NATIONAL
SENIOR CERTIFICATE

GRADE 12

MATHEMATICS P1

SEPTEMBER 2020

MARKING GUIDELINES

MARKS: 150

These marking guidelines consist of 16 pages and two pages with cognitive levels.

NOTE:

- If a candidate answers a question TWICE, only mark the FIRST attempt.
- Consistent Accuracy applies in ALL aspects of the marking memorandum.

QUESTION 1

1.1.1	$9x^2 - 7x - 3 = 0$ $$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$ $$= \frac{-(-7) \pm \sqrt{(-7)^2 - 4(9)(-3)}}{2(9)}$$ $$= \frac{7 \pm \sqrt{157}}{18}$$ $x = 1,08 \quad \text{or} \quad x = -0,31$	✓ substitution into the correct formula ✓ $x = 1,08$ ✓ $x = -0,31$ (3)
1.1.2	$5x^2 - 10x > 0$ $5x(x - 2) > 0$ $5x < 0 \quad \text{or} \quad x > 2$ $\therefore \ x < 0 \quad \text{or} \quad x > 2$	✓ factors/critical values ✓✓ $x < 0$ or $x > 2$ (3)
1.1.3	$4 - \sqrt{x + 5} = x + 3$ $4 - x - 3 = \sqrt{x + 5}$ $(1 - x)^2 = x + 5$ $1 - 2x + x^2 = x + 5$ $x^2 - 3x - 4 = 0$ $(x - 4)(x + 1) = 0$ $x = 4 \quad \text{or} \quad x = -1$ $n.a.$	✓ root the subject ✓ square both sides ✓ standard form ✓ factors/formula ✓ both answers ✓ selection (6)
1.2.1	$y = 4: \ (x - 3)(4 + 4) = 0$ $(x - 3) = 0$ $x = 3$	✓ $x = 3$ (1)
1.2.2	$y = -4: \ (x - 3)(-4 + 4) = 0$ $(x - 3)(0) = 0$ $x \in \mathbb{R}$	✓ $x \in \mathbb{R}$ (1)
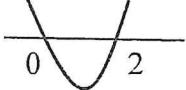
| 1.3 | $2y + x = 1$
 $\qquad x = 1 - 2y$
 $x^2 + y^2 = y - x$
 $(1 - 2y)^2 + y^2 = y - (1 - 2y)$
 $1 - 4y + 4y^2 + y^2 = y - 1 + 2y$
 $5y^2 - 7y + 2 = 0$
 $(5y - 2)(y - 1) = 0$
 $5y = 2 \quad$ or $\quad y = 1$
 $y = \dfrac{2}{5}$
 $x = 1 - 2\left(\dfrac{2}{5}\right) \quad x = 1 - 2(1)$
 $\quad = \dfrac{1}{5} \qquad\qquad = -1$

 OR

 $2y = 1 - x$
 $y = \dfrac{1 - x}{2}$
 $x^2 + \left(\dfrac{1 - x}{2}\right)^2 = \dfrac{1 - x}{2} - x$
 $x^2 + \left(\dfrac{1 - 2x + x^2}{4}\right) = \dfrac{1 - x}{2} - x$
 $4x^2 + 1 - 2x + x^2 = 2(1 - x) - 4x$
 $4x^2 + 1 - 2x + x^2 = 2 - 2x - 4x$
 $5x^2 + 4x - 1 = 0$
 $(5x - 1)(x + 1) = 0$
 $5x = 1 \quad$ or $\quad x = -1$
 $x = \dfrac{1}{5}$
 $y = \dfrac{2}{5} \qquad\qquad y = 1$ | ✓ $x = 1 - 2y$

 ✓ substitution

 ✓ standard form
 ✓ factors/formula

 ✓ both y-values

 ✓ both x-values
 $\qquad\qquad\qquad$ (6)

