

The constant a is such that $\int_1^a x^2 \ln x \, dx = 4$.

(a) Show that $a = \left(\frac{35}{3 \ln a - 1} \right)^{\frac{1}{3}}$. [5]

This image shows a full page of primary-ruled paper. It features approximately 20 horizontal dotted lines spaced evenly apart, providing a guide for handwriting practice. The lines are light gray or black dots forming a continuous line across the width of the page. There are no margins, text, or other markings on the paper.

- (b) Verify by calculation that a lies between 2.4 and 2.8.

[2]

This image shows a full page of white paper with ten horizontal dashed lines, evenly spaced from top to bottom. These lines are typical of primary-ruled notebook paper used for teaching handwriting or basic writing skills. There are no margins, text, or other markings on the page.

- (c) Use an iterative formula based on the equation in part (a) to determine a correct to 2 decimal places. Give the result of each iteration to 4 decimal places. [3]

[3]

[illegible]