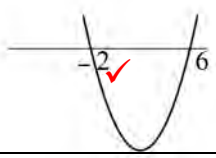
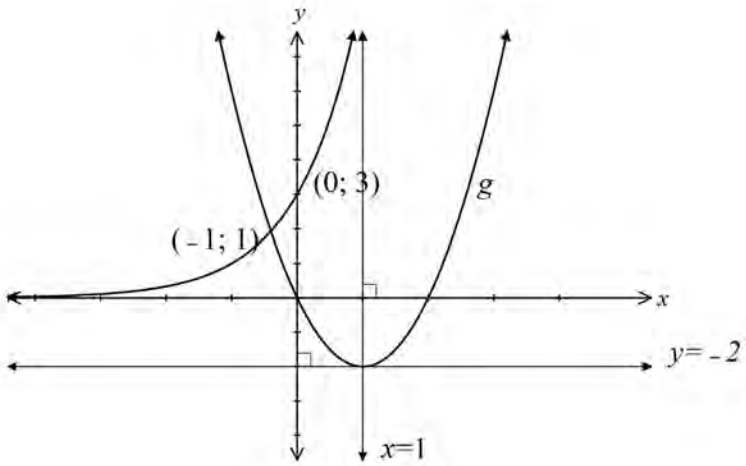
GRADE 12 Maths Paper 1 Memo JUNE 2018

1.1.1	$x(x-9)$ $x=0$✓ **OR** $x=9$✓	**(2)**
1.1.2	$3x^2-5x+1=0$ $\therefore x=\dfrac{5\pm\sqrt{(-5)^2-4(3)(1)}}{6}$ ✓ $\quad\therefore x=1,43$ ✓or $x=0,23$✓	**(3)**
1.1.3	$(\sqrt{2x-1})^2=(x-2)^2$✓ $2x-1=x^2-4x+4$✓ $x^2-6x+5=0$✓ $(x-5)(x-1)=0$ ✓ $x=5$ ✓or $x\neq 1$✓	**(6)**
1.1.4	$x^2-4x-12<0$ $(x-6)(x+2)<0$✓ $-2<x<6$✓✓ 	**(4)**
1.1.5	$2x^2-7xy-15y^2=0$ $(2x+3y)(x-5y)=0$✓ $2x=-3y \quad x=5y$ $\dfrac{x}{y}\neq\dfrac{-3}{2}$ ✓ or $\dfrac{x}{y}=5$ ✓	**(3)**
1.2	Sub $y^2=x$ ✓ $x-\dfrac{10}{x}-3=0$ $x^2-3x-10=0$ ✓ $(x-5)(x+2)=0$ ✓ $x=5$ ✓ or $x\neq -2$ ✓ $y=\sqrt{5}$ ✓	**(6)**
1.3	$x^2-x+p=0$ ✓ $\Delta=(-1)^2-4(1)(p)$ ✓ <0✓ $1-4p<0$ $1<4p$ $p>¼$ ✓	**(4)**
1.4	$\dfrac{5^{2016}\checkmark(5^2+1)}{13\times 5^{2014}\checkmark}$ $=\dfrac{5^2(26)}{13}$ $=25\times 2=50$✓	**(3)**
		[31]

2.1.1	$-4 \quad -3 \quad 0 \quad 5 \quad 12 \quad 21$ $1 \quad 3 \quad 5 \quad 7 \quad 9$ ✓ $2 \quad 2 \quad 2 \quad 2$ $2a = 2 \quad \therefore a = 1$ ✓ $\quad b = 0$ ✓ $\quad c = -4$ ✓ $T_n = n^2 - 4$ ✓	**(5)**
2.1.2	$1365 = n^2 - 4$ ✓ $n^2 = 1369 \qquad n = 37$; 37^{th} term ✓	**(2)**
2.2.1	40 litres ✓	**(1)**
2.2.2	$T_8 = 40\left(\frac{4}{5}\right)^7$ ✓ $\qquad = 8{,}39$ litres ✓	**(2)**
2.3	$b - a = c - b$ ✓ $\qquad \frac{c}{b} = \frac{d}{c}$ ✓ $\qquad \therefore$ $2b - a = c$ ✓ $\qquad c^2 = bd$ ✓ $(2b - a)^2 = bd$ (no mark, as given)	**(4)**
		[14]
3.1	-2 ; 0 ; 2 ; 4 ; … ✓ $130 = \frac{n}{2}(-4 + (n-1)2)$ ✓ $= \frac{n}{2}(-4 + 2n - 2)$ $0 = 2n^2 - 6n - 260$ ✓ $= 2(n-13)(n+10)$ ✓ $= n = 13 \text{ or } n \neq -10$ ✓	**(5)**
3.2	(sigma) ✓ $\sum_{n=1}^{\infty}\left(\frac{7n-1}{2^{n+2}}\right)$ $\qquad$ 6; 13; 20; 27 ✓ $\qquad$ ✓ numerator ✓ denom	**(4)**
		[9]

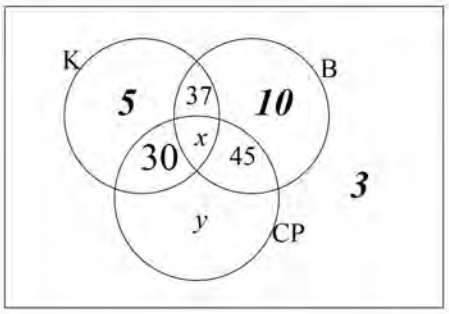
4.1	f shape ✓ intercept ✓ point ✓  	(3)
4.2	$p = 1$ ✓ $q = -2$ ✓	(2)
4.3	$d = 3$ ✓	(1)
4.4.1	$k(x) = -(3^{x+1}) - 2$ first term ✓ second term ✓	(2)
4.4.2	$y = -2$ ✓	(1)
4.5	$x = 3^{y+1}$ ✓ $x = 3.3^{y}$ ✓ $\log_3 x = y + 1$ ✓ OR $\frac{x}{3} = 3^{y}$ ✓ $y = \log_3 x - 1$ ✓ $y = \log_3 \frac{x}{3}$ ✓	(3)
4.6	$0 \le x \le 2$ ✓ ✓	(2)
4.7	$x < 1$ ✓ ✓	(2)
		[16]