 OR

 ✓ $\;y = \dfrac{1 - x}{2}$

 ✓ substitution

 ✓ standard form
 ✓ factors/formula

 ✓ both x-values

 ✓ both y-values
 $\qquad\qquad\qquad$ (6) |
| 1.4 | $5x^2 - kx + 16 = (x + 2).Q(x) + 10$
 Say $\;f(x) = 5x^2 - kx + 16$
 $\qquad f(-2) = 5(-2)^2 - k(-2) + 16$
 $\qquad\qquad 10 = 20 + 2k + 16$
 $\qquad\qquad -26 = 2k$
 $\qquad\qquad -13 = k$ | ✓ substitution
 ✓ $f(-2) = 10$

 ✓ answer
 $\qquad\qquad\qquad$ (3)
 $\qquad\qquad\qquad$ **[23]** |

QUESTION 2

2.1.1	$1; 1,25; 1,5; \ldots$	✓ sequence
	$T_n = a + (n-1)d$	
	$T_{10} = 1 + (9)(0,25)$	✓ substitution
	$= 3,25$ hours	✓ answer
		(3)
2.1.2	$6 = 1 + (n-1)(0,25)$	✓ substitution
	$5 = (n-1)(0,25)$	
	$20 = n - 1$	
	$21 = n$	
	$\therefore$ on 21st day	✓ answer
		(2)
2.1.3	$S_n = \dfrac{n}{2}\left[2a + (n-1)d\right]$	
	$S_{21} = \dfrac{21}{2}\left[2(1) + (21-1)(0,25)\right]$	✓ substitution
	$= 73,5$	✓ 73,5
	Day 22 to 30	
	$= (9)(6)$	
	$= 54$	✓ 54
	Total hours $= 73,5 + 54$	
	$= 127,5$ *hours*	✓ answer
		(4)
2.2	$AS: \log x + \log y + \log z$	
	$\therefore T_2 - T_1 = T_3 - T_2$	✓
	$\log y - \log x = \log z - \log y$	$\log y - \log x = \log z - \log y$
	$\log \dfrac{y}{x} = \log \dfrac{z}{y}$	✓ $\log \dfrac{y}{x} = \log \dfrac{z}{y}$
	$\dfrac{y}{x} = \dfrac{z}{y}$	✓ $\dfrac{y}{x} = \dfrac{z}{y}$
	$\therefore \dfrac{T_2}{T_1} = \dfrac{T_3}{T_2}$	✓ $\dfrac{T_2}{T_1} = \dfrac{T_3}{T_2}$
	$\therefore$ Geometric sequence: $x; y; z$	(4)
		[13]

QUESTION 3

3.1.1	$64 + 32 + 16 + \ldots$ $r = \dfrac{32}{64} = \dfrac{1}{2}$ $T_n = ar^{n-1}$ $T_9 = 64\left(\dfrac{1}{2}\right)^{9-1}$ $\quad = \dfrac{1}{4}$	✓ $r = \dfrac{1}{2}$ ✓ substitution ✓ answer (3)
3.1.2	$S_\infty = \dfrac{a}{1-r}$ $\quad = \dfrac{64}{1 - \dfrac{1}{2}}$ $\quad = 128$	 ✓ substitution ✓ answer (2)
3.2.1	1st differences : $T_n = 6n + 8$ 14 20 26 1st differences $\quad$ 6 6 2nd difference $2a = 6$ $a = 3$	✓ 1st differences ✓ 2nd difference ✓ $2a = 6$ (3)
3.2.2	$T_2 - T_1 = 3a + b$ $\quad 14 = 3(3) + b$ $\quad 5 = b$ $T_1 = a + b + c$ $\quad 2 = 3 + 5 + c$ $-6 = c$ $\therefore T_n = 3n^2 + 5n - 6$	 ✓ $b = 5$ ✓ $c = -6$ ✓ $T_n = 3n^2 + 5n - 6$ (3)
3.3	$\displaystyle\sum_{r=5}^{17} (3r + 2)\, p^{r+3}\, k^{20-r}$ **OR** $\displaystyle\sum_{r=8}^{20} (3r - 7)\, p^{r}\, k^{23-r}$ **OR** $\displaystyle\sum_{r=1}^{13} (3r + 14)\, p^{r+7}\, k^{16-r}$	✓ $\displaystyle\sum_{r=begin}^{end}$ ✓ general term ✓ exponent of p ✓ exponent of k (4) [15]
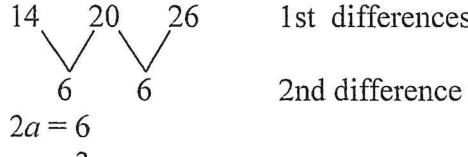
QUESTION 4

