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**	

Question	Answer	Marks	Partial Marks
10(a)	$y = \frac{30}{x^2}$ oe	**B1**	
	$S = \pi x\sqrt{x^2 + \left(their\ \frac{30}{x^2}\right)^2}$	**M1**	**FT** *their* $y = \frac{30}{x^2}$ providing $10\pi = \frac{1}{3}\pi x^2 y$ was attempted
	Correct completion to given answer $S = \frac{\pi\sqrt{x^6 + 900}}{x}$	**A1**	
10(b)	$\frac{\mathrm{d}([\pi]\sqrt{x^6 + 900})}{\mathrm{d}x} = [\pi\times]\frac{1}{2}(x^6 + 900)^{-\frac{1}{2}} \times 6x^5$	**B2**	**B1** for $[\pi\times]\, kx^5(x^6 + 900)^{-\frac{1}{2}}$, $k \neq 3$ or 0
	Applies correct form of quotient or product rule e.g.: $\frac{\pi x\left(3x^5(x^6 + 900)^{-\frac{1}{2}}\right) - \pi(x^6 + 900)^{\frac{1}{2}}}{x^2}$ or $-\pi x^{-2}(x^6 + 900)^{\frac{1}{2}} + \frac{\pi}{x}\left(3x^5(x^6 + 900)^{-\frac{1}{2}}\right)$	**M1**	**FT** *their* $\frac{\mathrm{d}([\pi]\sqrt{x^6 + 900})}{\mathrm{d}x}$
	their $\frac{\mathrm{d}S}{\mathrm{d}x} = 0$ and attempt to solve	**M1**	**DEP**
	$x = \sqrt[6]{450}$ isw	**A1**	