5.1	$y \neq 1$ ✓	(1)
5.2	$b = 2$ ✓ $c = 1$ ✓	(1)
5.3	A (1; 0) ✓✓	(2)
5.4	$\frac{3}{x-2} = -1 \quad \therefore \quad x = -1$ B (−1; 0) ✓✓	(2)
5.5	$y = \log_2 2 = -1$ C(2; −1) ✓✓	(2)
5.6	Reflection ✓ in line $x = 2$ ✓	(2)
5.7	$y = -x + 3$ ✓ Reflection in line $x = 2$ OR Reflection in line $y = 1$ ✓	(2)
		[13]
6.1	$f'(x) = \lim_{h\to 0} \frac{(x+h)^2 - (x+h) - (x^2 - x)}{h}$ ✓ $= \lim_{h\to 0} \frac{x^2 + 2xh + h^2 - x - h - x^2 + x)}{h}$ ✓ limit notation correct ✓ $= \lim_{h\to 0} \frac{h(2x + h - 1)}{h}$ ✓ $= 2x - 1$ ✓	(5)
6.2.1	$y = -9x^2 + 6x - 1$ ✓ $\frac{dy}{dx} = -18x + 6$ ✓ ✓	(3)
6.2.2	$f(x) = \frac{x^{\frac{1}{2}}}{3} - x^{-3}$ ✓ $f'(x) = \frac{1}{6}x^{-\frac{1}{2}} + 3x^{-4}$ ✓✓	(3)
6.2.3	$D_x\left(\frac{(2x-1)(4x^2+2x+1)}{(2x-1)}\right)$ ✓ $= 8x$ ✓ $+ 2$ ✓	(3)

		[14]

7.1	$-x^3 + 3x + 2 = 0$ $-(x+1)^2(x-2) = 0$ ✓ ✓ $\therefore$ C (2; 0) ✓ ✓	(4)
7.2	$f'(x) = -3x^2 + 3$ ✓ $= 9$ ✓ $= 3x^2 - 12 = 0$ $= 3(x-2)(x+2)$ $\therefore x = \pm 2$ ✓✓	(4)
7.3	$f'(x) = -3x^2 + 3 = 0$ at B $-3(x^2-1) = 0$ ✓ $\therefore x = \pm 1$ $f(x) = -(1)^3 + 3(1) + 2 = 4$ ✓ Min of graph h is $(1; -4)$ ✓ ✓	(4)
7.4	$f''(x) = -6x$ ✓ $f''(x) > 0$ for $x < 0$ $\therefore$ concave up $f''(x) < 0$ for $x > 0$ $\therefore$ concave down ✓ for testing both regions $f''(x) = 0$ at $x = 0$ $\therefore$ POI at $x = 0$ ✓	(3)
		[15]

8.1	$P = 20 = 2y + 2x + \frac{2\pi x}{2}$ ✓ $2y = 20 - 2x - \pi x$ $y = 10 - x - \frac{\pi}{2}x$ ✓	(2)
8.2	$A = 2xy + \frac{\pi(x)^2}{2}$ ✓ $= 2x(10 - x - \frac{\pi}{2}x) + \frac{\pi x^2}{2}$ ✓ $= 20x - 2x^2 - \frac{\pi x^2}{2}$	(2)
8.3	$\frac{dA}{dx} = 20 - 4x - \pi x$ ✓ $= 0$ for maximum ✓ $20 = 4x + \pi x$ $= x(4 + \pi)$ ✓ $x = \frac{20}{4 + \pi} = 2{,}8$ metres ✓	(4)
		[8]
9.1	$20\ 375(1-,04)^{25}$ ✓ formula ✓ $= 7343$ rhinos ✓	(3)
9.2	$110\ 000$ ✓ $= \frac{x\left(\left(1 + \frac{,085}{4}\right)^{16} - 1\right)}{\frac{,085}{4}}$ formula ✓ $= R5\ 844{,}45$ ✓	(5)
9.3	$110\ 000\left(1 + \frac{,12}{12}\right)^{144} - \frac{11\ 848\left(\left(1 + \frac{,12}{12}\right)^{144} - 1\right)}{\frac{,12}{12}}$ formula ✓ $= R871\ 341{,}95$ ✓	(6)
		[14]

10.1.1	$\frac{9!}{3!2!} = 30240$ ✓✓✓	(3)
10.1.2	$\frac{\frac{7!}{3!}}{30240} = \frac{1}{36}$ ✓✓✓	(3)
10.1.3	$2 \times \frac{4!}{3!} \times \frac{5!}{2!} = 4 \times 5! = 480$ ✓✓✓	(3)
10.2.1	$x = 80 - (37 + 5 + 30) = 8$ ✓ $y = 90 - (45 + 30 + 8) = 7$ ✓ (5 , 10 , 30 , 3) ✓✓ (Completed on Venn Diagram) 	
10.2.2	145 people ✓	(1)
10.2.3	$\frac{30 + 37 + 45}{145} = \frac{112}{145}$ ✓✓	(2)
		[16]