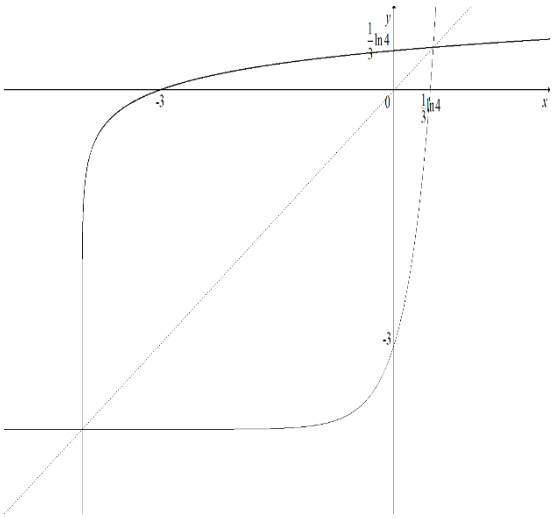
Question	Answer	Marks	Guidance
4(d)	$(3x+2)(x-1)(2x+5)$	**B1**	
5(a)	$r^3 = \frac{1}{8}$ soi	**M1**	Allow unsimplified $ar^{14} = \frac{1}{8}ar^{11}$ or $\frac{5r^{11}-5r^{12}}{5r^{14}-5r^{15}} = 8$ oe
	$r = \frac{1}{2}$	**A1**	
	$5 = \frac{a}{1-r}$	**M1**	For use of sum to infinity with *their* r, must 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 $y =$

Question	Answer	Marks	Guidance
6(c)		**4**	**B1** for f(x) with correct shape in quadrant 1, 3 and 4 and appropriate asymptotic behaviour **B1** for –3 on the y-axis and $\frac{1}{3}\ln 4$ on the x-axis for f(x) must have the correct shape **B1** for $f^{-1}(x)$with correct shape in quadrant 1, 2 and 3 and appropriate asymptotic behaviour **B1** for –3 on the x-axis and $\frac{1}{3}\ln 4$ on the y-axis for $f^{-1}(x)$ must have correct shape and intersect at least once
7	$\frac{1}{3}\sin 3x - 2\cos 2x + x$	**2**	**M1** for $a\sin 3x + b\cos 2x + x$, $a \neq \pm 3$ and $b \neq \pm 8$ **A1** all correct
	$\left(\frac{1}{3}\sin\frac{3\pi}{2} - 2\cos\pi + \frac{\pi}{2}\right) - (-2)$	**M1**	**Dep** on previous **M** mark for correct substitution (seen or implied) of **both** limits in x
	$\frac{11}{3}$	**A1**	
	$\frac{\pi}{2}$	**B1**	From correct substitution (seen or implied) of **both** limits in x
8(a)	1.75	**B1**	
8(b)	$\cos BOC = \frac{7}{25}$, $\tan BOC = \frac{24}{7}$, $\sin BOC = \frac{24}{25}$ BOC = 1.287 soi	**B1**	
	Arc length = $r \times$ *their* 1.287	**B1**	Follow through on *their BOC*
	Perimeter = 12.25 + *their* 9.009 + 14	**M1**	For a complete method
	35.3	**A1**	
8(c)	$\left(\frac{1}{2}\times 7^2 \times 1.75\right) + \left(\frac{1}{2}\times 7^2 \times \textit{their } BOC\right)$ oe or $\pi \times 7^2 - \frac{1}{2}\times 7^2 \times (2\pi - 1.75 - \textit{their} 1.287)$	**M1**	For a complete method
	74.4	**A1**	
9(a)(i)	665 280	**B1**	
9(a)(ii)	221 760	**B1**	