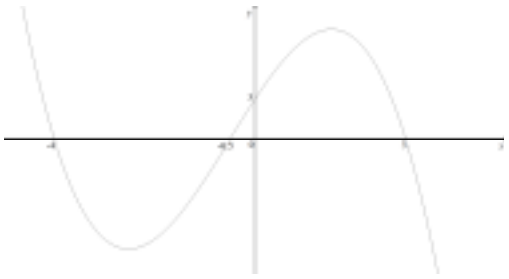
Question	Answer	Marks	Guidance
1		**3**	**B1** for a cubic shape with a maximum in the first quadrant, a minimum in the third quadrant, extending into the second and 4th quadrants. The extensions must not curve incorrectly and not lead to a complete stationary point. **B1** for x-intercepts $-4, -\frac{1}{2}, 3$ either on diagram or stated but must be with a cubic graph. **B1** for y-intercept 3 either on diagram or stated but must be with a cubic graph.
2	$v = -4.91$ soi	**B1**	
	Speed = 4.91	**B1**	
3	$\tan\left(2x - \frac{\pi}{3}\right) = \pm\sqrt{3}$ soi or $\sin\left(2x - \frac{\pi}{3}\right) = \pm\frac{\sqrt{3}}{2}$ soi	**B1**	**B0** if negative root is rejected Allow truncated decimals May be implied by subsequent work From use of $\text{cosec}^2\left(2x - \frac{\pi}{3}\right) - 1 = \cot^2\left(2x - \frac{\pi}{3}\right)$
	$2x - \frac{\pi}{3} = -\frac{\pi}{3}, \frac{\pi}{3}, \frac{2\pi}{3}, \frac{4\pi}{3}$ $2x = 0, \frac{2\pi}{3}, \pi, \frac{5\pi}{3}$ $x = 0, \frac{\pi}{3}, \frac{\pi}{2}, \frac{5\pi}{6}$ or 0, 1.05, 1.57, 2.62 or greater accuracy	**4**	**M1** for correct order of operations to obtain one solution in the range using $\tan\left(2x - \frac{\pi}{3}\right) = k$ or $\sin\left(2x - \frac{\pi}{3}\right) = m, \ \lvert m\rvert < 1$ **Dep M1** for correct order of operations to obtain a second solution in the range using $\left(2x - \frac{\pi}{3}\right) = \tan^{-1}(k) \pm \pi$ or $\left(2x - \frac{\pi}{3}\right) = \pi - \sin^{-1}(m), \ \lvert m\rvert < 1$ oe $\left(2x - \frac{\pi}{3}\right) = -\sin^{-1}(m), \ \lvert m\rvert < 1$ oe **A1** for any pair of correct solutions **A1** for remaining pair of solutions, with no extra solutions within the range
4(a)	$\frac{1}{256} - \frac{x^2}{24} + \frac{7x^4}{36}$	**3**	**B1** for $\frac{1}{256}$ **B1** for $-\frac{x^2}{24}$ **B1** for $\frac{7x^4}{36}$

Question	Answer	Marks	Guidance
4(b)	$4x^2 + 4 + \frac{1}{x^2}$ soi	**B1**	
	Coefficient of x^2 $\left(their 4 \times their \frac{1}{256}\right)$ $+\left(their 4 \times their -\frac{1}{24}\right)$ $+\left(their \frac{7}{36}\right)$	**M1**	Allow one sign error, but must have 3 terms in x^2 only, with an attempt at addition.
	$\frac{25}{576}$	**A1**	
5(a)	$\frac{a\left(r^4-1\right)}{r-1} = 17\frac{a\left(r^2-1\right)}{r-1}$	**M1**	Allow equivalents Allow if 'a' terms missing (assume to have been cancelled)
	$\left(r^2-1\right)\left(r^2+1\right) = 17\left(r^2-1\right)$ or better $r^4 - 17r^2 + 16 = 0$ oe $r^3 + r^2 - 16r - 16 = 0$ oe	**M1**	**Dep M1** for a correct simplified equation in r only
	$r = 4$ only, from correct working	**A1**	
5(b)	$ar^5 = 64$	**M1**	For use of ar^5 with *their* positive r
	$a = 0.0625$ or $\frac{1}{16}$	**A1**	Must be exact A0 if $r=4$not from correct working in **(a)**
5(c)	Because $r>1$ oe	**B1**	**FT** on *their* $r>1$ Must have a value for r