Question	Answer	Marks	Partial Marks
8(c)	$t = \frac{1}{3}$ $x = \frac{211}{27}$ or 7.814[814…] rot to 4 or more sf	**B1**	
	Distance $t = 0$ to $t = \frac{1}{3}$: $8 - \frac{211}{27}$ or $\frac{5}{27}$ or 0.1851[85…] rot to 4 or more sf **and** Distance $t = \frac{1}{3}$ to $t = 2$: $18 - \frac{211}{27}$ or $\frac{275}{27}$ or 10.18[51…] rot to 4 or more sf	**M2**	**M1** for distance $t = 0$ to $t = \frac{1}{3}$: $8 - \frac{211}{27}$ or $\frac{5}{27}$ or 0.1851[85…] rot to 4 or more sf or $t = \frac{1}{3}$ to $t = 2$: $18 - \frac{211}{27}$ or $\frac{275}{27}$ or 10.18[51…] rot to 4 or more sf
	Total: 10.4 or 10.37[037…] rot to 4 or more sf	**A1**	
9(a)(i)	$c = 12$	**B1**	
9(a)(ii)	$\frac{dy}{dx} = 2x - 8 = 0$ or $x^2 - 8x + c = (x - 4)^2 - 16 + c$	**M1**	
	$3 = -16 + c$ or $3 = 4^2 - 8\times4 + c$	**DM1**	
	$c = 19$	**A1**	
9(b)	$c > 16$	**B2**	**B1** for c * 16 where * is = or an incorrect inequality sign
10(a)	${}^7C_3 \times {}^8C_3 + {}^7C_4 \times {}^8C_2$	**M2**	**M1** for ${}^7C_3 \times {}^8C_3$ or ${}^7C_4 \times {}^8C_2$
	2940	**A1**	
10(b)	${}^6P_4 \times 3 \times 5$ oe	**M2**	**M1** for ${}^6P_4[\times 1]$ or ${}^6P_4 \times 3$ or ${}^6P_4 \times 5$ oe
	5400	**A1**	
11(a)(i)	Valid explanation e.g. The line $x = k$, where $-10 \leqslant k \leqslant 10$ cuts the curve in one point only	**B1**	
11(a)(ii)	$\frac{\frac{x}{x-1}}{\frac{x}{x-1} - 1}$	**M1**	
	Correct simplification to x	**A1**	

Question	Answer	Marks	Partial Marks
11(a)(iii)	Valid explanation e.g. f and f^{-1} are the same or f is self-inverse oe	**B1**	
11(a)(iv)	Valid explanation e.g. The curve is symmetrical about line $y = x$	**B1**	
11(b)	$1 < g \leqslant 2$	**B1**	
11(c)	$x \neq -\frac{1}{3}$	**B1**	
12(a)	$d_A = 3$ and $d_B = -3$	**B2**	**B1** for $d_A = 3$ or $d_B = -3$
	$a_n = 1 + (n - 1) \times 3$ oe, isw or $a_n = 3n - 2$	**B1**	
	$b_n = 298 + (n - 1) \times (-3)$ oe, isw or $b_n = -3n + 301$	**B1**	
	Solves $3n - 2 - (-3n + 301) = 45$ oe to find a value of n	**M1**	**FT** *their* $a_n - (-3n + 301)$ or $3n - 2 -$ *their* b_n
	$n = 58$	**A1**	
12(b)	$3m - 2 * 2(-3m + 301)$ oe where * is = or any inequality sign	**M1**	**FT** *their* a_n and *their* b_n from part **(a)**
	m * 67.1[11…] where * is = or any inequality sign	**A1**	
	68	**A1**	

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