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	Guidance
1(a)	2π	**B1**	
1(b)		**3**	**B1** for the correct shape, must be tending correctly towards the asymptotes **B1** for $(0,\ -3)$ **B1** for $\left(\frac{\pi}{2},\ 0\right)$
2(a)	$2\left(x+\frac{5}{4}\right)^2-\frac{1}{8}$ oe	**2**	**B1** for $2\left(x+\frac{5}{4}\right)^2$ **B1** for $-\frac{1}{8}$
2(b)	$\left(-\frac{5}{4},\ -\frac{1}{8}\right)$ oe	**2**	**B1 FT** for each on *their* (a).

Question	Answer	Marks	Guidance
2(c)	Use of *their* (a) or expansion to 3 term quadratic (= 0), to obtain two critical values.	**M1**	
	$-\frac{9}{4}$, $-\frac{1}{4}$	**A1**	For both critical values
	$-\frac{9}{4} < x < -\frac{1}{4}$	**A1**	
3(a)	$\lg\frac{500a^2}{b}$ oe	**3**	**B1** for $\lg a^2$, $-\lg 2b$ or $\lg 1000$ **B2** for $\lg\frac{a^2}{2b}$, $\lg 1000a^2$ or $\lg\frac{1000}{2b}$
3(b)	$\log_3 c = \frac{1}{\log_c 3}$	**B1**	
	$2(\log_c 3)^2 - 7\log_c 3 - 4 \ (=0)$ $(2\log_c 3 + 1)(\log_c 3 - 4) \ (=0)$ $\log_c 3 = -\frac{1}{2}$, $\log_c 3 = 4$	**M1**	Attempt to obtain a 3 term quadratic equation (= 0) and attempt to solve to obtain $\log_c 3 = ...$ Allow one sign error
	$c^{-\frac{1}{2}} = 3$ $c^4 = 3$	**M1**	**Dep** for attempt to solve at least one of *their* log equations
	$c = \frac{1}{9}$, $c = 3^{\frac{1}{4}}$ or exact equivalents	**2**	**A1** for each
	Alternative Method		
	$\log_c 3 = \frac{1}{\log_3 c}$	**B1**	
	$4(\log_3 c)^2 + 7\log_3 c - 2 \ (=0)$ $(4\log_3 c - 1)(\log_3 c + 2) \ (=0)$ $\log_3 c = \frac{1}{4}$, $\log_3 c = -2$	**M1**	Attempt to obtain a 3 term quadratic equation = 0 and attempt to solve to obtain $\log_3 c = ...$ Allow one sign error
	$c = 3^{\frac{1}{4}}$, c $= \frac{1}{9}$ or exact equivalents	**3**	**M1 dep** for attempt to solve at least one of *their* log equations. **A2** for both or **A1** for either