Question	Answer	Marks	Partial marks
8	For A: $x = \frac{1}{3}$	**B1**	
	$\frac{dy}{dx} = -\frac{15}{x^2} + \frac{10}{x^3}$ oe. isw OR $\frac{dy}{dx} = \frac{-15x^2 + 10x}{x^4}$ oe, isw	**B2**	**B1** for each correct term OR for $\frac{dy}{dx} = \frac{-15x^2 + ...}{x^4}$ oe or $\frac{...+10x}{x^4}$
	Solves $their \frac{dy}{dx} = 0$ as far as x = …	**M1**	**FT** *their* $\frac{dy}{dx}$ providing at least one term is correct
	B: $\left(\frac{2}{3}, \frac{45}{4}\right)$ oe, nfww	**A2**	**A1** for each correct coordinate
	Correct plan e.g. $\int_{their\frac{1}{3}}^{their\frac{2}{3}} \left(\frac{15}{x} - \frac{5}{x^2}\right) dx - \frac{1}{2} \times their\frac{45}{4} \times \left(their\frac{2}{3} - their\frac{1}{3}\right)$ or $\int_{their\frac{1}{3}}^{their\frac{2}{3}} \left(\frac{15}{x} - \frac{5}{x^2} - \left(their\frac{135}{4}x - their\frac{45}{4}\right)\right) dx$	**M1**	
	$\int \left(\frac{15}{x} - \frac{5}{x^2}\right) dx = 15\ln x + \frac{5}{x}$ oe	**B2**	**B1** for $15\ln x$ or $k\ln x + \frac{5}{x}$ oe
	$\left(15\ln\frac{2}{3} + \frac{15}{2}\right) - \left(15\ln\frac{1}{3} + 15\right)$ or exact equivalent	**M1**	**FT** *their* $\frac{1}{3}$ and *their* $\frac{2}{3}$ providing at least **B1** awarded for integration
	Area of shaded region: 15ln2 – 9.375 or $15\ln 2 - \frac{75}{8}$ or exact equivalent	**A1**	**dep** on all previous marks awarded
9(a)	$\tan 3x = \frac{1}{\sqrt{3}}$ or $\frac{\sqrt{3}}{3}$ or 0.57735…	**B2**	**B1** for $\frac{3}{\cos 3x} = \frac{\sqrt{3}}{\sin 3x}$ oe
	$3x$ = 30 or 210 or –150 or –330	**M1**	Finds one correct and valid triple angle May be in radians for this mark implied by one correct value of x
	x: 10, 70, –50, –110 and no extras in range	**A2**	**A1** for any two correct angles ignoring extras

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Question	Answer	Marks	Partial marks
9(b)	$\sin\left(y+\frac{\pi}{3}\right)=0$	**B1**	
	$\cos\left(y+\frac{\pi}{3}\right)=\frac{1}{2}$	**B1**	
	$y+\frac{\pi}{3}=0$ or π or 2π or $\frac{\pi}{3}$ or $\frac{5\pi}{3}$	**M1**	Finds one correct and valid compound angle May be in degrees for this mark
	y: $\frac{2\pi}{3}$, $\frac{5\pi}{3}$, 0, $\frac{4\pi}{3}$ oe, nfww	**A2**	**A1** for any two correct angles ignoring extras
10	$n = 6$ stated; nfww	**B2**	**B1** for first term: $\left(3x^2\right)^n$ or $\left(3x^2\right)^6$ soi
	$-6\left(3x^2\right)^5 a+2\left(729x^{10}\right)=972x^{10}$ oe and $\frac{6\times5\left(3x^2\right)^4(-a)^2}{2}+6\left(3x^2\right)^5\times\frac{2}{x^2}(-a)+729x^8=bx^8$ oe	**B3**	**B2** for one correct equation **OR** **B1** for second term: $n(-a)\left(3x^2\right)^{n-1}$ or $6(-a)\left(3x^2\right)^5$ or $-1458ax^{10}$ soi **B1** for third term: $\frac{n(n-1)(-a)^2\left(3x^2\right)^{n-2}}{2}$ or $\frac{6(5)(-a)^2\left(3x^2\right)^4}{2}$ or $1215a^2x^8$ soi **B1** for 1 [+] $\frac{2}{x^2}$ [+] $\frac{1}{x^4}$ soi
	$a=\frac{1}{3}$	**B2**	**B1** for $-1458a+1458=972$ soi
	$b = -108$	**B2**	**B1** for $1215a^2 - 2916a + 729$ soi

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