4.1	$f(x) = -x^2 - 6x - 4$ $x = -\dfrac{b}{2a}$ OR $f'(x) = -2x - 6$ $\quad = -\dfrac{(-6)}{2(-1)}$ $0 = -2x - 6$ $\quad = -3$ $x = -3$ $y = -(-3)^2 - 6(-3) - 4$ $\quad = 5$ $\therefore \text{A}(-3; 5)$	$\checkmark$ substitution $/\ f'(x) = 0$ $\checkmark$ $\ x = -3$ $\checkmark$ $\ y = 5$ (3)
4.2	$\text{B}(0; -4)$	$\checkmark$ $\ y = -4$ (1)
4.3	$f(x) = -x^2 - 6x - 4$ $0 = -x^2 - 6x - 4$ $x = \dfrac{6 \pm \sqrt{(-6)^2 - 4(-1)(-4)}}{2(-1)}$ $x = -0,76 \quad \text{or} \quad x = -5,24$	$\checkmark$ $y = 0$ $\checkmark$ substitution $\checkmark$ both x answers (3)
4.4	$g(x) = \dfrac{2}{x+3} - 4$	$\checkmark$ $\ x + 3$ $\checkmark$ $\ \dfrac{2}{x+3} - 4$ (2)
4.5	$y = (x + 3) - 4$ $\quad = x + 3 - 4$ $\quad = x - 1$ **OR** $\quad y = x + c$ $-4 = -3 + c$ $\quad c = -1$ $\quad y = x - 1$	$\checkmark$ substitution $\checkmark$ answer (2) **OR** $\checkmark$ substitution $\checkmark$ answer (2)

4.6	$x - 1 = \dfrac{2}{x+3} - 4$	✓ equating
	$x + 3 = \dfrac{2}{x+3}$	
	$(x+3)^2 = 2$	✓ simplify
	$x^2 + 6x + 9 = 2$	
	$x^2 + 6x + 7 = 0$	✓ standard form
	$x = \dfrac{-6 \pm \sqrt{6^2 - 4(1)(7)}}{2(1)}$	
	$x = -1,59 \quad \text{or} \quad x = -4,41$	✓ $x = -1,59$
	$\qquad\qquad\qquad n.a.$	
	$y = -1,59 - 1$	
	$\quad = -2,59$	✓ y answer
	$\therefore (-1,59; -2,59)$	(5)
4.7	$y - y_1 = m(x - x_1)$	✓ $m = -1$
	$y + 2,59 = -(x + 1,59)$	✓ substitution
	$y = -x - 1,59 - 2,59$	
	$y = -x - 4,18$	✓ answer
		(3)
4.8	$[-5,24; -3]$ or $[-0,76; \infty)$	✓ $[-5,24; -3]$
		✓ $[-0,76; \infty)$
	OR	**OR**
	$-5,24 \le x \le -3$ or $-0,76 \le x$	✓ $-5,24 \le x \le -3$
		✓ $-0,76 \le x$
		(2)
		[21]

