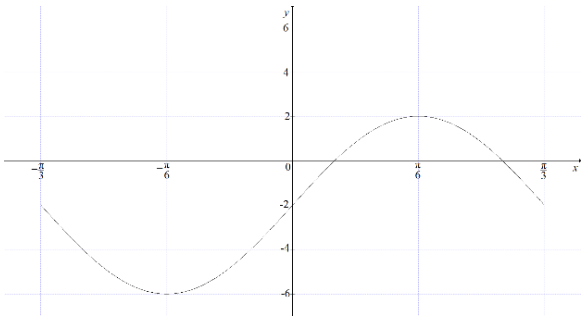
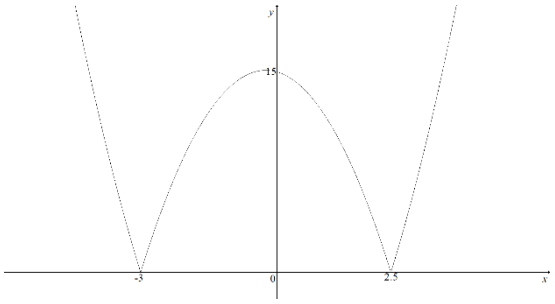
Question	Answer	Marks	Guidance
1		**3**	**B1** for a curve starting at $\left(-\frac{\pi}{3},-2\right)$ and finishing at $\left(\frac{\pi}{3},-2\right)$ **B1** for a curve, must have implied symmetry about $\frac{\pi}{6}$ and $-\frac{\pi}{6}$, one complete cycle only. **B1** for a curve passing through (0, –2) and distinct maximum at $\left(\frac{\pi}{6}, 2\right)$ and distinct minimum at only $\left(-\frac{\pi}{6},-6\right)$
2(a)	$2\left(x+\frac{1}{4}\right)^2-\frac{121}{8}$	**2**	**B1** for $a=\frac{1}{4}$ **B1** for $b=-\frac{121}{8}$
2(b)	$\left(-\frac{1}{4},-\frac{121}{8}\right)$	**2**	**FTB1** for each, follow through on *their a* and *b* from **(a)** or **SC1** if differentiation is used ie $\frac{dy}{dx}=4x+1=0$ then $\left(-\frac{1}{4},-\frac{121}{8}\right)$
2(c)		**3**	**B1** for a correct shape. Must have the parabola part of the curve in the first and second quadrant with cusps and correct curvature and a max in the **2nd** quadrant. Ignore labelling of their maximum point if incorrect coordinates **B1** for a curve $\left(\frac{5}{2},0\right)$ and (–3, 0) **B1** for a curve (0, 15)
2(d)	$k=\frac{121}{8}$	**B1**	**FT** Follow through on *their* $-b$

Question	Answer	Marks	Guidance
3(a)	$3y^2+2y-1[=0]$ oe or $4x^2-4x-3[=0]$ oe	**M1**	**M1** for obtaining a 3 term quadratic equation in y or x **and** an attempt to solve
	$x=\frac{3}{2},\ x=-\frac{1}{2}$ oe	**A1**	
	$y=\frac{1}{3},\ y=-1$ oe	**A1**	Allow **A1** for the one correct pair e.g. $\left(\frac{3}{2},\frac{1}{3}\right)$ or $\left(-\frac{1}{2},-1\right)$
3(b)	$[\log_3 x+3=]\frac{10}{\log_3 x}$ oe or $\frac{1}{\log_x 3}[+3=10\log_x 3]$ oe	**B1**	For change of base
	$(\log_3 x)^2+3\log_3 x-10=0$ or $10(\log_x 3)^2-3\log_x 3-1=0$ $\log_3 x=-5\ \ \log_3 x=2$ or $\log_x 3=-\frac{1}{5}\ \ \log_x 3=\frac{1}{2}$	**M1**	**Dep** on previous **B** mark, for attempt to obtain a 3-term quadratic equation and attempt to solve to obtain 2 solutions of the form $\log_3 x=p$ or $\log_x 3=q$
	$3^{-5}\ \ 3^2$ isw	**2**	**A1** for each
4(a)	$p'(x)=3ax^2+26x+b$ $p'(0)=b$	**B1**	Must see at least $p'(x)=3ax^2+26x+b$ to award the mark
4(b)	$p\left(-\frac{2}{3}\right):8a-27c=318$ oe	**M1**	For use of $x=-\frac{2}{3}$, at least once **and** attempt at simplification leading to an equation in a and c only Allow one sign error.
	$p(-1):a-c=16$ oe	**M1**	For use of $x=-1$ **and** attempt at simplification leading to an equation in a and c only
	$a=6, c=-10$	**2**	**M1 dep** on both previous **M** marks and attempt to solve simultaneously to obtain both a and c **A1** for both
4(c)	$2x^2+3x-5$	**B1**	Allow if seen embedded i.e.: $(3x+2)(2x^2+3x-5)$ or as a quotient in long division