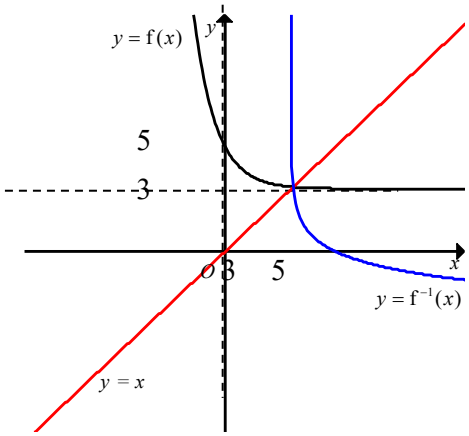
Question	Answer	Marks	Partial Marks
6(b)	51 963 120	**2**	**M1** for ${}^{12}C_4\left(\frac{6}{x^2}\right)^8\left(\frac{x^4}{2}\right)^4$ soi
7(a)	Correct pair of graphs with **both** asymptotes and **both** intercepts correctly shown  	**4**	**B1** for correct shape for f; must have positive y-intercept 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.

Question	Answer	Marks	Partial Marks
	$12\sin^2(2\theta+1)+5\sin(2\theta+1)-2\,[=0]$ or $2\text{cosec}^2(2\theta+1)-5\text{cosec}(2\theta+1)-12\,[=0]$ oe	**A1**	
	$4\sin(2\theta+1)-1)(3\sin(2\theta+1)+2)\,[=0]$ or $(2\,\text{cosec}(2\theta+1)+3)(\text{cosec}(2\theta+1)-4)\,[=0]$	**M1**	Factorises or solves *their* 3-term quadratic in $\sin(2\theta+1)$ or $\text{cosec}(2\theta+1)$ **dep** on previous **M1**
	$2\theta+1 = 0.253$ or $0.2526[80\ldots]$ OR $2\theta+1 = -0.73[0]$ or $-0.7297[27\ldots]$ OR $2\theta+1 = \sin^{-1}\left(their\ \frac{1}{4}\right)$ OR $2\theta+1 = \sin^{-1}\left(their-\frac{2}{3}\right)$	**M1**	**dep** on previous **M1** **FT** providing $-1 \leqslant their\ \frac{1}{4} \leqslant 1$ and/or $-1 \leqslant their-\frac{2}{3} \leqslant 1$
	-0.374 or $-0.3736[59\ldots]$ 0.944 or $0.9444[56\ldots]$ -0.865 or $-0.8648[63\ldots]$ 1.44 or $1.435[66\ldots]$	**A2**	and no extra solutions in range **A1** for two correct solutions ignoring extras in range
9(a)	135π isw or 424 or 424.1 to 424.2	**2**	**M1** for $\frac{1}{2}\times15^2\times\frac{6\pi}{5}$ oe
9(b)	18π or 56.5 to 56.6	**2**	**M1** for $15\times\frac{6\pi}{5}$ oe
9(c)	radius = 9, height = 12	**2**	**B1** for radius = 9 OR **M1** for a correct Pythagoras' statement e.g. *their* r^2 + height^2 = 15^2
9(d)(i)	$r=\frac{3}{4}h$ oe	**B1**	

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