Indefinite Integrals Ex 19.26 Q10

$$\text{Let } I = \int e^x \frac{x+1-2}{(x+1)^3}$$

$$= \int e^x \left\{\frac{1}{(x+1)^2} + \frac{-2}{(x+1)^3}\right\} dx$$

$$= \int e^x \frac{1}{(x+1)^2} dx + \int e^x \frac{(-2)}{(x+1)^3} dx$$

Integrating by parts

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

$$= e^x \frac{1}{(x+1)^2} - \int e^x \frac{(-2)}{(x+1)^3} dx + \int e^x \frac{(-2)}{(x+1)^3} dx$$

$$= e^x \frac{1}{(x+1)^2} + c$$

Indefinite Integrals Ex 19.26 Q11

$$\text{Let } I = \int e^x \left(\frac{\sin 4x - 4}{2\sin^2 2x}\right) dx$$

$$= \int e^x \left\{\frac{2\sin 2x \cos 2x}{2\sin^2 2x} - \frac{4}{2\sin^2 2x}\right\} dx$$

$$= \int e^x \left(\cot 2x - 2\,\text{cosec}^2 2x\right) dx$$

$$= \int e^x \cot 2x dx - 2\int e^x \,\text{cosec}^2 2x dx$$

Integrating by parts

$$= e^x \cot 2x - \int e^x \frac{d}{dx}(\cot 2x) dx - 2\int e^x \,\text{cosec}^2 2x dx$$

$$= e^x \cot 2x + 2\int e^x \,\text{cosec}^2 2x - 2\int e^x \,\text{cosec}^2 2x dx$$

$$= e^x \cot 2x + c$$

Indefinite Integrals Ex 19.26 Q12

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

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

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

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

And we know that,

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

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

Hence,

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

Indefinite Integrals Ex 19.26 Q13

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 **********