



Indefinite Integrals Ex 19.26 Q10

$$\begin{aligned}\text{Let } I &= \int e^x \frac{x+1-2}{(x+1)^3} \\&= \int e^x \left\{ \frac{1}{(x+1)^2} + \frac{-2}{(x+1)^3} \right\} dx \\&= \int e^x \frac{1}{(x+1)^2} dx + \int e^x \frac{(-2)}{(x+1)^3} dx\end{aligned}$$

Integrating by parts

$$\begin{aligned}&= e^x \frac{1}{(x+1)^2} - \int e^x \left(\frac{d}{dx} (x+1)^{-2} \right) dx + \int e^x \frac{(-2)}{(x+1)^3} dx \\&= e^x \frac{1}{(x+1)^2} - \int e^x \frac{(-2)}{(x+1)^3} dx + \int e^x \frac{(-2)}{(x+1)^3} dx \\&= e^x \frac{1}{(x+1)^2} + c\end{aligned}$$

Indefinite Integrals Ex 19.26 Q11

$$\begin{aligned}\text{Let } I &= \int e^x \left(\frac{\sin 4x - 4}{2 \sin^2 2x} \right) dx \\&= \int e^x \left\{ \frac{2 \sin 2x \cos 2x}{2 \sin^2 2x} - \frac{4}{2 \sin^2 2x} \right\} dx \\&= \int e^x (\cot 2x - 2 \operatorname{cosec}^2 2x) dx \\&= \int e^x \cot 2x dx - 2 \int e^x \operatorname{cosec}^2 2x dx\end{aligned}$$

Integrating by parts

$$\begin{aligned}&= e^x \cot 2x - \int e^x \frac{d}{dx} (\cot 2x) dx - 2 \int e^x \operatorname{cosec}^2 2x dx \\&= e^x \cot 2x + 2 \int e^x \operatorname{cosec}^2 2x - 2 \int e^x \operatorname{cosec}^2 2x dx \\&= e^x \cot 2x + c\end{aligned}$$

Indefinite Integrals Ex 19.26 Q12

$$\text{Let } I = \int \frac{2-x}{(1-x)^2} e^x dx$$

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

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

$$\text{Here, } f(x) = \frac{1}{1-x} \text{ and } f'(x) = \frac{1}{(1-x)^2}$$

And we know that,

$$\int e^{ax} \{af(x) + f'(x)\} dx = e^{ax} f(x) + c$$

$$\therefore \int e^x \left\{ \frac{1}{1-x} + \frac{1}{(1-x)^2} \right\} dx = e^x \cdot \frac{1}{1-x} + c$$

Hence,

$$I = \frac{e^x}{1-x} + c$$

Indefinite Integrals Ex 19.26 Q13

$$\text{Let } I = \int e^x \frac{1+x}{(2+x)^2} dx$$

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

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

$$= \int e^x \frac{1}{x+2} dx - \int e^x \frac{1}{(x+2)^2} dx$$

Integrating by parts

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

$$= e^x \frac{1}{x+2} + \int e^x \frac{1}{(x+2)^2} dx - \int e^x \frac{1}{(x+2)^2} dx$$

$$= \frac{e^x}{x+2} + c$$

***** END *****

