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

Question	Answer	Marks	Guidance
4(d)	$(3x+2)(x-1)(2x+5)$	**B1**	
5(a)	$r^3 = \frac{1}{8}$ soi	**M1**	Allow unsimplified $ar^{14} = \frac{1}{8}ar^{11}$ or $\frac{5r^{11}-5r^{12}}{5r^{14}-5r^{15}} = 8$ oe
	$r = \frac{1}{2}$	**A1**	
	$5 = \frac{a}{1-r}$	**M1**	For use of sum to infinity with *their* r, must be $-1 < r < 1$
	$a = \frac{5}{2}$	**A1**	
5(b)	$their(\mathbf{a}) \times \frac{\left(1-(their\ r)^n\right)}{(1-their\ r)}$	**M1**	For use of the sum to n terms
	$(their\ r)^n = 0.0002$ (12.29)	**M1**	**M1 dep** For simplification and attempt to obtain the critical value using either an equation or an inequality leading to $n =$ or $n >$
	13	**A1**	Accept $n \geqslant 13$
6(a)	$f > -4$	**B1**	Allow $y > -4$ or $-4 < f < \infty$ or $f \in (-4, \infty)$
6(b)	$[f^{-1}(x) =] \frac{1}{3}\ln(x+4)$	**2**	**M1** for a correct method to find the inverse, allow one sign error Must be in the form of $3x = \ln(y \pm 4)$ or $3y = \ln(x \pm 4)$ **A1** allow $y =$