Test 1 LEC 0101 from 10 am - 12 pm – SOLUTIONS

A1. [**2 marks**] Write the degree-2 Taylor polynomial centred at $x = 1$ for $f(x) = xe^{3x}$.

Note: Do NOT replace e with a number.
Solution: $f'(x) = e^{3x} + 3xe^{3x} = (3x+1)e^{3x}$

$f''(x) = 3e^{3x} + 3(3x+1)e^{3x}$

$f(1) = e^3,\ f'(1) = 4e^3,\ f''(1) = 15e^3$

$$\boxed{T_2(x) = e^3 + 4e^3(x-1) + \frac{15e^3}{2!}(x-1)^2}$$