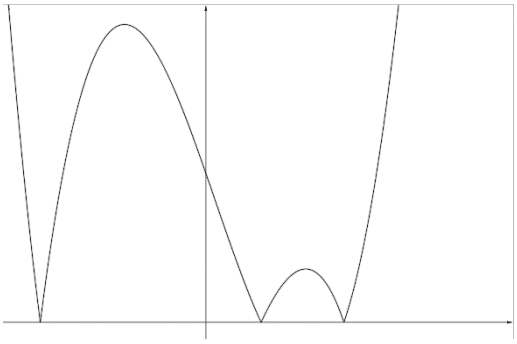
| Question | Answer | Marks | Partial Marks |
|---|---|---|---|
| 1(b)(i) | $-3 \leqslant x \leqslant 1$ , $x \geqslant 2.5$ mark final answer | **B2** | **FT** *their* **(a)** providing it is an equivalent cubic shape and has 3 stated or indicated roots for **B2, B1** or **SC1**<br><br>**B1** for one correct inequality out of two<br><br>If 0 scored then **SC1** for<br>$-3 < x < 1$ , $x > 2.5$ or<br>$-3 < x \leqslant 1$ , $x > 2.5$ or<br>$-3 \leqslant x < 1$ , $x > 2.5$ |
| 1(b)(ii) | Graph of correct shape, with cusps, positive $y$-intercept and $x$-intercepts which match **(a)**<br> | **B1** | **FT** *their* **(a)** providing it is an equivalent cubic shape |
| 2(a) | $\left[4\sin\frac{x}{4}\right]_{\frac{\pi}{3}}^{\frac{\pi}{2}}$ | **B2** | **B1** for $k\sin\frac{x}{4}$ where $k > 0$ or $k = -4$ |
| | $4\sin\frac{\pi}{8} - 4\sin\frac{\pi}{12}$ | **M1** | **FT** provided at least **B1** awarded |
| | 0.495 or 0.4954[57…] rot to 4 or more sf | **A1** | **dep** on all previous marks awarded |
| 2(b) | $\frac{1}{4}\ln(4x-3) - \frac{x^{-2}}{2}\ (+c)$ oe, isw<br><br>or<br><br>$\frac{1}{4}\ln(x-0.75) - \frac{x^{-2}}{2}\ (+c)$ oe, isw | **B3** | **B2** for $\frac{1}{4}\ln(4x-3)$ or $\frac{1}{4}\ln(x-0.75)$<br>or **B1** for<br>$\frac{1}{4}\ln 4x - 3$ or $\frac{1}{4}\ln x - 0.75$<br>or $k\ln(4x-3)$<br>or $k\ln(x-0.75)$ where $k \neq \frac{1}{4}$<br>and<br>**B1** for $\frac{x^{-2}}{-2}$ oe |

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| Question | Answer | Marks | Partial Marks |
|---|---|---|---|
| 3(a) | $7x^2 + 9x + 5[= 0]$ or<br>$-7x^2 - 9x - 5[= 0]$ | **B2** | **B1** for two terms correct in $7x^2 + 9x + 5 = 0$ or at most one term incorrect in $12x^2 + 11x + 2 = 5x^2 + 2x - 3$ oe |
| | $9^2 - 4(7)(5)$ or<br><br>$(-9)^2 - 4(-7)(-5)$ oe | **M1** | **FT** *their* 3-term quadratic |
| | –59 and no real roots<br>or<br>81 – 140 < 0 and no real roots oe | **A1** | |
| 3(b) | $\left(\sqrt[3]{x}\right)^2 + 4\sqrt[3]{x} - 12 = 0$ oe soi<br>or<br>$y = \sqrt[3]{x}$ and $y^2 + 4y - 12 = 0$ oe soi | **B1** | |
| | Factorises or solves *their* 3-term quadratic in $\sqrt[3]{x}$ | **M1** | **FT** *their* 3-term quadratic in $\sqrt[3]{x}$ or a stated substituted unknown |
| | $x = 8 \quad x = -216$ | **A2** | **A1** for $\sqrt[3]{x} = 2 \quad \sqrt[3]{x} = -6$ |
| 4(a) | 33 | **B1** | |
| 4(b)(i) | $6\left(\frac{1}{2}\right)^3 + \left(\frac{1}{2}\right)^2 - 12\left(\frac{1}{2}\right) + 5 = 0$ oe<br>or<br>$6\left(\frac{1}{8}\right) + \frac{1}{4} - \frac{12}{2} + 5 = 0$ oe<br>or<br>$\frac{3}{4} + \frac{1}{4} - 6 + 5 = 0$ oe | **B1** | |
| 4(b)(ii) | Finds the quadratic factor $3x^2 + 2x - 5$ | **M2** | **M1** for any two terms correct in $3x^2 + 2x - 5$ |
| | $(2x - 1)(3x + 5)(x - 1)$ oe | **A1** | If 0 scored then **SC2** for justifying $x - 1$ as a factor and writing down $(2x - 1)(3x + 5)(x - 1)$ without any incorrect work seen |
| 4(b)(iii) | $[\sin\theta = 0.5]$ $\theta = 30$ nfww<br><br>$[\sin\theta = 1]$ $\theta = 90$ nfww<br><br>and no value of $\theta$ from $3\sin\theta + 5 = 0$ | **B2** | **B1** for $\sin\theta = 0.5$ or $\theta = 30$<br>or<br>**B1** for $\sin\theta = 1$ nfww or $\theta = 90$ nfww |

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