Q6) $\int e^x \cos x \, dx$ $\quad u = \cos x \quad du = -\sin x \, dx$

$dv = e^x \quad v = e^x$

$\cos x \, e^x + \int \sin x \, e^x \, dx$

$u_1 = \sin x \quad du_1 = \cos x \, dx$

$dv_1 = e^x \quad v_1 = e^x$

$\cos x \, e^x + \sin x \, e^x - \int \cos x \, e^x \, dx = \int e^x \cos x \, dx$

$C + \dfrac{\cos x \, e^x + \sin x \, e^x}{2} = \int e^x \cos x \, dx$

Q7) $y = x^3 - 3x + 2x \quad y = 0$ when $x = 0, x = 1, x = 2$

$\text{Area} = \int_0^1 x^3 - 3x^2 + 2x - \int_1^2 x^3 - 3x^2 + 2x$

$\text{Area} = \left[\frac{1}{4}x^4 - x^3 + x^2\right]_0^1 - \left[\frac{1}{4}x^4 - x^3 + x^2\right]_1^2$

$\text{Area} = \left(\frac{1}{4} - 1 + 1\right) - \left((4 - 8 + 4) - \left(\frac{1}{4} - 1 + 1\right)\right)$

$\text{Area} = \frac{1}{4} - \left(0 - \frac{1}{4}\right) = \frac{1}{4} + \frac{1}{4} = \underline{\underline{\frac{1}{2}}}$