



## **Education and Sport Development**

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**NORTH WEST PROVINCE**

**GRADE 10**

**MATHEMATICS PAPER 1**

**MID YEAR EXAMINATION MEMORANDUM 2017**

**MARKS: 75**

**This memorandum consists of 6 pages**

**QUESTION 1**

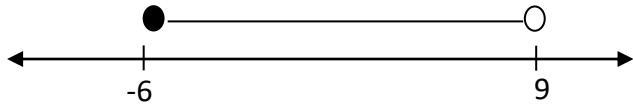
1.1.1	$\sqrt{-16}$	✓ answer (1)
1.1.2	$\frac{\pi}{3}$ and $\sqrt[3]{9}$	✓✓ each answer (2)
1.2	$0,6\dot{3} = 0,633333..$ let $x = 0,6\dot{3}$ $\therefore 10x = 6,3\dot{3} \text{ ----- (1)}$ $\therefore 100x = 63,3\dot{3} \text{ ----- (2)}$ equation (2) - (1) $90x = 57$ $\therefore x = \frac{19}{30}$	✓ equation 1 ✓ equation 2  ✓ $90x = 57$  ✓ answer (4)
1.3	$\sqrt{100} < \sqrt{111} < \sqrt{121}$ $10 < \sqrt{111} < 11$ $\therefore$ it lies between integers 10 and 11	✓ $\sqrt{100} < \sqrt{111} < \sqrt{121}$  ✓ answer (2)

**QUESTION 2**

2.1.1	$(2x + 3y)(-7x + 4y) = -14x^2 + 8xy - 21xy + 12y^2$ $= -14x^2 - 3xy + 12y^2$	✓ removing brackets ✓ answer (2)
2.1.2	$(x + 3)(x^2 - 3x + 9) - (x + 2)^2$ $= x(x^2 - 3x + 9) + 3(x^2 - 3x + 9) - (x + 2)(x + 2)$ $= x^3 - 3x^2 + 9x + 3x^2 - 9x + 27 - (x^2 + 4x + 4)$ $= x^3 + 27 - x^2 - 4x - 4$ $= x^3 - x^2 - 4x + 23$	✓✓ removing brackets ✓ simplification ✓ answer (4)
2.1.3	$\frac{3x^2 - 3}{x^2 - 5x - 6} \div \frac{1 - x}{x - 6} = \frac{3(x - 1)}{(x - 6)(x + 1)} \times \frac{x - 6}{-(x - 1)}$ $= -\frac{3}{x + 1}$	✓ $3(x - 1)$ ✓ $(x - 6)(x + 1)$ ✓ $-(x - 1)$ ✓ answer (4)
2.1.4	$\frac{3^x - 3^{x-1}}{5 \cdot 3^x - 3^{x+1}} = \frac{3^x - 3^x \cdot 3^{-1}}{5 \cdot 3^x - 3^x \cdot 3^1}$ $= \frac{3^x \left(1 - \frac{1}{3}\right)}{3^x (5 - 3)}$ $= \frac{2}{3} \div 2$ $\frac{1}{3}$	✓ expanding both denominator and numerator ✓ factorising numerator ✓ factorising denominator  ✓ answer (4)
2.2.1	$a^2 - 2a - ax + 2x = a(a - 2) - x(a - 2)$ $= (a - 2)(a - x)$	✓✓ taking out common factors ✓ answer (3)
2.2.2	$3y^3 + 192 = 3(y^3 + 64)$ $= 3(y + 3)(y^2 - 3y + 8)$	✓ taking out common factor ✓ factorising sum of two cubes (2)

## Marking Memorandum

**QUESTION 3**

3.1.1	$(x+4)(x-3) = x(x-1)$ $x^2 + x - 12 = x^2 - x$ $2x = 12$ $\therefore x = 6$	✓simplify LHS ✓simplify RHS ✓ $2x = 12$ ✓answer (4)
3.1.2	$x^2 - 6x - 7 = 0$ $(x-7)(x+1) = 0$ $x-7 = 0$ or $x+1 = 0$ $\therefore x = 7$ or $x = -1$	✓factors ✓both answers (2)
3.1.3	$4 \cdot 3^{x+1} = 972$ $3^{x+1} = 243$ $3^{x+1} = 3^5$ $x+1 = 5$ $\therefore x = 4$	✓simplification ✓ $3^5$ ✓equating exponents ✓answer (4)
3.2	$-8 \leq x-2 < 7$ $-8+2 \leq x < 7+2$ $-6 \leq x < 9$ 	✓transposing -2 ✓critical values ✓notation ✓graphical representation (4)
3.3	let number of 2 wheel toy motorcycles be $x$ and number of 3 wheel motorcycles be $y$ $x + y = 80$ ----- 1 $2x + 3y = 181$ ----- 2  From equation 1 $x = 80 - y$ Substitute $x = 80 - y$ in equation 2 $2(80 - y) + 3y = 181$ $160 - 2y + 3y = 181$ $\therefore y = 181 - 160$ $= 21$ $\therefore x = 80 - 21$ $= 59$ $\therefore$ There are 59 2 wheel and 21 3 wheel toy motorcycles	✓equation (1) ✓equation (2)  ✓substitution  ✓ $y$ value ✓ $x$ value (5)

