



The diagram shows the curve with equation $y = (x^3 - 2x^2)\ln x$. The curve has a point of inflection at the point M .

(a) (i) Show that the x -coordinate of M satisfies the equation

$$x = \frac{6 + (4 - 6x)\ln x}{5}. \quad [5]$$

(ii) Use an iterative formula, based on the equation in part (a)(i), to determine the x -coordinate of M correct to 2 decimal places. Use an initial value of 1.1 and show the result of each step of the iterative process. [2]

(b) Determine the exact area of the shaded region, giving your answer in the form $p \ln q - r$, where p and r are positive rational numbers and q is a positive integer. [6]