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MA 226 Quiz 1 - B

Please show your work.

1. Use the method of partial fractions to integrate

$$\int \frac{6x+7}{(x-3)(x+2)} dx$$

$$\frac{6x+7}{(x-3)(x+2)} = \frac{A}{x-3} + \frac{B}{x+2}$$

$$= \frac{A(x+2) + B(x-3)}{(x-3)(x+2)}$$

$$= \frac{(A+B)x + (2A-3B)}{(x-3)(x+2)}$$

$$\begin{aligned} A+B &= 6 \\ 2A-3B &= 7 \end{aligned} \Rightarrow \begin{aligned} 3A+3B &= 18 \\ 2A-3B &= 7 \\ \hline 5A &= 25 \end{aligned} \quad \begin{aligned} A &= 5 \\ B &= 1 \end{aligned}$$

$$\frac{6x+7}{(x-3)(x+2)} = \frac{5}{x-3} + \frac{1}{x+2}$$

$$\int \frac{6x+7}{(x-3)(x+2)} dx$$

$$= \int \frac{5}{x-3} + \frac{1}{x+2} dx$$

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

2. Use the method of integration by parts to integrate $\int_{x=0}^1 x e^x dx$

$$\int_0^1 x e^x dx = x e^x \Big|_0^1 - \int_0^1 e^x dx$$

$\underbrace{\quad}_{u} \quad \underbrace{\quad}_{dv}$

$$du = 1 dx \quad v = e^x$$

$$= (e - 0) - e^x \Big|_0^1$$

$$= (e - 0) - (e - e^0)$$

$$= 1 - e + e$$

$$= 1$$