

Question 3 - Integration

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

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

$$\frac{x^3(5x^3 + 6x^2 + 45x - 60)}{30} + C$$

ii) $\int (e^x + 5)(e^x + 6) dx$

$$\int e^{2x} + 6e^x + 5e^x + 30 dx$$

$$\hookrightarrow e^{2x} + 11e^x + 30x + C$$

iii) $\int_0^3 (x+6)(x-1) dx$

$$x^2 - x + 6x - 6$$

$$\int x^2 + 5x - 6$$

$$\hookrightarrow \frac{x^3}{3} + \frac{5}{2}x^2 - 6x + 6$$

Let $x=3$

$$\frac{(3)^3}{3} + \frac{5(3)^2}{2} - 6(3) = 13.5$$

iv) $\int_1^5 (2x+7)(x+3) dx$
 $= 2 \int x^2 dx + 13 \int x dx + 21 \int 1 dx$

$$\int x^2 dx$$

$$= \frac{x^3}{3}$$

$$\int 1 dx = x$$