



The diagram shows part of the curve  $y = \frac{1}{2}(x^4 - 1)$ , defined for  $x \geq 0$ .

- (i) Find, showing all necessary working, the area of the shaded region. [3]

This image shows a full page of white paper with ten horizontal dashed lines, typical of primary school handwriting practice paper. The lines are evenly spaced and extend across the entire width of the page. There is no text or other markings on the paper.

- (ii) Find, showing all necessary working, the volume obtained when the shaded region is rotated through  $360^\circ$  about the  $x$ -axis. [4]

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[illegible]

- (iii) Find, showing all necessary working, the volume obtained when the shaded region is rotated through  $360^\circ$  about the y-axis. [5]

This image shows a full page of white paper with horizontal dashed lines, typical of primary school writing paper. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.