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MBBS/MHS

$\int 2x^2 \ln x \, dx$

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

$u = 2x^2,\ du = 4x\ ;\ dv = \ln x\,dx,\ v = x\ln x - x$

$\int 2x^2 \ln x\,dx = 2x^2 \times (x\ln x - x) - \int x\ln x - x \times 4x\,dx$

$\int 2x^2 \ln x\,dx = 2x^3 \ln x - 2x^3 - \int 4x^2 \ln x - 4x^2$

$\int 2x^2 \ln x\,dx = 2x^3 \ln x - 2x^3 - \int 4x^2 (\ln x - 1)$

$\int 2x^2 \ln x\,dx = 2x^3 \ln x - 2x^3 - \frac{4x^3}{3} \int \ln x - 1$

$\int 2x^2 \ln x\,dx = 2x^3 \ln x - 2x3 - \frac{4x^3}{3} ((x\ln x - x) - x) - 2x$

$\int 2x^2 \ln x\,dx = 2x^3 \ln x - 2x^3 - \frac{4x^4 \ln x}{3} - \frac{8x^4}{3}$

$\int 2x^2 \ln x\,dx = 2x^3 (\ln x - \frac{2x\ln x}{3} - \frac{4x}{3} - 1) + c$

$\int 3te^{2t}\,dt$

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

$u = 3t,\ du = 3\ \ dv = e^{2t}dt\ \ v = e^{2t}/2$

$\int 3te^{2t}dt = 3tx\,e^{2t}/2 - \int e^{2t}/2 \times 3$

$\int 3te^{2t}dt = \frac{3te^{2t}}{2} - \int \frac{3e^{2t}}{2}$

$\int 3te^{2t}dt = 3te^{2t} - 3/2\,e^{2t}$

$\int 3te^{2t}dt = \frac{3te^{2t}}{2} - \frac{3e^{2t}}{4} + C$

3. $\int x^2 \sin x \, dx$

$u = x^2 \quad du = 2x \quad dv = \sin x dx \quad v = -\cos x$

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

$\int x^2 \sin x dx = x^2 \times -\cos x - \int -\cos x \, 2x$

$x^2 \sin x dx = x^2 \times -\cos x + \int 2x \cos x$

$\int 2x \cos x = 2x \times \sin x - \int \sin x \times 2 \quad (u = 2x, dv = \cos x,$
$du = 2)$

$\int 2x \cos x = 2x \sin x - 2\int \sin x$

$\int 2x \cos x = 2x \sin x - 2\cos x$

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

4. $\int \cos 5x \cos 6x dx = 1/2 \int [\cos(A+B) + \cos(A-B)] \quad (A = 5x, B = 6x)$

$= 1/2 [\cos(5x + 6x) + \cos(5x - 6x)]$

$= 1/2 \int [\cos 11x - \cos x]$

$= 1/2 \left[\frac{\sin 11x}{4} - \sin x\right]$

$= \frac{\sin 11x}{22} - \frac{\sin x}{2} + C$

5.) $\int \sin 7x \cos 2x dx = 1/2 [\sin(7x + 2x) + \sin(7x - 2x)] \quad (A = 7x, B =$

$= 1/2 \int (\sin 9x + \sin 5x) dx$

$= \frac{1}{2}\left[\frac{-\cos 9x}{9} - \frac{\cos 5x}{5}\right]$

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