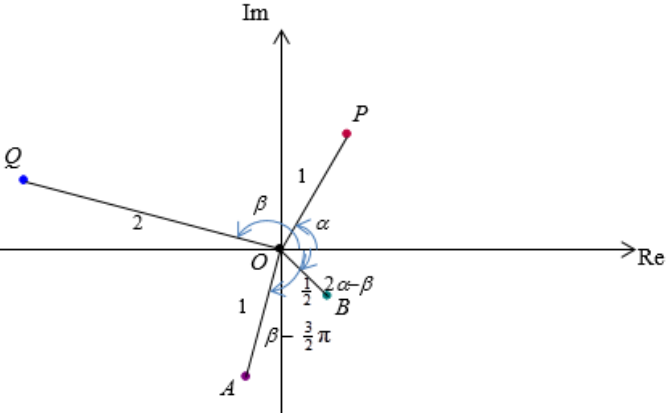
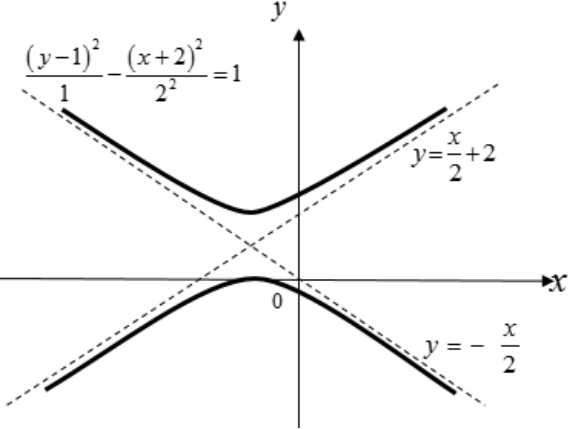
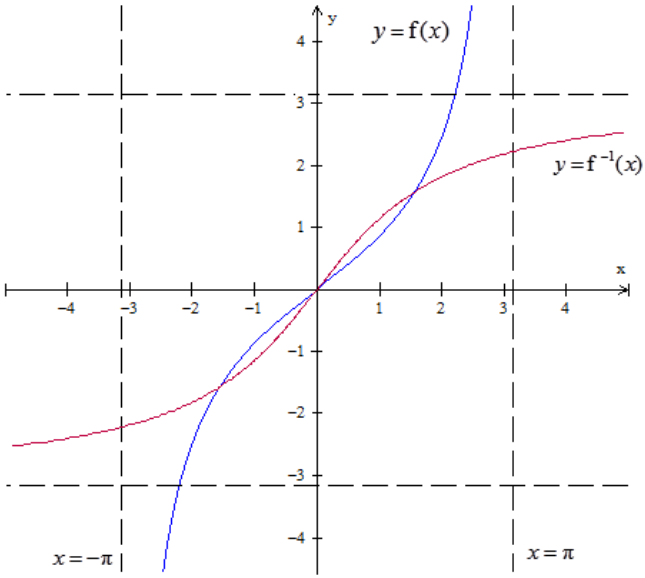
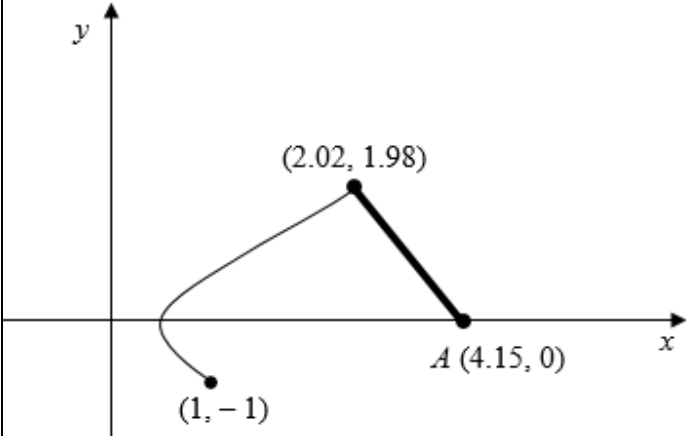


ANNEX B

SRJC H2 Math JC2 Preliminary Examination Paper 1

QN	Topic Set	Answers
1	Complex numbers	$z = -1 + i$ and $w = 3 + 2i$
2	Equations and Inequalities	$-2 < x \leq -1$ or $0 < x \leq 1$, $-1 \leq x \leq 1$, $x \neq 0$
3	Complex numbers	$\left \frac{i}{2} z_2 \right = 1, \arg\left(\frac{i}{2} z_2\right) = \beta - \frac{3\pi}{2}$ $\left \frac{z_1^2}{z_2} \right = \frac{1}{2}, \arg\left(\frac{z_1^2}{z_2}\right) = 2\alpha - \beta$ <p>(i) & (ii)</p>  <p>Smallest n required = 12</p>
4	Graphs and Transformation	<p>(i) $0 < y < 2$</p> <p>(ii)</p> 

5	Functions	<p>(ii) $a = \pi$, $f^{-1} : x \mapsto 2 \tan^{-1}\left(\frac{2x}{\pi}\right)$, $x \in \mathbb{R}$.</p> <p>(iii)</p>  <p>The line required is $y = x$.</p> <p>(iv)</p> <p>Since the graphs of $y = f(x)$ and $y = f^{-1}(x)$ intersect along the line $y = x$, and since $x = \frac{\pi}{2}$ is a root of the equation $x = f(x)$, thus, the graphs of $y = f(x)$ and $y = f^{-1}(x)$ must also intersect at the point $x = \frac{\pi}{2}$.</p>
6	Vectors	<p>(i) $\theta = 45^\circ$</p> <p>(ii) $13\lambda^2 + 10\lambda + 2$</p> <p>Exact shortest distance from D to l is $\frac{1}{\sqrt{13}}$ units</p> <p>$\overrightarrow{OF} = \frac{21}{13}\mathbf{a} - \frac{10}{13}\mathbf{b}$</p>
7	Maclaurin series	<p>(a) $\frac{1}{2}x^2 + \frac{1}{12}x^4$, $A = \frac{1}{12}$</p> <p>(b) (i) $y = x + \frac{x^2}{2} - \frac{x^3}{6} + \dots$</p> <p>(iii) $\frac{55}{384}$</p>
8	AP and GP	<p>(a) $r = \pm\sqrt{2}$ so $r > 1$</p> <p>Hence, the geometric progression is not convergent.</p>

		(b) $r = 0.75610, A = 61.8$
9	Integration techniques	<p>(a) $P = 4, Q = 3$ and $R = 8$</p> $\int \frac{x \ln(4x+3)}{(2x+3)^3} dx = -\frac{(4x+3) \ln(4x+3) + 2(2x+3)}{8(2x+3)^2} + C$ <p>(b) $-\frac{1}{20} \cos 10x + \frac{1}{4} \cos 2x + C$,</p> $-\frac{1}{20} \cos 10e^x + \frac{1}{4} \cos 2e^x + C$
10	Differentiation & Applications	<p>(i) $(1, -1)$</p> <p>(ii) The path of the particle approaches the line $y = x$</p> <p>(iii) $y = -0.929x + 3.857$</p> <p>(iv) $A(4.15, 0)$</p>  <p>(v) 3.56 units^2</p>
11	Differentiation & Applications	<p>(i) $b = \frac{100 - a(\pi + 2)}{4}$</p> <p>(ii) $5000a - 75\pi a - \frac{a^3}{4}(\pi^2 + 2\pi - 8)$</p> <p>(iii) $a = 12.7$, greatest volume = 29671.95 cm^3</p>