Question			Answer	Marks	AO	Guidance	
6	(a)	(i)	$\int(x^3-16x)\,dx=\frac{1}{4}x^4-8x^2$	M1	1.1	Attempt integration Implied by correct answer	Obtain ax^4+bx^2
				A1	1.1	Obtain correct integral Implied by correct answer	May also have $+c$
			$\left[\frac{1}{4}x^4-8x^2\right]_0^k$ $=\left(\frac{1}{4}k^4-8k^2\right)-(0-0)$ $=\frac{1}{4}k^4-8k^2$	A1	1.1	Use given limits to obtain correct answer in terms of k	Correct order, and subtraction (condone use of 0 not being explicit) **A0** if $+c$ still present
				[3]			
6	(a)	(ii)	$\left[\frac{1}{4}x^4-8x^2\right]_{-k}^k$ $=\left(\frac{1}{4}k^4-8k^2\right)-\left(\frac{1}{4}(-k)^4-8(-k)^2\right)$ $=\left(\frac{1}{4}k^4-8k^2\right)-\left(\frac{1}{4}k^4-8k^2\right)$ $=0$ **AG**	B1FT	2.1	Replace lower limit with $-k$ to obtain given answer **FT** their **(i)** answer, as long as there are two terms both with even powers	Need to see $-k$ being used correctly, so brackets around $-k$ are needed Must see $\frac{1}{4}(-k)^4-8(-k)^2$ becoming $\frac{1}{4}k^4-8k^2$ before given answer of 0 is stated
				[1]			
6	(b)		Equal areas above and below the x-axis (between $x=-k$ and $x=k$, for all k)	B1	2.2a	Any sensible statement that refers to equal areas (soi to be both above and below the x-axis); condone reference to 'negative' area Could refer to the symmetry of the curve No need to mention limits, as it is true for all k	Must go both above and below the x-axis is not sufficient Accept 'odd function', but this is not on the specification so also allow a description of an odd function eg referring to **rotational** symmetry around the origin oe Accept $f(x)=-f(-x)$ oe Condone additional incorrect statements as long as not directly contradictory A sketch alone is not sufficient, but could be used to support their explanation
				[1]			

Question			Answer	Marks	AO	Guidance	
6	(c)		$x^3 - 16x = x(x+4)(x-4)$ so points of intersection with x-axis are $-4, 0, 4$	**B1**	**3.1a**	Identify limits as 0 (soi) and at least one of -4 and 4 Implied by answer of ± 64 www	Possibly **BC**
			$\int_0^4 (x^3 - 16x)\,dx = -64$ or $\int_{-4}^0 (x^3 - 16x)\,dx = 64$	**M1**	**1.1a**	Attempt integral / area between 0 and either of their ± 4 Implied by answer of ± 64	Limits used in either order, and no need to see explicit use of 0 Could also see modulus being used (or implied) Possibly **BC**
			Hence total area is 128	**A1** **[3]**	**1.1**	Obtain total area of 128 www	**A0** for -128