LIMPOPO
PROVINCIAL GOVERNMENT
REPUBLIC OF SOUTH AFRICA

DEPARTMENT OF
EDUCATION

CAPRICORN SOUTH DISTRICT

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GRADE 12

MATHEMATICS

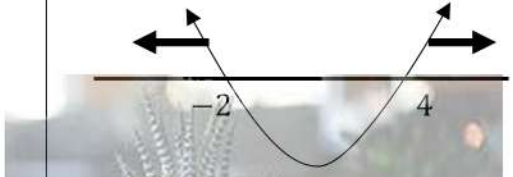
TEST 1

MEMORANDUM

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MARKS: 100

QUESTION 1

1.1			
	1.1.1	$2-3x=x-6$ $-4x=-8$ $x=4$	✓ simplification ✓ answer
	1.1.2	$6x^2-x-15=0$ $(3x-5)(2x+3)=0$ $x=\frac{5}{3}$ *or* $x=-\frac{3}{2}$	✓ factors ✓ $x=\frac{5}{3}$ ✓ $x=-\frac{3}{2}$
	1.1.3	$3x^2+x-5=0$ $x=\frac{-(1)\pm\sqrt{(1)^2-4(3)(-5)}}{2(3)}$ $=\frac{-1\pm\sqrt{61}}{6}$ $x=1.14$ *or* $x=-1.47$	✓ substitution ✓ simplification ✓ $x=1.14$ ✓ $x=-1.47$
	1.1.4	$(x-1)^2>9$ $x^2-2x-8>0$ $(x-4)(x+2)>0$ CV: $x=4$ *or* $x=-2$  $x<-2$ *or* $x>4$	✓ standard form ✓ critical values ✓ $x<-2$ ✓ $x>4$
	1.1.5	$\sqrt{2-7x}=2-x$ $2-7x=4-4x+x^2$ $x^2+3x+2=0$ $(x+1)(x+2)=0$ $x=-1$ *or* $x=-2$	✓ squaring ✓ standard form ✓ $x=-1$ ✓ $x=-2$

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1.2	$x - 2y = 1$ $x^2 - 2xy + y^2 = 9$ $x = 2y + 1$ $(2y + 1)^2 - 2y(2y + 1) + y^2 = 9$ $4y^2 + 4y + 1 - 4y^2 - 2y + y^2 - 9 = 0$ $y^2 + 2y - 8 = 0$ $(y + 4)(y - 2) = 0$ $y = -4 \text{ or } y = 2$ $x = 2(-4) + 1 = -7$ $x = 2(2) + 1 = 5$		✓ $x = 2y + 1$ ✓ substitution ✓ simplification ✓ standard form ✓ $y = -4 \text{ or } y = 2$ ✓ $x = -7 \text{ or } x = 5$
	1.3.1	$12^{x+1} = 36(6^x)$ $12^x.12 = 36(6^x)$ $\frac{12^x}{6^x} = \frac{36}{12}$ $\frac{2^x.6^x}{6^x} = 3$ $2^x = 3$	✓ $12^x.12$ ✓ $\frac{12^x}{6^x} = \frac{36}{12}$ ✓ $2^x.6^x$
	1.3.2	$2^x = 3$ $x = \log_2 3$ $x = 1.58$	✓ $x = \log_2 3$ ✓ answer

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QUESTION 2

2.1	6 13 22 33 **46** **61** 7 9 11 13 15 2 2 2 2	✓ first difference ✓ second difference
2.2	$x = 46$ $y = 61$	✓ $x = 46$ ✓ $y = 61$
2.3	$2a = 2$ $a = 1$ $3a + b = 7$ $b = 4$	✓ $a = 1$ ✓ $b = 4$

	$a+b+c=6$ $1+4+c=6$ $c=1$ $T_n=n^2+4n+1$ $T_{160}=160^2+4(160)+1$ $T_{160}=26\,241$	✓ $c=1$ ✓ substitution ✓ answer
2.4	$n^2+4n+1=397$ $n^2+4n-396=0$ $(n+20)(n-18)=0$ $n=-20\ or\ n=18$ $n=18$	✓ equating ✓ standard form ✓ $n=-20\ or\ n=18$ ✓ $n=18$

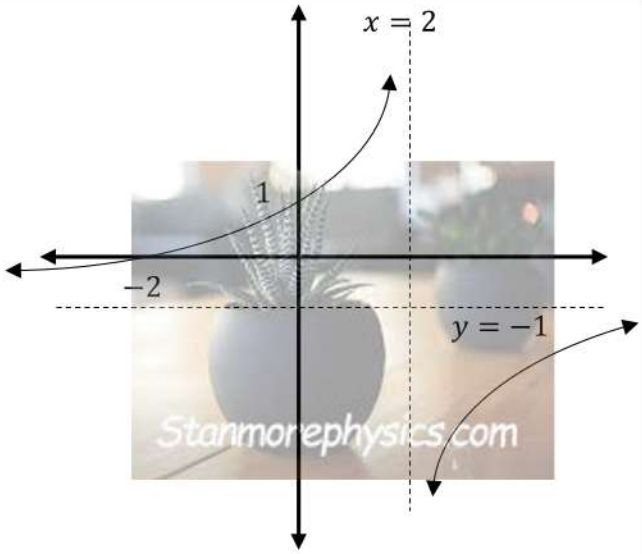
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QUESTION 3

