Question	Answer	Marks	Guidance
11	$\frac{(n-4)(n+1)!}{(n-4)!5!} = \frac{(n+2)!}{(n-5)!7!}$ leading to $7\times6 = n+2$	**2**	**B1** for 7×6 or 42 seen as a result of simplification of the numerical factorials **B1** for $n+2$ seen as a result of simplification of the algebraic factorials
	$n = 40$	**B1**	
12(a)	$\frac{dy}{dx} = \frac{(x-2)2xe^{x^2} - e^{x^2}}{(x-2)^2}$ or $\frac{dy}{dx} = 2xe^{x^2}(x-2)^{-1} - e^{x^2}(x-2)^{-2}$	**3**	**B1** for $2xe^{x^2}$ **M1** for differentiation of a quotient or equivalent correct product **A1** all other terms correct
	$-\frac{1}{4}$	**A1**	Must be from correct working
12(b)	For use of $\frac{dy}{dx}\times\frac{dx}{dt} = \frac{dy}{dt}$	**M1**	**FT** on $0.5\times\frac{1}{their\left(-\frac{1}{4}\right)}$
	–2	**A1**	Must be from correct working in part **(a)**

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Question	Answer	Marks	Guidance
13	$\sin\theta = \frac{2-x}{3}$	**B1**	
	$y = 3\left(\frac{\cos^2\theta}{\sin^2\theta}\right)$ soi	**B1**	
	Use of $\sin^2\theta + \cos^2\theta = 1$ to obtain $y = 3\left(\frac{1-\left(\frac{2-x}{3}\right)^2}{\left(\frac{2-x}{3}\right)^2}\right)$	**B1**	**Dep** on both previous **B** marks
	$y = 3\left(\left(\frac{3}{(2-x)}\right)^2 - 1\right)$ oe	**B1**	**Dep** on all previous **B** marks No fractions within fractions
	Alternative method 1		
	$\text{cosec}\,\theta = \frac{3}{2-x}$	**(B1)**	
	$\cot^2\theta = \frac{y}{3}$	**(B1)**	
	Use of $\cot^2\theta + 1 = \text{cosec}^2\theta$ to obtain $\frac{y}{3} + 1 = \frac{9}{(2-x)^2}$	**(B1)**	**Dep** on both previous **B** marks
	$y = 3\left(\frac{9}{(2-x)^2} - 1\right)$ oe	**(B1)**	**Dep** on all previous **B** marks No fractions within fractions
	Alternative method 2		
	$y = 3\left(\text{cosec}^2\theta - 1\right)$ or $\frac{y}{3} = \text{cosec}^2\theta - 1$ soi	**(B1)**	
	$\text{cosec}^2\theta = \frac{1}{\sin^2\theta}$ soi	**(B1)**	
	$\sin\theta = \frac{2-x}{3}$	**(B1)**	
	$y = 3\left(\frac{9}{(2-x)^2} - 1\right)$ oe	**(B1)**	**Dep** on all previous **B** marks No fractions within fractions

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