

Indefinite Integrals Ex 19.26 Q18

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

$$I = \int e^x \sin^{-1} x + \int e^x \frac{1}{\sqrt{1 - x^2}} dx$$

Integrating by parts

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

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

Indefinite Integrals Ex 19.26 Q19

Let 
$$I = \int e^{2x} \left(-\sin x + 2\cos x\right) dx$$
  
=  $-\int e^{2x} \sin x dx + 2\int e^{2x} \cos x dx$ 

Applying by parts in the 2<sup>nd</sup> integrand

$$I = -\int e^{2x} \sin x dx + 2\left\{ \frac{1}{2}e^{2x} \cos x + \int \frac{1}{2}e^{2x} \sin x dx \right\}$$
$$= -\int e^{2x} \sin x dx + e^{2x} \cos x + \int e^{2x} \sin x dx + c$$
$$= e^{2x} \cos x + c$$

Thus,

$$I = e^{2x} \cos x + c$$

Indefinite Integrals Ex 19.26 Q20

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

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

And we know that,

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

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

Thus

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

Indefinite Integrals Ex 19.26 Q21

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

$$= \int e^x \left( \cot x - \cos e c^2 x \right) dx$$

$$= \int e^x \left( \cot x + \left( -\cos e c^2 x \right) \right) dx$$

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

Here 
$$f(x) = \cot x$$
  

$$\Rightarrow f'(x) = -\cos ec^2 x$$

$$\therefore \int e^x \left(\cot x - \csc^2 x\right) dx = e^x \cot x + c$$

Thus,

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

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