Question	Answer	Marks	Guidance
3(b)	$e^{x^2-3-(7-x^2)} = 25$ oe	**M1**	Arrange as equation with one power of e
	$2x^2 - 10 = \ln 25$	**A1**	
	$x^2 = \dfrac{\ln 25 + 10}{2}$	**A1**	
	$x = \pm\sqrt{\frac{\ln 25+10}{2}}$ oe or $\pm\sqrt{\ln 5 + 5}$	**A1**	isw
4(a)	Many-many (mapping) oe or A vertical line meets graph more than once (or twice) oe	**B1**	
4(b)	<table><tr><td></td><td>✓</td><td></td></tr><tr><td>✓</td><td></td><td>✓</td></tr><tr><td></td><td>✓</td><td></td></tr><tr><td>✓</td><td></td><td></td></tr></table>	**4**	**B1** for each correct row
4(c)(i)	$\sin x \geqslant \frac{1}{2}$	**M1**	May be implied. Allow >
	$a = 150$ seen	**A1**	
4(c)(ii)	$0 \leqslant \text{gf}(x) \leqslant \frac{1}{\sqrt{2}}$	**2**	**B1** for each correct value with correct sign associated with it
4(c)(iii)	No. Range of g $\not\subset$ domain of g oe	**B1**	
5(a)	$\frac{10}{2}(6 + 9d) = 4 \times \frac{5}{2}(6 + 4d)$	**M2**	**M1** for either sum correct
	$d = 6$	**A1**	

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Question	Answer	Marks	Guidance
5(b)	$ar^2 = a + 4(ar - a)$	**M1**	For $ar = a + d$, $ar^2 = a + 4d$ or for $ar^2 = a + k(ar - a)$ $(k > 2)$ with a correct attempt to eliminate d
	$r^2 - 4r + 3 = 0$	**A1**	
	$(r - 3)(r - 1) = 0$ or formula	**M1**	**Dep** for solving *their* 3-term quadratic
	$r = 3$ only	**A1**	
	Alternative method		
	$\frac{a+d}{a} = \frac{a+4d}{a+d}$	**(M1)**	
	$\Rightarrow d = 2a$	**(A1)**	
	$r = \frac{a+2a}{a}$	**(M1)**	**Dep**
	$r = 3$	**(A1)**	
6	$x^2 - 5x = 6 \Rightarrow x^2 - 5x - 6 = 0$ $(x - 6)(x + 1) = 0$	**M1**	or $x = \frac{5 \pm \sqrt{25 - 4 \times (-6)}}{2}$
	$x = 6$ or -1	**A1**	
	$x^2 - 5x = -6 \Rightarrow x^2 - 5x + 6 = 0$	**M1**	
	$(x - 3)(x - 2) = 0$	**M1**	or $x = \frac{5 \pm \sqrt{25 - 4 \times 6}}{2}$
	$x = 3$ or 2	**A1**	
	Alternative method		
	$(x^2 - 5x)^2 = 36$	**(M1)**	
	$x^4 - 10x^3 + 25x^2 - 36 = 0$	**(A1)**	
	$(x - 3)(x - 2)(x - 6)(x + 1) = 0$	**(M1)**	Attempt to factorise into 4 brackets
	$x = -1$ or 2 or 3 or 6	**(A1A1)**	**A1** for any two

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