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Analytical Methods (ACHA 4000)

b) ii) $\int_1^2 3x e^{2x} dx$

$$= 3 \times \int_1^2 x e^{2x} dx$$

$$= 3 \times \int_2^4 \frac{eu}{4} du$$

$$= 3 \times \frac{1}{4} \times \int_2^4 e^u u du$$

$$= 3 \times \frac{1}{4} [e^u u - \int e^u du]_2^4$$

$$= 3 \times \frac{1}{4} [e^u u - e^u]_2^4$$

$$= \frac{3}{4} [e^u u - e^u]_2^4$$

$$= \frac{3}{4} (3e^4 - e^2)$$

c) i) $\int \frac{21x^2 + 10x - 3}{7x^3 + 5x^2 - 3x - 1} dx$

$$= \int \frac{1}{u} du$$

$$= \ln |7x^3 + 5x^2 - 3x - 1| + C$$