Test 1 LEC 5101 from 5-7 pm – SOLUTIONS

A1. [**2 marks**] Write the degree-2 Taylor polynomial centred at $x = 1$ for $f(x) = xe^{2x}$.

Note: Do NOT replace e with a number.

Solution: $f'(x) = e^{2x} + 2xe^{2x} = (2x+1)e^{2x}$

$f''(x) = 2e^{2x} + 2e^{2x} + 4xe^{2x} = (4x+4)e^{2x}$

At $x = 1$, $f(1) = e^2$, $f'(1) = 3e^2$, and $f''(1) = 8e^2$

$$\boxed{T_2(x) = e^2 + 3e^2(x-1) + \frac{8}{2}e^2(x-1)^2}$$