

Question 3 (a) Abdullah Rahman 201863

Q1) $\int (x^5 - 2x)(5x^3 + 6x) dx$

$$5x^8 + 6x^6 - 10x^4 - 12x^2$$

$$5 \int x^8 dx + 6 \int x^6 dx - 10 \int x^4 dx - 12 \int x^2 dx$$

$$= \frac{5x^9}{9} + 6 \int x^6 dx - 10 \int x^4 dx - 12 \int x^2 dx$$

$$= \frac{6x^7}{7} + \frac{5x^9}{9} - 10 \int x^4 dx - 12 \int x^2 dx$$

$$= 2x^5 + \frac{6x^7}{7} + \frac{5x^9}{9} - 12 \int x^2 dx$$

$$= \boxed{\frac{5x^9}{9} + \frac{6x^7}{7} - 2x^5 - 4x^3}$$

(ii) $\int (e^{5x} + 1)(e^{3x} + 2) dx$

$$u = e^{3x}$$

$$v' = (1 + e^{5x}) dx$$

$$u' = (3^x e^x \log(3)) dx$$

$$v = \frac{(e^{5x})}{\log(5)} + x$$

$$\int (2 + e^{3x})(1 + e^{5x}) dx = \int (2 + e^{3x}) \left(x + \frac{e^{5x}}{\log(5)} - \int 3^x e^{3x} \log(3) \left(x + \frac{e^{5x}}{\log(5)} \right) dx \right)$$