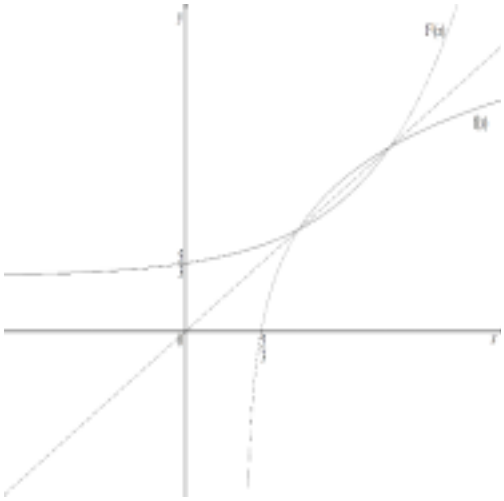
Question	Answer	Marks	Guidance
5(a)	$6p^{\frac{2}{3}} - 13p^{\frac{1}{3}} - 5(=0)$ soi	**B1**	May introduce *their* own variable e.g. x
	$\left(\left(2p^{\frac{1}{3}} - 5\right)\left(3p^{\frac{1}{3}} + 1\right) = 0 \text{ oe}\right)$ $p^{\frac{1}{3}} = \frac{5}{2} \quad p^{\frac{1}{3}} = -\frac{1}{3}$	**M1**	For attempt to solve quadratic equation to obtain $p^{\frac{1}{3}} = ..$ or e.g. $x = \ldots$
	$\frac{125}{8}$ or 15.625 or $15\frac{5}{8}$	**A1**	Must be simplified and exact
	$-\frac{1}{27}$	**A1**	Must be simplified and exact
5(b)	$\lg(2x+5)^2$	**B1**	
	$\lg\frac{(2x+5)^2}{x+2}$	**B1**	**Dep** on first **B1**, must be a correct statement
	$1 = \lg 10$ soi	**B1**	
	$\frac{(2x+5)^2}{(x+2)} = k$ oe	**M1**	Dep on second **B** mark For correct attempt to obtain a quadratic equation with no log terms, where $k = 1$ or 10
	$4x^2 + 10x + 5 = 0$ $x = \frac{-5 \pm \sqrt{5}}{4}$ or exact equivalent	**2**	**M1** for attempt to solve *their* quadratic to obtain $x = \ldots$, implied by decimals of -1.8 or -0.69 or better **A1** for both, **A0** if one is discarded
6(a)	A correct equation in terms of x and y only	**B1**	No inverse trig functions
	$y = (x-4)^2 - 3$ or $y = x^2 - 8x + 13$	**B1**	
6(b)	$\sin\left(2\phi + \frac{3\pi}{4}\right) = \frac{\sqrt{3}}{2}$ soi	**B1**	May be implied by one correct solution
	$-\frac{5\pi}{24}, -\frac{\pi}{24}, \frac{19\pi}{24}, \frac{23\pi}{24}$ with no extra solutions within the range	**4**	**M1** for explicitly correct order of operations from $\textit{their}\left(2\phi + \frac{3\pi}{4}\right) = k$, or may be implied by one correct solution **A1** for two correct solutions **A1** for a third correct solution **A1** for a further solution with no extra solutions in the range

Question	Answer	Marks	Guidance
7(a)	${}^{14}C_2 \times {}^{12}C_3 \times {}^{9}C_4$ oe, soi 2 522 520	**3**	**B1** for a product of 3 combinations (ignore combinations that are equal to 1), one of which must be in the form ${}^{14}C_k$ where $k = 2,\ 3,\ 4,\ 5,\ 9,\ 10,\ 11,\ 12$ **B2** for a correct product of combinations
7(b)(i)	136 080	**B1**	
7(b)(ii)	15 120	**B1**	
7(b)(iii)	38 640	**3**	**B1** for ${}^{8}P_4$ or 1680 or $(8\times7\times6\times5)$ **B2** for $8\times {}^{8}P_4$ (13 440) oe or $15\times {}^{8}P_4$ (25 200) oe
8(a)	$(a=)\ \frac{4}{3}$ or $1.\dot{3}$	**B1**	Allow a recurring decimal Must not be an inequality in terms of a Allow $x > \frac{4}{3}$
8(b)	$f \in \mathbb{R}$ or $-\infty < f < \infty$ or $\mathbb{R}$	**B1**	Allow y or $f(x)$ but not x.
8(c)		**4**	**B1** for a correct shape for $y = f(x)$ in quadrants 1 and 4 **B1** for $\left(\frac{5}{3},\ 0\right)$, must have a correct shape in either quadrant 1 or quadrant 4 **B1** for $y = f^{-1}(x)$, must be a correct shape in quadrants 1 and 2 and intersect twice. **B1** for $\left(0,\ \frac{5}{3}\right)$, must have a reasonable shape for $y = f^{-1}(x)$ in either the first quadrant or the second quadrant
8(d)(i)	$g(g(x)) = 4x - 9$	**B1**	Must be simplified
8(d)(ii)	$fg(g(x)) = 2\ln(12x - 31)$	**M1**	allow unsimplified, using *their* answer to **(i)**
	$2\ln(12x - 31) = 4$ $x = \frac{e^2 + 31}{12}$	**2**	**Dep M1** for correct order of operations to solve *their* equation, to get as far as $x = \ldots$ Implied by decimal answer of awrt 3.2 **A1** Must be exact form.