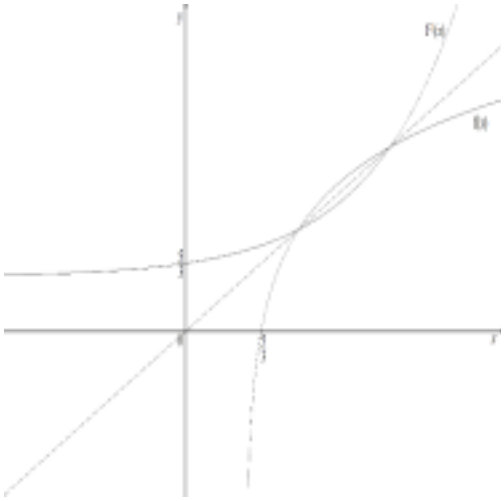
Question	Answer	Marks	Guidance
7(a)	${}^{14}C_2 \times {}^{12}C_3 \times {}^{9}C_4$ oe, soi 2 522 520	**3**	**B1** for a product of 3 combinations (ignore combinations that are equal to 1), one of which must be in the form ${}^{14}C_k$ where $k = 2,\ 3,\ 4,\ 5,\ 9,\ 10,\ 11,\ 12$ **B2** for a correct 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.