NAME EBAJI EDIFOME
DEPARTMENT COMPUTER ENGINEERING
MATRIC NO: 19/ENG02/015
Course : MAT 104

1. $3te^{2t}$ & $dv = e^{2t}$

let $u = 3t$ $\int dv = 3e^{2t}$

$\frac{du}{dt} = 3$ $v = \frac{e^{2t}}{2}$

$du = 3dt$

using $uv - \int v\,du = \int u\,dv$

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

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

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

$\left[\frac{3}{2}te^{2t} - \frac{3e^{2t}}{4}\right] + C$

(2) & $\int x^2 \sin x$

let $u = x^2$ & $dv = \sin x$

$\frac{du}{dx} = 2x$ & $v = -\cos x$

using $uv - \int v\,du$

$(x^2)(-\cos x) - \int (-\cos x)(2x\,dx)$

$-x^2\cos x - \int -2x\cos x\,dx$

let $u = 2x$ & $dv = \cos x$

$du/dx = -2x$ & $v = \sin x$

$(-2x)(\sin x) - \int (\sin x)(-2)\,dx$

$-2x\sin x - (-2)\int \sin x\,dx$

$-2x\sin x - (-2)(-\cos x) + C$

$-2x\sin x - 2\cos x + C$

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

3. $\int \sin 7x \cos 2x$

let $A = 7x$, $B = 2x$

$\int \sin 7x \cos 2x = \frac{1}{2}[\sin(7x+2x) + \sin(7x-2x)]$

$\int \sin 7x \cos 2x = \frac{1}{2}[\sin 9x + \sin 5x]$

$= \frac{1}{2}\int\left[\frac{\sin 9x}{9} + \frac{\sin 5x}{5}\right]$

$= -\frac{\cos 9x}{18} - \frac{\cos 5x}{10} + C$ //

4. $\frac{2x - 3x^2}{1-x}$

$1-x \;\overline{)\; 2x - 3x^2 \;(\; 2x - x^2}$

$-2x - 2x^2$

$-x^2$

$-(-x^2 + x^3)$

$-x^3$

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

$$= \frac{2x^2}{2} - \frac{x^3}{3} + x^3 \ln(1-x),$$