MARK SCHEME NOTES

The following notes are intended to aid interpretation of mark schemes in general, but individual mark schemes may include marks awarded for specific reasons outside the scope of these notes.

Types of mark

M Method marks, awarded for a valid method applied to the problem.

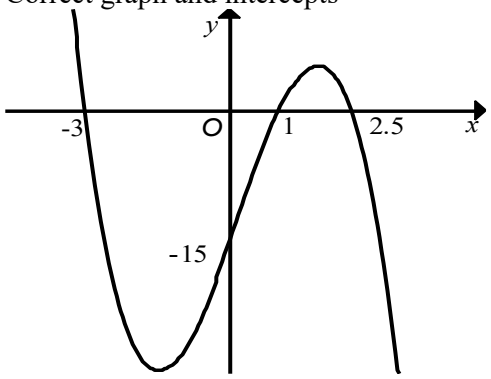
A Accuracy mark, awarded for a correct answer or intermediate step correctly obtained. For accuracy marks to be given, the associated Method mark must be earned or implied.

B Mark for a correct result or statement independent of Method marks.

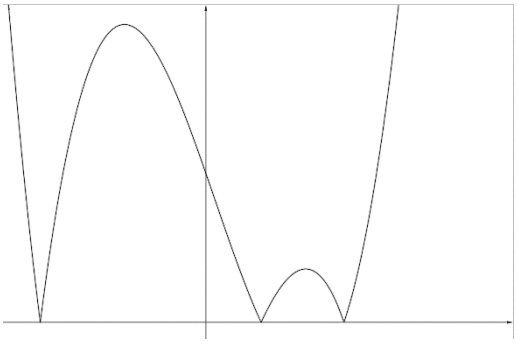
When a part of a question has two or more 'method' steps, the M marks are in principle independent unless the scheme specifically says otherwise; and similarly where there are several B marks allocated. The notation 'dep' is used to indicate that a particular M or B mark is dependent on an earlier mark in the scheme.

Abbreviations

awrt answers which round to
cao correct answer only
dep dependent
FT follow through after error
isw ignore subsequent working
nfww not from wrong working
oe or equivalent
rot rounded or truncated
SC Special Case
soi seen or implied

Question	Answer	Marks	Partial Marks
1(a)	Correct graph and intercepts 	**B3**	**B1** for correct shape; the ends must extend above and below the x-axis **B1** for correct roots indicated; must have attempted a cubic shape **B1** for correct y-intercept indicated; must have attempted a cubic shape

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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** **B1** for one correct inequality out of two If 0 scored then **SC1** for $-3 < x < 1$, $x > 2.5$ or $-3 < x \leqslant 1$, $x > 2.5$ or $-3 \leqslant x < 1$, $x > 2.5$
1(b)(ii)	Graph of correct shape, with cusps, positive y-intercept and x-intercepts which match **(a)** 	**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 or $\frac{1}{4}\ln(x-0.75) - \frac{x^{-2}}{2}\ (+c)$ oe, isw	**B3**	**B2** for $\frac{1}{4}\ln(4x-3)$ or $\frac{1}{4}\ln(x-0.75)$ or **B1** for $\frac{1}{4}\ln 4x - 3$ or $\frac{1}{4}\ln x - 0.75$ or $k\ln(4x-3)$ or $k\ln(x-0.75)$ where $k \neq \frac{1}{4}$ and **B1** for $\frac{x^{-2}}{-2}$ oe

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