QUESTION 5

5.1	$0 = -\dfrac{2}{3}x + 3$ $\dfrac{2}{3} = 3$ $x = \dfrac{9}{2} = 4,5$	✓ $y = 0$ ✓ $x = \dfrac{9}{2} = 4,5$ (2)
5.2	$k(x) = -\dfrac{2}{3}x + 3;\ -4 \le x < 6$ $k(-4) = -\dfrac{2}{3}(-4) + 3 \quad k(6) = -\dfrac{2}{3}(6) + 3$ $\qquad\qquad = 5,67 \qquad\qquad\qquad = -1$ $\therefore -1 < x \le 5,67$ **OR** $x \in (-1;\ 5,67]$	✓ critical values ✓ notation (2) **OR** ✓ critical values ✓ notation (2)
5.3	$h:\quad y = \left(\dfrac{1}{2}\right)^{x}$ $h^{-1}:\ x = \left(\dfrac{1}{2}\right)^{y}$ $\qquad y = \log_{\frac{1}{2}} x$ **OR** $h:\quad y = 2^{-x}$ $h^{-1}:\ x = 2^{-y}$ $\qquad -y = \log_{2} x$ $\qquad\ y = -\log_{2} x$	✓ swop x and y ✓ answer **OR** ✓ swop x and y ✓ answer (2)
5.4	$(1;\ 0)$	✓ $x = 1$ ✓ $y = 0$ (2)
5.5	$3 < x \le 5,67$ **OR** $x \in (3;\ 5,67]$	✓ critical values ✓ notation (2) **OR** ✓ critical values ✓ notation (2)
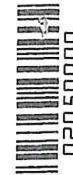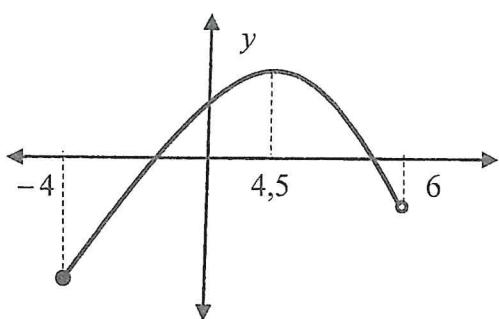
5.6		✓ turning point at $x = 4,5$ ✓ x-values of end points ✓ form (3) **[13]**

QUESTION 6

6.1	$$F = \frac{x\left[(1+i)^n - 1\right]}{i}$$ $$3\,000\,000 = \frac{x\left[\left(1 + \frac{0,1}{12}\right)^{241} - 1\right]}{\frac{0,1}{12}}$$ $x = R\,3\,912,89$	✓ $n = 241$ ✓ $i = \dfrac{0,1}{12}$ ✓ substitution in correct formula ✓ answer (4)

6.2	$A = P\left(1 + i\right)^{n}$		
	$= 3\,000\,000\left(1 + \dfrac{0,08}{12}\right)^{3}$	✓	substitution in correct formula
	$= R3\,060\,400,889$	✓	answer
	$P = \dfrac{x\left[1 - \left(1 + i\right)^{-n}\right]}{i}$		
	$3\,060\,400,889 = \dfrac{20\,600\left[1 - \left(1 + \dfrac{0,08}{12}\right)^{-n}\right]}{\dfrac{0,08}{12}}$	✓	substitution in correct formula
	$0,9904209997 = 1 - \left(1 + \dfrac{0,08}{12}\right)^{-n}$		
	$\left(1 + \dfrac{0,08}{12}\right)^{-n} = 1 - 0,9904209997$	✓	simplification
	$\log_{\left(1 + \frac{0,08}{12}\right)}\left(0,009579\right) = -n$	✓	correct use of logs
	OR $\dfrac{\log\left(0,009579\right)}{\log\left(1 + \dfrac{0,08}{12}\right)} = -n$		
	$n = 699,548824061$	✓	$n = 699,55$
	∴ He will survive 702 months after his retirement on his current lifestyle.	✓	answer
			(7)

6.3	$A = P(1 + i)^n$	
	$= 3\,000\,000\left(1 + \dfrac{0,08}{12}\right)^{702}$	✓ substitution in correct formula
	$= 318\,327\,675,10$	
	OR $= 3\,060\,400,889\left(1 + \dfrac{0,08}{12}\right)^{699}$	
	$= 318\,327\,675,10$	
	$F = \dfrac{x\left[(1 + i)^n - 1\right]}{i}$	
	$= \dfrac{20\,600\left[\left(1 + \dfrac{0,08}{12}\right)^{699} - 1\right]}{\dfrac{0,08}{12}}$	✓ substitution in correct formula
	$= 318\,316\,427,40$	
	Outstanding amount after month 699	
	$= A - F$	
	$= 318\,327\,675,10 - 318\,316\,427,40$	✓ A - F
	$= R11\,247,73$	
	Last withdrawal:	
	$A = P(1 + i)^n$	
	$= 11\,247,73\left(1 + \dfrac{0,08}{12}\right)^{1}$	
	$= R11\,322,72$	✓ answer
		(4)
	OR	**OR**
	$P = \dfrac{x\left[1 - (1 + i)^{-n}\right]}{i}$	
	$= \dfrac{20\,600\left[1 - \left(1 + \dfrac{0,08}{12}\right)^{-0,548824061}\right]}{\dfrac{0,08}{12}}$	✓ $n = -0,548824061$ ✓ substitution in correct formula
	$= R11\,247,73546$	✓ answer
	Last withdrawal:	
	$A = P(1 + i)^n$	
	$= 11\,247,73\left(1 + \dfrac{0,08}{12}\right)^{1}$	
	$= R11\,322,72$	✓ answer
		(4)
		[15]

