Indefinite Integrals Ex 19.26 Q5

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

Integrating by parts

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

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

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

Indefinite Integrals Ex 19.26 Q6

$$\text{Let } I = \int e^x \sec x \left(1 + \tan x\right)dx$$

$$= \int e^x \sec x dx + \int e^x \sec x \tan x dx$$

Integrating by parts

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

$$= e^x \sec x - \int e^x \sec x \tan x dx + \int e^x \sec x \tan x dx$$

$$= e^x \sec x + c$$

$$\therefore \quad \int e^x \sec x \left(1 + \tan x\right)dx = e^x \sec x + c$$

Indefinite Integrals Ex 19.26 Q7

Let $I = \int e^x \left(\tan x - \log\cos x\right) dx$

$= \int e^x \tan x dx - \int e^x \log\cos x dx$

Integrating by parts

$= \int e^x \tan x dx - \left\{e^x \log\cos x - \int e^x \left(\frac{d}{dx}\log\cos x\right) dx\right\}$

$= \int e^x \tan x dx - \left\{e^x \log\cos x + \int e^x \tan x dx\right\}$

$= \int e^x \tan x dx - e^x \log\cos x - \int e^x \tan x dx + c$

$= -e^x \log\cos x + c$

$= e^x \log\sec x + c \qquad \left[\because \quad \log\sec x = -\log\cos x\right]$

Indefinite Integrals Ex 19.26 Q8

Let $I = \int e^x \left[\sec x + \log\left(\sec x + \tan x\right)\right] dx$

$= \int e^x \sec x dx + \int e^x \log\left(\sec x + \tan x\right) dx$

Integrating by parts

$= \int e^x \sec x dx + e^x \log\left(\sec x + \tan x\right) - \int e^x \left\{\frac{d}{dx}\log\left(\sec x + \tan x\right)\right\} dx$

$= \int e^x \sec x dx + e^x \log\left(\sec x + \tan x\right) - \int e^x \sec x dx$

$= e^x \log\left(\sec x + \tan x\right) + c$

Indefinite Integrals Ex 19.26 Q9

Let $I = \int e^x \left(\cot x + \log\sin x\right) dx$

$= \int e^x \cot x dx + \int e^x \log\sin x dx$

Integrating by parts

$= \int e^x \log\sin x dx + \int e^x \cot x dx$

$= \left(\log\sin x\right) e^x - \int e^x \left(\frac{d}{dx}\log\sin x\right) dx + \int e^x \cot x dx$

$= e^x \log\sin x - \int e^x \cot x dx + \int e^x \cot x dx$

$= e^x \log\sin x + c$

********** END **********