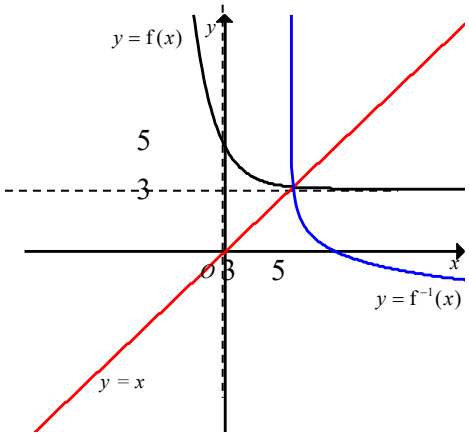
Question	Answer	Marks	Partial Marks
4	$m_{AB} = \frac{-9-3}{6--4}$ oe isw or $-\frac{6}{5}$	**M1**	
	$[m_{\perp} =]\ \frac{5}{6}$ or $\frac{-1}{\text{their } m_{AB}}$	**M1**	**FT** *their* m_{AB} providing that $\frac{\text{difference in } y}{\text{difference in } x}$ attempted
	[Midpoint] $\left(\frac{-4+6}{2}, \frac{3-9}{2}\right)$ oe isw or $(1, -3)$	**M1**	
	Finds equation of perpendicular bisector: $y - \text{their } (-3) = -\frac{1}{\text{their}\left(-\frac{6}{5}\right)}(x - \text{their } 1)$ oe	**M1**	**FT** *their* perpendicular gradient providing gradient is $\frac{-1}{\text{their } m_{AB}}$ and using *their* midpoint *Their* midpoint must not be any of A, B, C or D
	$11x - 75 = \frac{5}{6}x - \frac{23}{6}$	**M1**	Eliminates one variable **dep** on previous **M** mark $11x - 75$ = *their* perp bisector equation
	$E(7, 2)$	**A1**	
	[Area CDE =] 40	**A1**	Dependent on all previous marks
5	$\frac{dy}{dx} = 2x\tan\frac{x}{2} + \frac{x^2}{2}\sec^2\frac{x}{2}$ oe	**2**	**B1** for $\frac{d}{dx}\left(\tan\frac{x}{2}\right) = \frac{1}{2}\sec^2\frac{x}{2}$ soi or **M1 FT** for a product rule of correct structure with *their* $\frac{d}{dx}\left(\tan\frac{x}{2}\right)$
	$\frac{\delta y}{h} = \text{their}\left.\frac{dy}{dx}\right\|_{x=\frac{\pi}{3}}$ or $\text{their}\left.\frac{dy}{dx}\right\|_{x=\frac{\pi}{3}} \times h$	**M1**	Correct small changes relationship
	$1.94h$	**A1**	Dependent on **B2**
6(a)	$(3x + 2)^{10}$ oe	**M2**	**M1** for $(3x + 2)^2$ soi
	$1024 + 15\,360x + 103\,680x^2$	**A2**	**A1** for any two terms correct or $2^{10} + 10(2^9)(3x) + 45(2^8)(3x)^2$ or for 3 correct terms seen but not summed e.g. a list After **M2 A0**, allow **SC1** for an answer of $59\,049x^{10} + 393\,660x^9 + 1\,180\,980x^8$

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Question	Answer	Marks	Partial Marks
6(b)	51 963 120	**2**	**M1** for ${}^{12}C_4\left(\frac{6}{x^2}\right)^8\left(\frac{x^4}{2}\right)^4$ soi
7(a)	Correct pair of graphs with **both** asymptotes and **both** intercepts correctly shown  	**4**	**B1** for correct shape for f; must have positive y-intercept and appear to tend to an asymptote in the 1st quadrant **B1** for (0, 5) indicated; must have attempted correct shape for f **B1** for asymptote at $y = 3$; must have attempted correct shape for f **B1** for a correct reflection of *their* f in the line $y = x$ $y = x$ does not have to be drawn **Maximum of B3 if not fully correct**
7(b)	$e^y = \frac{3}{2-x} - 2$ oe OR $e^x = \frac{3}{2-y} - 2$ oe and variables swapped at some point	**M1**	Rearranges to $e^y = \ldots$ e.g. $e^y = \frac{2x-1}{2-x}$ or $e^y = \frac{1-2x}{x-2}$ or $e^y = \frac{-3}{x-2} - 2$
	$\ln\left(\frac{3}{2-x} - 2\right)$ oe, isw	**A1**	
	$1 \leqslant x < 2$	**B2**	**B1** $x \geqslant 1$ oe OR $x < 2$ oe OR $1 < x \leqslant 2$
8(a)	$\cos x = 0$ or $\tan x = \frac{3}{2}$ oe	**M1**	
	$[x =] \frac{\pi}{2}$ or 1.57[07...] 0.983 or 0.9827[93…]	**A2**	and no extra solutions in range **A1** for either ignoring extras
8(b)	$\frac{2}{\sin(2\theta+1)} - 12\sin(2\theta+1) = 5$ or $2\operatorname{cosec}(2\theta+1) - \frac{12}{\operatorname{cosec}(2\theta+1)} = 5$	**M1**	• Writes in terms of $\operatorname{cosec}(2\theta+1)$ or $\sin(2\theta+1)$ only.