

Question 12**(15 marks)**

Let $f(x) = x^2 e^x$.

(a) Show that $f'(x) = x e^x (x + 2)$.

(2 marks)

(b) Use calculus to determine all the stationary points of $f(x)$ and determine their nature.

(7 marks)

(c) Determine the coordinates of any points of inflection.

(2 marks)

(d) Hence sketch the graph of $f(x)$, clearly indicating the location of all stationary points and points of inflection. (4 marks)

