

**TG 6**
ADI

(a) Show that $\int_{-2}^2 x^3 dx = 0$.

(b) Explain why this is not representative of the area bounded by the graph of $y = x^3$, the x -axis, and the lines $x = -2$ and $x = 2$.

$$\begin{aligned} \text{(a)} \quad \int_{-2}^2 x^3 dx &= \left[\frac{x^4}{4} \right]_{-2}^2 \\ &= \frac{2^4}{4} - \frac{(-2)^4}{4} \\ &= 4 - 4 \\ &= 0 \end{aligned}$$

(b) $y = x^3$ is an odd function.

As $\int_{-2}^0 x^3 dx = -4$ and $\int_0^2 x^3 dx = 4$, then

$$\int_{-2}^2 x^3 dx = 0.$$

The area is $\left| \int_{-2}^0 x^3 dx \right| + \int_0^2 x^3 dx = 8 \text{ units}^2$.

* These solutions have been provided by [projectmaths](http://projectmaths.com.au) and are not supplied or endorsed by NESA.

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