Thanks For Coming






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Course Code: ~~[illegible]~~ MAT 104
ASSIGNMENT

(1) $\int x^{1/2} \ln(x)\, dx$

Applying Integration by Parts

$\Rightarrow u = \ln(x), \; dv = \sqrt{x}$

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

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

$= \frac{2}{3} x^{3/2} \ln(x) - \frac{4}{9} x^{3/2} + C$

(2) $2\cos 6t \cos t$

$= 2\int \cos(x) \cos(6x)\, dx$

$= \int \cos(x) \cos(6x)\, dx$

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$= \frac{2}{2}\int \frac{\cos(7t)+\cos(5t)}{2}\,dt$

$= \frac{1}{2}\int \cos(7t)\,dt + \int \cos(5t)\,dt$

$= \frac{1}{7}\sin(7t) + \frac{1}{5}\sin(5t) + C$

(3) $\sin^3 x \cos^4 x$

$\int \cos^4(x)\sin^3(x)\,dx$

$= \int \cos^4(x)\sin^3(x)\sin(x)\,dx$

$= \int \cos^4(x)\left(2-\cos^2(x)\right)\sin x\,dx$

let $u = \cos x$, $\frac{du}{dx} = -\sin x$, $dx = \frac{du}{-\sin x}$

$= \int u^4(1-u^2)\sin x \frac{du}{-\sin x}$

$= \int -u^4(1-u^2)\,du$

$= \int -u^4 + u^6\,du$






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$$= \frac{-u^5}{5} + \frac{u^7}{7} + C$$

Since $u = \cos x$

$$= \int \sin(x)\cos^4(x)\,dx = \frac{-\cos^5(x)}{5} + \frac{\cos^7(x)}{7} + C$$