

Q3. a)

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

$\int 5x^8 + 6x^5 - 3x^4 - 12x^2 dx$

$= \boxed{\frac{5x^9}{9} + \frac{6x^6}{6} - \frac{3x^5}{5} - \frac{12x^3}{3} + C}$

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

$\int e^{8x} + 2e^{5x} + e^{3x} + 2 dx$

$\boxed{\frac{e^{8x}}{8} + \frac{2e^{5x}}{5} + \frac{e^{3x}}{3} + 2x + C}$

iii) $\int_0^2 (3x^3 + 2x)^3 + 4x + 3 dx$

$\int_0^2 (3x^3 + 2x)(3x^3 + 2x)(3x^3 + 2x) + 4x + 3 dx$

$\int 9x^6 + 6x^4 + 6x^4 + 4x^2(3x^3 + 2x) + 4x + 3 dx$

~~$\int 9x^6 + 12x^4 + 4x^2 + 4x + 3 dx$~~

~~$\int_0^2 (27x^9 + 12x^7 + 12x^7 + 18x^7) dx$~~

$\int_0^2 9x^6 + 12x^4 + 4x^2(3x^3 + 2x) + 4x + 3 dx$

$\int_0^2 27x^9 + 12x^7 + 36x^7 + 12x^5 + 8x^5 + 4x + 3 dx$

$\int 27x^9 + 48x^7 + 20x^5 + 4x + 3 dx$

$\left[\frac{27x^{10}}{10} + \frac{48x^8}{8} + \frac{20x^6}{6} + 2x^2 + 3x \right]_0^2$