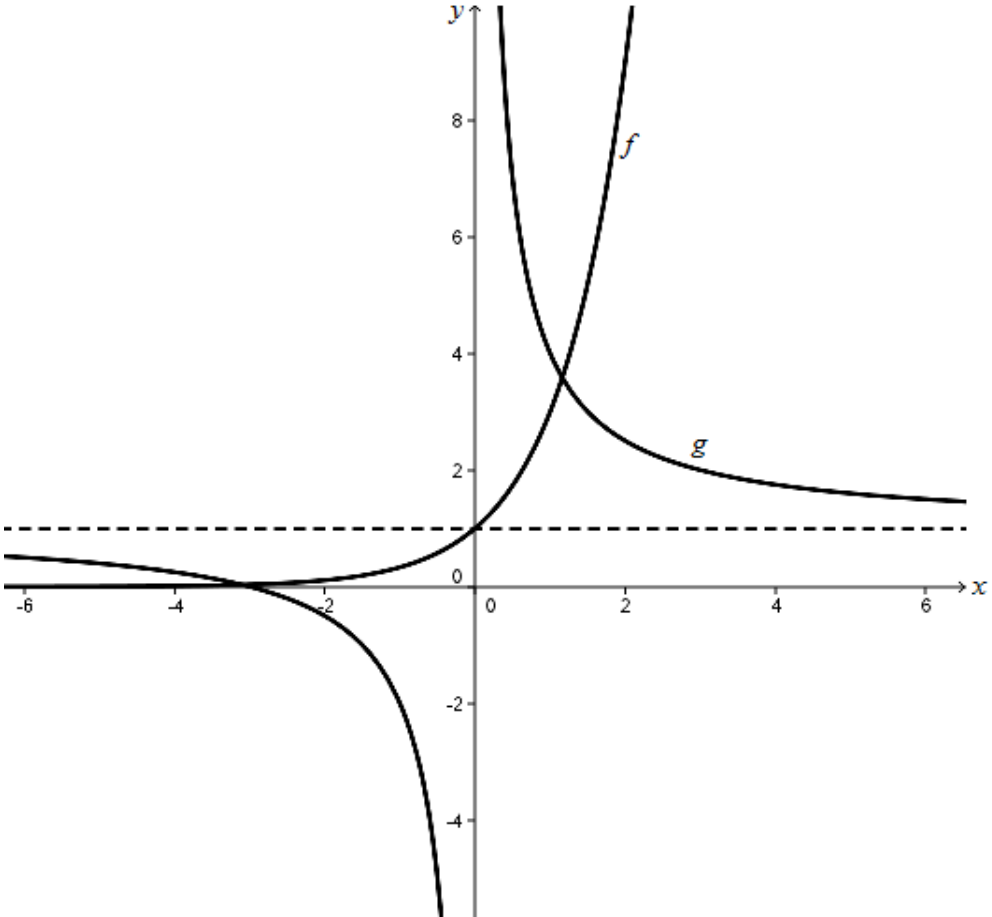
## Marking Memorandum

3.4	$V = \frac{1}{3}\pi r^2 h$ $3V = \pi r^2 h$ $\frac{3V}{\pi h} = r^2$ $\therefore r = \sqrt{\frac{3V}{\pi h}}$	✓ simplification ✓ simplification ✓ answer (3)
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## QUESTION 4

4.1.1	Pattern is linear, $T_n = dn + c$ To solve for $c$ , substitute $n = 1$ and $T_1 = 7$ and $d = 4$ $7 = 4(1) + c$ $\therefore c = 3$ $\therefore T_n = 4n + 3$	✓ substitution ✓ value of $c$ ✓ answer (3)
4.1.2	$T_n = 4n + 3$ $T_{71} = 4(71) + 3$ $= 287$	✓ substitution ✓ answer (2)
4.1.3	$T_n = 4n + 3$ $131 = 4n + 3$ $131 - 3 = 4n$ $128 = 4n$ $\therefore n = 32$	✓ substitution ✓ answer (2)
4.2.1	$4x + 11$ ; $5x + 14$	✓✓ each term (2)
4.2.2	For $x$ ; $2x$ ; $3x$ ;.. $T_n = xn$ For $2$ ; $5$ ; $8$ ;.. $T_n = 3n - 1$ $\therefore T_n = xn + 3n - 1$	✓ $T_n = xn$ ✓ $T_n = 3n - 1$ ✓ $T_n = xn + 3n - 1$ (3)

## QUESTION 5

5.1	$g(x) = \frac{3}{x} + 1$ $0 = \frac{3}{x} + 1$ $-1 = \frac{3}{x}$ $-x = 3$ $\therefore x = -3$	<div>✓simplification</div> <div>✓answer</div> <div>(2)</div>										
5.2		<table><tr><td>f</td><td>g</td></tr><tr><td>✓y-int</td><td>✓x-int</td></tr><tr><td>✓assym</td><td>✓assym</td></tr><tr><td>✓shape</td><td>✓shape</td></tr><tr><td></td><td></td></tr></table> <div>(6)</div>	f	g	✓y-int	✓x-int	✓assym	✓assym	✓shape	✓shape		
f	g											
✓y-int	✓x-int											
✓assym	✓assym											
✓shape	✓shape											
5.3	Range : $y > 0$	<div>✓answer</div> <div>(1)</div>										
5.4	$p(x) = \frac{3}{x} + 1 + 2$ $\therefore p(x) = \frac{3}{x} + 3$	<div>✓✓answer</div> <div>(2)</div>										
5.5	$x = 0$ $y = 3$	<div>✓answer</div> <div>✓answer</div> <div>(2)</div>										