3.1	3.1.1	$a=5 \qquad d=4$ $5+(n-1)4=401$ $4n=400$ $n=100$	✓ values of a and d ✓ substitution ✓ simplification ✓ answer
	3.1.2	$S_n=\frac{100}{2}(5+401)$ $=50(406)$ $=20\,300$	✓ substitution ✓ simplification ✓ answer
3.2	3.2.1	$x-2=18-x$ $2x=20$ $x=10$	✓ equating ✓ simplification ✓ answer
	3.2.2	$\frac{x}{2}=\frac{18}{x}$ $x^2=36$ $x=\pm 6$ $x=6$	✓ equating ✓ $x^2=36$ ✓ $x=\pm 6$ ✓ $x=6$
3.3			
	3.3.1	12; 24; 48	✓ 12 ✓ 24 ✓ 48

	3.3.2	$S_{10} = \frac{12[2^{10}-1]}{2-1}$ $= 12(1023)$ $= 12276$	✓ substitution ✓ simplification ✓ answer

QUESTION 4

4.1	y – intercepts $y = \frac{-4}{0-2} - 1$ $y = 1$ x – intercepts $\frac{-4}{x-2} - 1 = 0$ $\frac{-4}{x-2} = 1$ $x - 2 = -4$ $x = -2$	✓ Substitute ($x = 0$) ✓ $y = 1$ ✓ equating to Zero ✓ simplification ✓ $x = -2$
4.2		✓ shape ✓ intercepts ✓ asymptotes
4.3	$y = \frac{-4}{x-2+5} - 1 - 2$ $y = \frac{-4}{x+3} - 3$	✓ substitution ✓ answer

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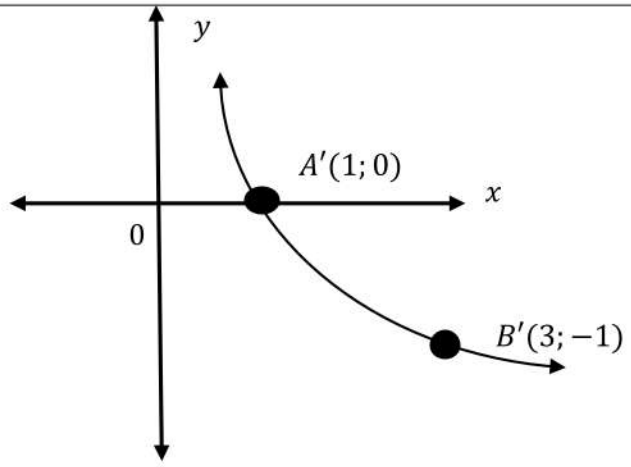
4.4	Domain: $x \in R; x \neq 2$ Range: $y \in R; y \neq -1$	✓ $x \in R; x \neq 2$ ✓ $y \in R; y \neq -1$

QUESTION 5

5.1	$y = mx + c$ $y = mx + 1$ Passing through $A(2;5)$ $5 = m(2) + 1$ $2m = 4$ $m = 2$ $y = 2x + 1$	✓ $y = mx + 1$ ✓ $5 = m(2) + 1$ ✓ $m = 2$ ✓ $y = 2x + 1$
5.2	$y = a(x + p)^2 + q$ $y = a(x + 2)^2 + 5$ Passing through $B(0;1)$ $1 = a(0 + 2)^2 + 5$ $4a = -4$ $a = -1$ $y = -(x + 2)^2 + 5$ $y = -x^2 - 4x - 4 + 5$ $y = -x^2 - 4x + 1$	✓ $y = a(x + 2)^2 + 5$ ✓ substitution $B(0;1)$ ✓ $a = -1$ ✓ $y = -x^2 - 4x + 1$
5.3	$AB^2 = 2^2 + 4^2$ $= 4 + 16$ $= 20$ $AB = 2\sqrt{5}$	✓ $AB^2 = 2^2 + 4^2$ ✓ $= 20$ ✓ $AB = 2\sqrt{5}$
5.4	$0 \leq x \leq 2$	✓✓ $0 \leq x \leq 2$

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QUESTION 6

6.1	$y = a^x$ $3 = a^{-1}$ $\frac{1}{a} = 3$ $a = \frac{1}{3}$	✓ substitution ✓ simplification ✓ $a = \frac{1}{3}$
6.2	$y = \left(\frac{1}{3}\right)^x$ $y = \left(\frac{1}{3}\right)^0$ $y = 1$ $A(0; 1)$	✓ substitution ($x = 0$) ✓ $y = 1$
6.3	$y = \left(\frac{1}{3}\right)^x$ $x = \left(\frac{1}{3}\right)^y$ $f^{-1}(x) = \log_{\frac{1}{3}} x$	✓ interchange x and y ✓ $y = \log_{\frac{1}{3}} x$
6.4		✓ shape ✓ coordinates of B' ✓ coordinates of A'
6.5	$x \in R; x > 0$	✓✓ $x \in R; x > 0$
6.6	$0 < x < -1$	✓✓ $0 < x < -1$

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