

QUESTION

Find and classify the stationary point of the function $f(x) = xe^x$.

ANSWER

$f(x) = xe^x$, $\frac{df}{dx} = xe^x + e^x = (x+1)e^x$, $= 0$ for stationary point.

$e^x \neq 0$, therefore $x+1 = 0$, $x = -1$ is the stationary point.

$\frac{d^2f}{dx^2} = (x+1)e^x + e^x = (x+2)e^x$

When $x = -1$, $\frac{d^2f}{dx^2} = (-1+2)e^{-1} = \frac{1}{e} > 0$ therefore the stationary point is a minimum.