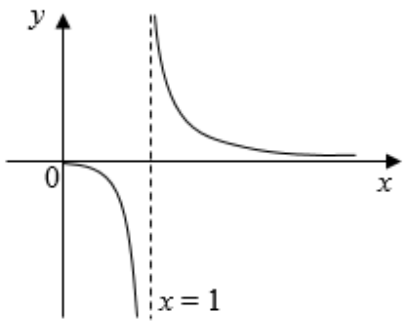
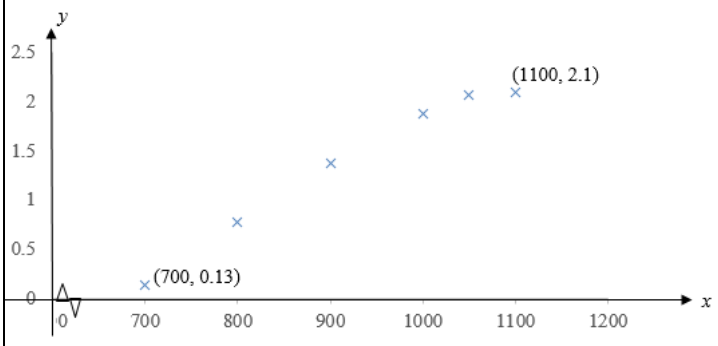
ANNEX B

SRJC H2 Math JC2 Preliminary Examination Paper 2

QN	Topic Set	Answers
1	Sigma Notation and Method of Difference	**(ii)** $\tan(N+1)x - \tan x$ **(iii)** $\tan\left[\frac{(N+1)\pi}{3}\right] - \sqrt{3}$
2	Application of Integration	**(i)** $\frac{1}{4} - \frac{9}{4\left(n^2-1\right)^2}$, $\frac{1}{4}$ **(ii)**  **(iii)** $y = \frac{9x}{\left(x^2-1\right)^3} - \frac{2}{3}$, 3.385 units^3
3	Differential Equations	**(a) (ii)** $y = \frac{1}{3}\left(\sin x - \frac{\sin^3 x}{3}\right) + \frac{2}{\pi}x$ **(b)** $y = \frac{3e^{18-2x^2}}{x^2}$
4	Vectors	**(ii)** (5, 1, 2) **(iii)** $\overrightarrow{OF} = \begin{pmatrix} 33/35 \\ 9/7 \\ 6/35 \end{pmatrix}$, $l_1' : \mathbf{r} = \begin{pmatrix} 5 \\ 1 \\ 2 \end{pmatrix} + \gamma \begin{pmatrix} 72 \\ -10 \\ 29 \end{pmatrix}, \gamma \in \mathbb{R}$ $\alpha = \frac{2}{3}$, $\beta = 3$
5	DRV	$a = 0.25$ and $b = 0.1, 0.18$
6	Binomial Distribution	**(i)** 0.987 **(ii)** 0.0106 **(iii)** 0.981
7	P&C, Probability	**(a) (i)** $\frac{7}{99}$ **(ii)** $\frac{1}{198}$, $\frac{1}{55}$ **(b)** 0.84 **(c)** $\frac{1}{3}$

8	Hypothesis Testing	**(i)** $\bar{x} = 499.3$, $s^2 \approx 7.45$, p-value = 0.06974 **(ii)** $\mu_0 \geq 490$
9	Normal Distribution	**(i)** 0.0135 **(ii)** 0.0781 **(iii)** Assumption: The amount of time spent by a randomly chosen student on mobile phones is independent of the amount of time spent by another randomly chosen student. **(iv)** $N = 69$
10	Correlation & Linear Regression	**(i)** The phrase 'random sample' means that every 50-year-old Singaporean woman has an **<u>equal probability of being included in the sample</u>**. **(ii)** $r = 0.988$ **(iii)**  **(iv)** $r = -0.995337$ **(v)** $a = 3.24$, $b = -0.00310$ The recommended daily calcium intake is 988 mg. Since the r value is – 0.995 is close to – 1, there is a strong negative linear correlation between $\ln(P - y)$ and x. Also since the value of $y = 1.8$ is within the data range, thus, the estimate obtained is reliable. **(vi)** The value of P is the maximum percentage increase in bone density achievable as the daily calcium intake increases.