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MAT. NO: 19/MHS01/083

C. C. MATHS 104

DEPT: MBBS



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Assignment

1)  $2x^2 \ln x$

$$\Rightarrow \int 2x^2 \ln x = \int 2x^2 \times \ln(x) dx$$

$$= 2 \int x^2 \times \ln(x) dx \quad \rightarrow \int u dv = uv - \int v du$$

$$= 2 \times \int \ln(x) \times x^2 dx \Rightarrow u = \ln(x) \Rightarrow du = \frac{1}{x}$$

$dv = x^2; v = \frac{x^3}{3}$

$$\Rightarrow 2 \left( \ln(x) \times \frac{x^3}{3} - \int \frac{x^3}{3} \times \frac{1}{x} dx \right)$$

$$= 2 \left( \ln(x) \times \frac{x^3}{3} - \int \frac{x^2}{3} dx \right)$$

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

$$= 2 \left( \ln(x) \times \frac{x^3}{3} - \frac{1}{3} \times \frac{x^3}{3} \right)$$

$$= \frac{2x^3 \times \ln(x)}{3} - \frac{2x^3}{9}$$

$$= 2 \left( \frac{x^3}{3} \ln(x) - \frac{x^3}{9} \right) + C$$

$$= 2 \left( \frac{1}{3} x^3 \ln(x) - \frac{1}{9} x^3 \right) + C //$$

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2)  $3te^{2t}$

$$\Rightarrow \int 3te^{2t} \Rightarrow \int u dv = uv - \int v du$$

$$\Rightarrow 3 \int te^{2t} \Rightarrow \begin{matrix} u = t, & du = 1 \\ dv = e^{2t}, & v = \frac{e^{2t}}{2} \end{matrix}$$

$$\Rightarrow 3 \left( t \times \frac{e^{2t}}{2} - \int \frac{e^{2t}}{2} dt \right)$$

$$\Rightarrow 3 \left( t \times \frac{e^{2t}}{2} - \frac{1}{2} \times \int e^{2t} dt \right)$$

$$\Rightarrow 3 \left( t \times \frac{e^{2t}}{2} - \frac{1}{2} \times \frac{1}{2} e^{2t} \right)$$

$$= 3 \left( \frac{te^{2t}}{2} - \frac{e^{2t}}{4} \right) + C //$$

3)  $x^2 \sin x$

$$\Rightarrow \int x^2 \sin x dx \Rightarrow \int u dv = uv - \int v du$$

$$\Rightarrow \begin{matrix} u = x^2, & du = 2x \\ dv = \sin x, & v = -\cos x \end{matrix}$$

$$\Rightarrow x^2 \times (-\cos(x)) - \int (-\cos(x)) \times 2x dx$$

$$\Rightarrow x^2 \times (-\cos(x)) - 1 \times (-2) \times \int \cos(x) \times x dx$$

$$\Rightarrow x^2 \times (-\cos(x)) + 2x \int x \times \cos(x) dx$$

$$\Rightarrow x^2 \times (-\cos(x)) + 2(x \sin(x) - (-\cos(x)))$$

$$\Rightarrow x^2 \times (-\cos(x)) + 2x \sin(x) + 2 \cos(x)$$

$$= -x^2 \cos(x) + 2(x \sin(x) + \cos(x)) + C //$$





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$$4) \cos 5x \cos 6x$$

$$\Rightarrow \int \cos(5x) \cos(6x) dx$$

$$\Rightarrow \int \frac{1}{2} x (\cos(-x) + \cos(11x)) dx$$

$$\Rightarrow \frac{1}{2} x \int (\cos(x) + \cos(11x))$$

$$\Rightarrow \frac{1}{2} x \left( \int \cos(x) dx + \int \cos(11x) dx \right)$$

$$\Rightarrow \frac{1}{2} x \left( \sin(x) + \frac{\sin(11x)}{11} \right)$$

$$\Rightarrow \frac{\sin(x)}{2} + \frac{\sin(11x)}{22} + C //$$

$$5) \sin 7x \cos 2x$$

$$\Rightarrow \int \sin 7x \cos 2x dx$$

$$\Rightarrow \int \frac{1}{2} x (\sin(9x) + \sin(5x)) dx$$

$$\Rightarrow \frac{1}{2} x \left( \int \sin(9x) dx + \int \sin(5x) dx \right)$$

$$\Rightarrow \frac{1}{2} x \left( \frac{-\cos(9x)}{9} - \frac{\cos(5x)}{5} \right)$$

$$\Rightarrow \frac{-\cos(9x)}{18} - \frac{\cos(5x)}{10} + C //$$