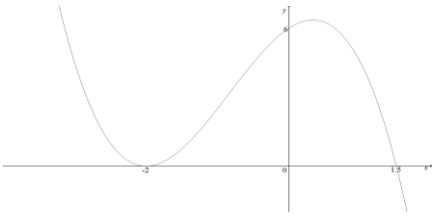
Question	Answer	Marks	Guidance
1(a)	$AOB = \arccos\left(\frac{5}{13}\right)$ oe	**M1**	For a complete method to find *AOB*
	1.18	**A1**	
1(b)	25.9 cm	**3**	**M1** for $AB = 12$ soi **M1** for arc length = $5 \times their AOB$ in radians
1(c)	Area = 15.3 cm^2	**3**	**M1** for area of triangle = 30 soi **M1** for area of sector = $\frac{1}{2} \times 25 \times their AOB$ in radians
2(a)	$\frac{dy}{dx} = \frac{1}{2}\left(2(x+2)(3-2x) - 2(x+2)^2\right)$ oe or $\frac{dy}{dx} = \frac{1}{2}\left(-6x^2 - 10x + 4\right)$ oe	**2**	**M1** for attempt to differentiate a product, or expansion and differentiation
	When $\frac{dy}{dx} = 0$, $x = -2$, $x = \frac{1}{3}$ nfww	**2**	**M1** for equating *their* $\frac{dy}{dx}$ to zero and attempt to solve a quadratic equation to obtain 2 *x*-values
2(b)		**3**	**B1** for correct shape with maximum in the first quadrant, continuing into the 4th quadrant. **B1** for correct intercepts -2 and 1.5 on the *x*-axis or stated and no others; must have a cubic graph **B1** for 6 on the *y*-axis or stated; must have a cubic graph
2(c)	$\frac{343}{54}$ or 6.35	**M1**	For finding the *y*-coordinate of the maximum point.
	$0 < k < \frac{343}{54}$ or $0 < k < 6.35$	**A1**	**A0** if additional values are given.

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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