QUESTION 7

7.1	$f(x) = -x^2 + 7x + 9$	
	$f(x + h) = -(x + h)^2 + 7(x + h) + 9$	✓ $-(x + h)^2 + 7(x + h) + 9$
	$\quad\quad = -(x^2 + 2xh + h^2) + 7x + 7h + 9$	
	$\quad\quad = -x^2 - 2xh - h^2 + 7x + 7h + 9$	
	$f(x + h) - f(x) = (-x^2 - 2xh - h^2 + 7x + 7h + 9)$	
	$\quad\quad\quad\quad\quad - (-x^2 + 7x + 9)$	
	$\quad\quad\quad\quad = -2xh - h^2 + 7h$	✓ simplification
	$f'(x) = \lim\limits_{h \to 0} \dfrac{f(x + h) - f(x)}{h}$	
	$\quad = \lim\limits_{h \to 0} \dfrac{-2xh - h^2 + 7h}{h}$	✓ substitution in formula
	$\quad = \lim\limits_{h \to 0} \dfrac{h(-2x - h + 7)}{h}$	✓ factors
	$\quad = \lim\limits_{h \to 0} (-2x - h + 7)$	
	$\quad = -2x + 7$	✓ answer (5)
	OR	**OR**
	$f(x) = -x^2 + 7x + 9$	
	$f'(x) = \lim\limits_{h \to 0} \dfrac{f(x + h) - f(x)}{h}$	
	$\quad = \lim\limits_{h \to 0} \dfrac{-(x + h)^2 + 7(x + h) + 9 - (-x^2 + 7x + 9)}{h}$	✓ $-(x + h)^2 + 7(x + h) + 9$ ✓ substitution in formula
	$\quad = \lim\limits_{h \to 0} \dfrac{-(x^2 + 2xh + h^2) + 7x + 7h + 9 + x^2 - 7x - 9}{h}$	
	$\quad = \lim\limits_{h \to 0} \dfrac{-x^2 - 2xh - h^2 + 7x + 7h + 9 + x^2 - 7x - 9}{h}$	
	$\quad = \lim\limits_{h \to 0} \dfrac{-2xh - h^2 + 7h}{h}$	✓ simplification
	$\quad = \lim\limits_{h \to 0} \dfrac{h(-2x - h + 7)}{h}$	✓ factors
	$\quad = \lim\limits_{h \to 0} (-2x - h + 7)$	
	$\quad = -2x + 7$	✓ answer (5)
7.2	$f(x) = \dfrac{4}{x^2} + 3x^5$	
	$\quad = 4x^{-2} + 3x^5$	✓ $4x^{-2}$
	$f'(x) = -8x^{-3} + 15x^4$	✓ $-8x^{-3}$ ✓ $+15x^4$
		(3)

7.3	$\dfrac{y}{x-3} = 1+x$		
	$y = (x-3)(1+x)$	✓	y subject
	$\quad = x + x^2 - 3 - 3x$		
	$\quad = x^2 - 2x - 3$	✓	simplification
	$\dfrac{dy}{dx} = 2x - 2$	✓	answer
			(3)
			[11]

