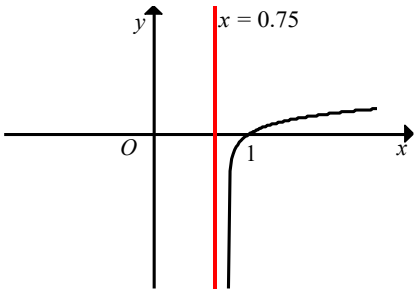
Question	Answer	Marks	Partial Marks
6(b)	$(4x + 1)(9x^2 – 6x + 1)$ oe	**B2**	**B1** for any two correct terms in the quadratic factor
	$(4x + 1)(3x – 1)(3x – 1)$ nfww	**B1**	dep on **B2**
	States e.g. Repeated factor, so repeated root or finds the remaining roots as $x=\frac{1}{3}, x=\frac{1}{3}$ or finds $x=\frac{1}{3}$ and indicates e.g. twice	**B1**	dependent on all previous marks
	Alternative method $p'(x)=108x^2-30x-2$	**(B1)**	
	solving *their* $p'(x)=0$ or factorising *their* $p'(x)$	**(B1)**	
	$x=\frac{1}{3}, x=-\frac{1}{18}$	**(B1)**	
	$p\left(\frac{1}{3}\right)=36\left(\frac{1}{3}\right)^3-15\left(\frac{1}{3}\right)^2-2\left(\frac{1}{3}\right)+1=0$ [x-axis tangential to turning point, therefore root is repeated oe]	**(B1)**	
7(a)	Correct sketch  	**B2**	**B1** for correct shape passing through (1, 0) **B1** for attempt at correct shape with asymptote at $x = 0.75$ soi
7(b)	$\frac{dy}{dx}=\frac{4}{4x-3}$	**B2**	**B1** for $\frac{dy}{dx}=\frac{k}{4x-3}$ where $k \neq 4$ or 0
	$\left.\frac{dy}{dx}\right\|_{x=2}=\frac{4}{4(2)-3}$ or $\frac{4}{5}$	**M1**	**FT** *their k*; dep on at least **B1** awarded for differentiation
	When $x = 2$, $y = \ln 5$	**B1**	
	$y – \ln 5 = \frac{4}{5}(x-2)$ oe, isw	**A1**	**FT** *their* ln5 and *their* 0.8

Question	Answer	Marks	Partial Marks
8(a)(i)	$-3\cos\left(\frac{\phi+\pi}{3}\right)(+c)$ oe	**B2**	**B1 for** $k\cos\left(\frac{\phi+\pi}{3}\right)(+c)$ where $k < 0$ or $k = 3$
8(a)(ii)	$\left[\int 5\mathrm{d}\theta =\right] 5\theta + c$	**B2**	**B1** for $5\sin^2\theta + 5\cos^2\theta = 5$ soi prior to integrating
8(b)	$\int\left(\frac{2}{x}+\frac{1}{x^2}\right)\mathrm{d}x$ soi	**B1**	
	$\left[2\ln x + \frac{x^{-1}}{-1}\right]_1^{\mathrm{e}}$	**M1**	**FT** $\int\left(\frac{k}{x}+\frac{1}{x^2}\right)\mathrm{d}x$
	$\left[2\ln \mathrm{e} - \frac{1}{\mathrm{e}}\right] - [2\ln 1 - 1]$	**DM1**	
	$2 - \frac{1}{\mathrm{e}} + 1 = \frac{3\mathrm{e}-1}{\mathrm{e}}$	**A1**	
9(a)(i)	$15 - 2(x+1)^2$ isw	**B3**	**B1** for $(x+1)^2$ **B1** for $a = 15$
9(a)(ii)	$\mathrm{f} \leqslant 15$	**B1**	**STRICT FT** *their a*
9(b)(i)	Domain: $x \geqslant \sqrt{2}$	**B1**	
	Range: $\mathrm{g}^{-1} \geqslant 1$	**B1**	
9(b)(ii)	$x^2 + 2x + (-1 - y^2) = 0$ or $y^2 + 2y + (-1 - x^2) = 0$	**B1**	
	Correctly applies quadratic formula: $[x =] \frac{-2 \pm \sqrt{2^2 - 4(1)(-1-y^2)}}{2}$ or $[y =] \frac{-2 \pm \sqrt{2^2 - 4(1)(-1-x^2)}}{2}$	**M1**	**FT** *their* $x^2 + 2x + (-1 - y^2) = 0$ or $y^2 + 2y + (-1 - x^2) = 0$ with at most one sign error in the equation
	Justifies the positive square root at some point	**B1**	
	Correct completion to $\mathrm{g}^{-1}(x) = -1 + \sqrt{x^2 + 2}$	**A1**	