Question	Answer	Marks	Guidance
3	$6x^{\frac{6}{5}} + x^{\frac{3}{5}} - 12 = 0$	**M1**	For attempt to obtain a 3-term quadratic in terms of $x^{\frac{3}{5}}$, allow one sign error. Allow use of substitution
	$x^{\frac{3}{5}} = \frac{4}{3},\ x^{\frac{3}{5}} = -\frac{3}{2}$	**M1**	**Dep** for solution of *their* quadratic equation to obtain 2 solutions in terms of $x^{\frac{3}{5}}$
	1.62, -1.97	**2**	**M1** for correct attempt to solve an equation of the form $x^{\frac{3}{5}} = k$, $k \neq 1$ **A1** for both
4(a)(i)	3003	**B1**	
4(a)(ii)	With the sisters: 792 soi	**B1**	
	Without the sisters: 66 soi	**B1**	
	Total 858	**B1**	
4(b)	68 880	**3**	**B1** Starts with 1, 3, 5, 7, 9: 42 000 soi **B1** Starts with 2, 4, 6 or 8: 26 880 soi
	Alternative		
	68 880	**(3)**	**B1** Ends with 0: 15 120 soi **B1** Ends with 2, 4, 6 or 8: 53 760 soi
5(a)	$e^y = mx^2 + c$ soi	**B1**	
	$m = -3$ used correctly	**B1**	
	$c = 18.75$	**B1**	
	$y = \ln\left(18.75 - 3x^2\right)$ oe	**B1**	Allow 18.8 **B0** for poor use of brackets
5(b)	$their\left(18.75 - 3x^2\right) > 0$	**B1**	May be implied by final answer
	Critical values $\pm$ 2.5 oe seen	**B1**	May be implied by final answer
	$-2.5 < x < 2.5$	**B1**	Mark final answer

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Question	Answer	Marks	Guidance
6(a)	$\dfrac{\left(\dfrac{4x}{2x^2+1}\times(x+2)\right)-\ln(2x^2+1)}{(x+2)^2}$ oe, isw	**3**	**B1** for $\dfrac{4x}{2x^2+1}$ **M1** for attempt at differentiation of a quotient or correct product **A1** for all terms apart from $\dfrac{4x}{2x^2+1}$ correct
6(b)	When $x=2$, $\dfrac{dy}{dx}=0.0849$ and attempt at correct use of small changes	**M1**	Substitution of $x=2$ needs to be seen if simplification of **(a)** is incorrect.
	Change = $0.0849h$	**A1**	Must have full marks in part **(a)**
6(c)	$\dfrac{dy}{dt}=-0.4$ soi	**B1**	
	$\dfrac{dx}{dt}=-\dfrac{0.4}{their\ \dfrac{dy}{dx}_{x=2}}$	**M1**	
	awrt -4.71	**A1**	
7(a)	Least value of a when $2+a=1$ so $a=-1$.	**2**	**B1** for range of f: $2+a$, may be implied by $a+1$ or $\sqrt{a+1}$
7(b)	$\sqrt{(2e^x+5)-1}$ $[=3]$	**M1**	For correct order
	$x=0.916$	**2**	**M1** for correct attempt to solve to obtain $x=\ldots$
8(a)	Numerator: $\dfrac{\sin\theta\times\sin^2\theta}{\cos^2\theta}$ or Denominator: $\dfrac{1}{\cos^2\theta}$ soi	**B1**	Allow for a correct step and equivalent methods
	$\dfrac{\dfrac{\sin\theta\times\sin^2\theta}{\cos^2\theta}}{\dfrac{1}{\cos^2\theta}}=\sin^3\theta$	**B1**	Must have sufficient detail