

Question Three

a)

$$i) \int (x^8 + 2x^2)(3x^2 + x) dx$$

$$3x^{10} + x^9 + 6x^4 + 2x^3$$

$$\boxed{\frac{3x^{11}}{11} + \frac{x^{10}}{10} + \frac{6x^5}{5} + \frac{2x^4}{4} + C}$$

$$ii) (e^x + 1)(e^x - 1) dx$$

$$e^2 - e^x + e^x - 1 \quad e^2 - 1 = \boxed{e^2 - x + C}$$

$$iii) \int (x+2)^3 + x - 1$$

$$(x+2)(x+2) (x^2 + 4x + 4) (x+2)$$

$$x^3 + 4x^2 + 4x + 2x^2 + 8x + 8$$

$$x^3 + 6x^2 + 12x + 8 + x - 1$$

$$x^3 + 6x^2 + 13x + 7$$

$$\frac{x^4}{4} + \frac{6x^3}{3} + \frac{13x^2}{2} + 7x - 1$$

$$\left[\frac{5^4}{4} + \frac{6(5^3)}{3} + \frac{13(5^2)}{2} + \frac{7 \times 5}{1} \right] - \left[\frac{2^4}{4} + \frac{6(2^3)}{3} + \frac{13(2^2)}{2} + \frac{7 \times 2}{1} \right]$$

$$156.25 + 250 + 162.5 + 35$$

$$4 + 24 + 26 + 14$$

$$568.75 -$$

$$603.75 - 44$$

$$\boxed{559.75}$$