Question	Answer	Marks	Guidance
9(a)	$\mathrm{f}'(x) = -(2x+5)^{-\frac{1}{2}}\ (+c)$	**2**	**M1** for $k(2x+5)^{-\frac{1}{2}}$ Allow unsimplified for **A1**
	$\mathrm{f}'(x) = -(2x+5)^{-\frac{1}{2}} + 1$ soi	**2**	**Dep M1** for use of $\mathrm{f}'(x) = \frac{2}{3}$ and $x = 2$ in *their* $\mathrm{f}'(x)$ in the form $k(2x+5)^{-\frac{1}{2}} + c$. Allow term in $(2x+5)^{-\frac{1}{2}}$ unsimplified. Need to see attempt at substitution.
	$\mathrm{f}(x) = x - (2x+5)^{\frac{1}{2}}\ (+d)$	**2**	**M1** for $p(2x+5)^{\frac{1}{2}}$
	$\mathrm{f}(x) = x - (2x+5)^{\frac{1}{2}} + 3$ soi	**2**	**Dep M1** for use of $x = 2$ and $y = 2$ in *their* $\mathrm{f}(x)$ in the form $rx + p(2x+5)^{\frac{1}{2}} + d$. Allow term in $(2x+5)^{\frac{1}{2}}$ unsimplified. Need to see an attempt at substitution.
	When $\mathrm{f}'(x) = 0$, $x = -2$	**2**	**M1** for solution of *their* $\mathrm{f}'(x) = 0$, must be in the form $p(2x+5)^{-\frac{1}{2}} + q$ to obtain a value for *x*.
	$y = 0$	**A1**	
9(b)	$\mathrm{f}''(-2) = 1$ [so positive] $\therefore$ a min point or correct use of first derivative test considering *x* values greater than $-\frac{5}{2}$	**B1**	Need to see evidence of substitution for either test. **B0** if $x = -2$ obtained incorrectly in part **(a)**
10	$(\sin\theta + \cos\theta)^2 + (\sin\theta - \cos\theta)^2 = 2$	**2**	**M1** for expansion of both terms with an attempt to simplify either using the correct identity or eliminating terms in $2\sin\theta\cos\theta$
	$\int 2\ \mathrm{d}\theta = 2\theta$	**M1**	**Dep M1**
	$\int_{\frac{\pi}{2}}^{\frac{3\pi}{2}} 2\ \mathrm{d}\theta = 3\pi - \pi$ $= 2\pi$	**2**	**Dep M1** for correct use of limits

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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