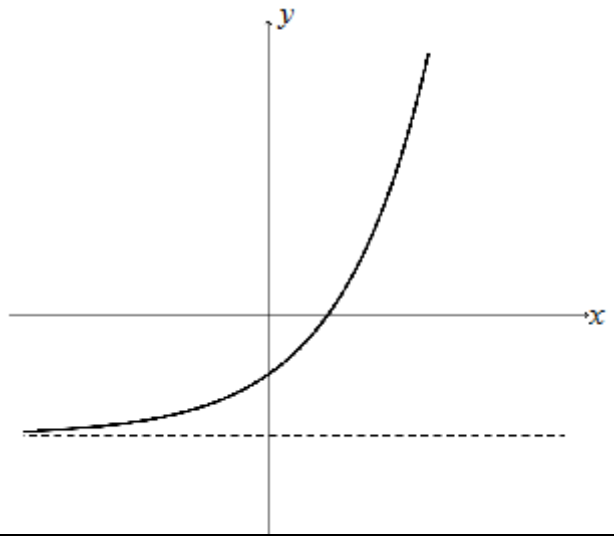
QUESTION 4[9]

4.1.1	4 $\overset{3}{\searrow}$ 7 $\overset{3}{\searrow}$ 10 next term is 13 $\therefore$ the fourth diagram will have 13 blocks	✓pattern ✓answer **Answer only: full marks** (2)
4.1.2	Pattern is linear, $T_n = dn + c$ To solve for c, substitute $n = 1$ and $T_1 = 4$ $4 = 3(1) + c$ $\therefore c = 1$ $\therefore T_n = 3n + 1$	✓substitution ✓ value of c ✓answer (3)

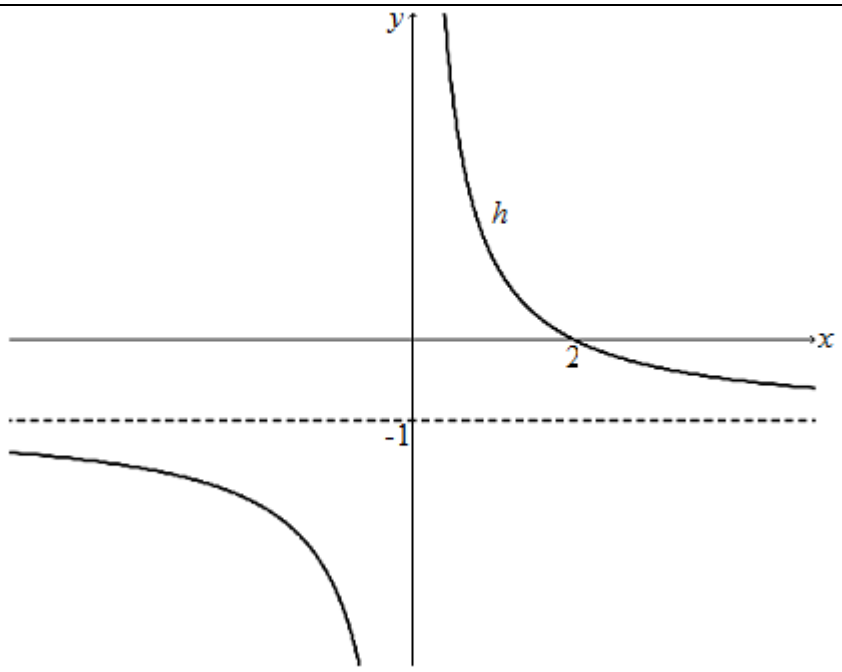
4.1.3	$T_n = 3n + 1$ $70 = 3n + 1$ $3n = 69$ $\therefore n = 23$ The 23rd diagram will have 70 blocks	✓substitution ✓answer (2)
4.2	$8888888 = 987654 \times 9 + 2$	✓987654 ✓+2 (2)

QUESTION 5[12]

5.1.1	C is y-intercept of f, $x = 0$ $\therefore y = -0^2 + 9$ $= 9$ $\therefore$ C(0;9) E is y-intercept of g $\therefore y = 0 - 3 = -3$ $\therefore$ E(0;–3)	✓ subst. $x = 0$ ✓ C(0;9) ✓ E(0;–3) (3)
5.1.2	CE = CO + OE = 9 + 3 = 12 units	✓method ✓answer (2)
5.1.3	A is point of intersection $\therefore f(x) = g(x)$ $-x^2 + 9 = x - 3$ $x^2 + x - 12 = 0$ $(x + 4)(x - 3) = 0$ $x = -4$ or $x = 3$ $\therefore x = -4$ $y = -4 - 3 = -7$ $\therefore$ A(-4;-7)	✓equating ✓standard form ✓✓each coordinate (4)

5.2		✓shape ✓increasing function ✓asymptote below x – axis (3)

QUESTION 6[6]

6.1	$h(x)=\frac{2}{x}-1$ x - intercept, $y=0$ $0=\frac{2}{x}-1$ $1=\frac{2}{x}$ $\therefore x=2$	✓subst. $y=0$ ✓ $x=2$ (2)
6.2	$y=-1$	✓answer (1)
6.3		✓x – intercept ✓asymptotes ✓shape (3)