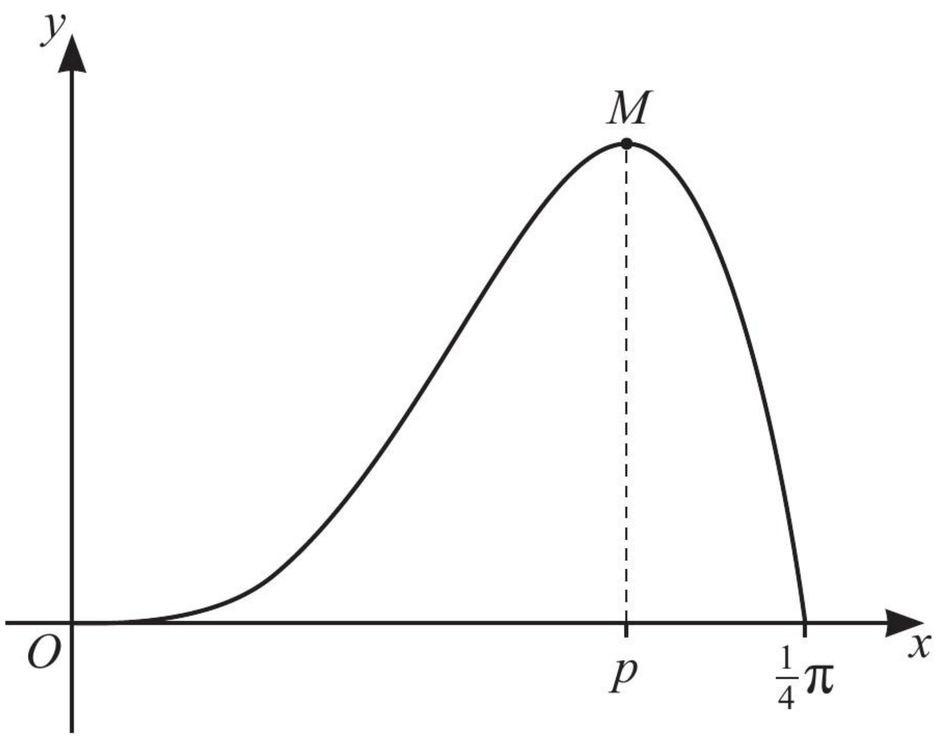

The diagram shows the curve $y = x^3 \cos 2x$ for $0 \leqslant x \leqslant \frac{1}{4}\pi$. The curve has a maximum point at M, where $x = p$.

(a) Show that p satisfies the equation $p = \frac{1}{2}\tan^{-1}\left(\frac{3}{2p}\right)$. [3]

(b) Show by calculation that $0.5 < p < 0.7$. [2]

(c) Use an iterative formula based on the equation in part **(a)** to calculate p correct to 3 decimal places. Give the result of each iteration to 5 decimal places. [3]