Question	Answer	Marks	Guidance
8	$\left(\text{f}'(x)=\right)\ k(3x+5)^{\frac{1}{3}}\ (+c)$	**M1**	
	$\left(\text{f}'(x)=\right)\ (3x+5)^{\frac{1}{3}}\ (+c)$	**A1**	Allow unsimplified
	$\left(\text{f}'(1)=\right)\ 6=(3+5)^{\frac{1}{3}}+c$	**M1**	**Dep M1** for use of given condition
	$\text{f}'(x)=(3x+5)^{\frac{1}{3}}+4$ soi	**A1**	
	$m(3x+5)^{\frac{4}{3}}$	**M1**	
	$\left(\text{f}(x)=\right)\ m(3x+5)^{\frac{4}{3}}+cx+d$	**M1**	**Dep M1, FT** on t*heir c*
	$\left(\text{f}(1)=\right)\ 20 = m(8)^{\frac{4}{3}}+c+d$	**M1**	**Dep M1, FT** on t*heir c*
	$\left(\text{f}(x)=\right)\ \frac{1}{4}(3x+5)^{\frac{4}{3}}+4x+12$	**A1**	
9(a)	$\frac{\text{d}y}{\text{d}x}=\frac{(x+1)\left(-3\text{e}^{-3x+2}\right)-\text{e}^{-3x+2}}{(x+1)^2}$	**3**	**B1** for -3e^{-3x+2} **M1** for correct attempt at differentiation of a quotient **A1** all terms apart from -3e^{-3x+2} correct
	$\frac{\text{e}^{-3x+2}(-3x-4)}{(x+1)^2}$	**2**	**M1 dep** for attempt to obtain the given form, allow sign errors
9(b)	$\text{e}^{-3x+2}\neq 0$	**B1**	
	$x=-\frac{4}{3}$	**B1**	**FT** on *their* $-3x-4$ $\frac{\text{d}y}{\text{d}x}$ must be in the correct form
	$y=-3\text{e}^{6}$	**B1**	
10(a)	$ar^2=6$ $ar^7=1458$ soi	**B1**	
	$r^5=243$	**B1**	
	$r=3$	**B1**	
	$a=\frac{2}{3}$	**B1**	

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Question	Answer	Marks	Guidance
10(b)	$r = 2\cos\theta$	**B1**	
	$-\frac{1}{2} < \cos\theta < \frac{1}{2}$ $-1 < 2\cos\theta < 1$ $\lvert 2\cos\theta \rvert < 1$	**B1**	
	$-90^{\circ} < \theta < -60^{\circ}$	**B1**	
	$60^{\circ} < \theta < 90^{\circ}$	**B1**	
11	$4x + k\cos 3x$	**M1**	
	$4x - \frac{2}{3}\cos 3x$	**A1**	
	$\left(\frac{4\pi}{3} - k\cos\pi\right) - \left(\frac{4\pi}{18} - k\cos\frac{\pi}{6}\right)$	**M1**	**M1 dep** for correct application of limits
	Area under the curve $\frac{10\pi}{9} + \frac{2}{3} + \frac{\sqrt{3}}{3}$	**A2**	**A1** for one correct term
	When $x = \frac{\pi}{18}$, $y = 5$	**B1**	May be seen on the diagram
	When $x = \frac{\pi}{3}$, $y = 4$	**B1**	May be seen on the diagram
	Area of trapezium $= \frac{5\pi}{4}$	**B1**	For area of trapezium
	Shaded area = $\frac{2}{3} + \frac{\sqrt{3}}{3} - \frac{5\pi}{36}$	**A1**	

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