QUESTION 8

8.1	$y = a(x-x_1)(x-x_2)(x-x_3)$		
	$\quad = a(x-3)^2(x+2)$	✓	substitution roots
	$9 = a(0-3)^2(0+2)$	✓	substitution $(0;9)$
	$9 = a(9)(2)$		
	$a = \dfrac{1}{2}$	✓	$a = \dfrac{1}{2}$
	$g(x) = \dfrac{1}{2}(x-3)^2(x+2)$		
	$\quad = \dfrac{1}{2}(x^2 - 6x + 9)(x+2)$		
	$\quad = \dfrac{1}{2}(x^3 - 6x^2 + 9x + 2x^2 - 12x + 18)$		
	$\quad = \dfrac{1}{2}(x^3 - 4x^2 - 3x + 18)$	✓	simplification
	$\quad = \dfrac{1}{2}x^3 - 2x^2 - \dfrac{3}{2}x + 9$		
	$a = \dfrac{1}{2} \quad b = -2 \quad c = -\dfrac{3}{2} \quad d = 9$		
			(4)
8.2	$g'(x) = \dfrac{3}{2}x^2 - 4x - \dfrac{3}{2}$	✓	$g'(x) = \dfrac{3}{2}x^2 - 4x - \dfrac{3}{2}$
	$0 = \dfrac{3}{2}x^2 - 4x - \dfrac{3}{2}$	✓	$g'(x) = 0$
	$0 = 3x^2 - 8x - 3$		
	$x = \dfrac{8 \pm \sqrt{(-8)^2 - 4(3)(-3)}}{2(3)}$ or $0 = (x-3)(3x+1)$	✓	formula/factors
	$x = 3$ or $x = -\dfrac{1}{3}$	✓	$x = -\dfrac{1}{3}$
	$n.a.$		(4)

8.3	$g''(x) = 3x - 4$	✓ $g''(x) = 3x - 4$
	$0 = 3x - 4$	✓ $g''(x) = 0$
	$4 = 3x$	
	$\dfrac{4}{3} = x$	
	$\therefore$ concave up : $x > \dfrac{4}{3}$	✓ answer
		(3)
8.4	$\dfrac{3}{2}x^2 - 4x - \dfrac{3}{2} = -\dfrac{7}{2}$	✓ $g'(x) = -\dfrac{7}{2}$
	$3x^2 - 8x - 3 = -7$	
	$3x^2 - 8x + 4 = 0$	✓ standard form
	$(x - 2)(3x - 2) = 0$	✓ factors/formula
	$x = 2 \quad$ or $\quad x = \dfrac{2}{3}$	✓ $x = 2$
	$y = 2 \qquad n.a.$	✓ $y = 2$
		(5)
		[16]

QUESTION 9

9.1	$4r + 2h = 16$	✓ equating
	$2r + h = 8$	✓ simplification
	$h = 8 - 2r$	(2)
9.2	$V = \pi r^2 h$	✓ formula
	$= \pi r^2 (8 - 2r)$	✓ substitution
	$= 8\pi r^2 - 2\pi r^3$	✓ answer
		(3)
9.3	$V'(r) = 16\pi r - 6\pi r^2$	✓ $V'(r) = 16\pi r - 6\pi r^2$
	$0 = 16\pi r - 6\pi r^2$	✓ $V'(r) = 0$
	$0 = 8\pi r - 3\pi r^2$	
	$0 = r(8\pi - 3\pi r)$	✓ factors
	$r = 0 \quad$ or $\quad 8\pi - 3\pi r = 0$	
	$n.a. \qquad\qquad\qquad 8\pi = 3\pi r$	
	$\qquad\qquad\qquad\qquad r = \dfrac{8}{3}$	✓ $r = \dfrac{8}{3}$
	$h = 8 - 2\left(\dfrac{8}{3}\right)$	
	$\qquad = \dfrac{8}{3}$	✓ $h = \dfrac{8}{3}$
		(5)
		[10]

QUESTION 10

10.1	P(Tom and Jerry) $= 0,85 \times 0,67$ $= 0,5695$ $\approx 0,57$	✓ $0,85 \times 0,67$ ✓ answer (2)
10.2	P(Tom and not Jerry) $= 0,85 \times 0,33$ $= 0,2805$ $\approx 0,28$	✓ $0,85 \times 0,33$ ✓ answer (2)
10.3	P(At least one) $= 1 - P$(none) $= 1 - P$(not Tom and not Jerry) $= 1 - (0,15)(0,33)$ $= 1 - 0,0495$ $= 0,9505$ $\approx 0,95$ **OR** P(At least one) $= P$(Tom and not Jerry) or P(Jerry and not Tom) or P(Tom and Jerry) $= (0,85 \times 0,33) + (0,67 \times 0,15) + (0,85 \times 0,67)$ $= 0,2805 + 0,1005 + 0,5695$ $= 0,9505$ $\approx 0,95$	✓ $1 - P$(none) ✓ P(none) ✓ answer (3) **OR** ✓ $(0,85 \times 0,33) +$ $(0,67 \times 0,15)$ ✓ $(0,85 \times 0,67)$ ✓ answer (3) [7]

QUESTION 11

11.1	Number of 5 – digit numbers in the bottle		
	$= (1 \times 10 \times 10 \times 10 \times 10) - 1$		
	$= 10\,000 - 1$	✓ 10 000	
	$= 9\,999$	✓ 9 999	
			(2)
11.2	Number of 5 – digit numbers that does not repeat:		
	$= 1 \times 9 \times 8 \times 7 \times 6$		
	$= 3\,024$	✓ 3 024	
	Number of 5 – digit numbers that does not repeat without a 6:		
	$= 1 \times 8 \times 7 \times 6 \times 5$		
	$= 1\,680$	✓ 1 680	
	Number of 5 – digit numbers with at least one 6:		
	$= 3\,024 - 1\,680$		
	$= 1\,344$	✓ 1 344	
	$P(5 - \text{digit number with at least one 6})$		
	$= \dfrac{1\,344}{9\,999}$		
	$= 0,13$	✓ 0,13	
			(4)
			[6]
		TOTAL:	**150**

COGNITIVE LEVELS   **MATHEMATICS P1**

	COGNITIVE LEVELS				TOPICS						
QUESTION	LEVEL 1 (20%) KNOWLEDGE	LEVEL 2 (35%) ROUTINE PROCEDURES	LEVEL 3 (30%) COMPLEX PROCEDURES	LEVEL 4 (15%) PROBLEM SOLVING	ALGEBRA	PATTERNS	FUNCTIONS	FINANCE	DIFFERENTIATION	PROBABILITY	TOTAL MARKS
1.1.1	3				3						
1.1.2		3			3						
1.1.3		6			6						
1.2.1	1				1						
1.2.2	1				1						
1.3		6			6						
1.4			3		3						23
2.1.1	3					3					
2.1.2		2				2					
2.1.3			4			4					
2.2				4		4					13
3.1.1	3					3					
3.1.2	2					2					
3.2.1			3			3					
3.2.2			3			3					
3.3				4		4					15
4.1	3						3				
4.2	1						1				
4.3	3						3				
4.4	2						2				
4.5	2						2				
4.6		5					5				
4.7		3					3				
4.8			2				2				21
5.1		2					2				
5.2		2					2				
5.3		2					2				
5.4	2						2				
5.5				2			2				
5.6			3						3		13
6.1		4						4			
6.2			7					7			
6.3				4				4			15
7.1		5							5		
7.2	3								3		
7.3			3						3		11
8.1		4							4		
8.2		4							4		
8.3		3							3		
8.4			5						5		16

| QUESTION | COGNITIVE LEVELS | | | | TOPICS | | | | | | TOTAL MARKS |
| | KNOWLEDGE | ROUTINE PROCEDURES | COMPLEX PROCEDURES | PROBLEM SOLVING | ALGEBRA | PATTERNS | FUNCTIONS | FINANCE | DIFFERENTIATION | PROBABILITY | |
	LEVEL 1 (25%)	LEVEL 2 (30 %)	LEVEL 3 (30%)	LEVEL 4 (15%)							
9.1			2						2		
9.2				3					3		
9.3				5					5		10
10.1	2									2	
10.2		2								2	
10.3			3							3	7
11.1			2							2	
11.2			4							4	6
TOT	31	53	44	22	23	28	34	15	37	13	150
%	21%	35%	29%	15%							
Pol	20%	35%	30%	15%	25	25	35	15	35	15	150