HARUNA ODUNAYO JOSHUA 19/ENG04/022 Elect/Elect MAT 206

1) $x^{1/2} \ln x$

$\int x^{1/2} \ln x$

$u = x^{1/2}$ $du = \ln x$

$\frac{du}{dx} = \frac{1}{2} x^{-1/2}$

$$\int \frac{v\,du}{dx} + \int \frac{u\,dv}{dx}$$

$$\ln x \int \frac{x^{1/2}}{dx} + x^{1/2} \int \frac{d \ln x}{dx}$$

$$\ln x \left[\frac{x^{3/2}}{3/2} \right] + x^{1/2} \left[\frac{1}{x} \right] + C$$

$$\frac{2 \ln x}{3} \cdot x^{3/2} + x^{1/2} \cdot + C$$

$$\frac{2x^{3/2} \ln x}{3} + \frac{\sqrt{x} + C}{x}$$

~~∫2∫~~ $2\cos 6t \cos t$

$A = 6t$ $B = 1t$

$\cos A \cos B = \frac{1}{2} [\cos(A+B) + \cos(A-B)]$

$\frac{2}{2} [\cos(6+1) + \cos(6-1)$

$\frac{2}{2} [\cos 7t + \cos 7t]$

$\int 2\cos 6t \cos dt = \frac{1}{2} (2\cos 7t + \cos 8t$

$$= \frac{2}{2} \left[\frac{\sin 7t}{7} - \frac{\sin 8t}{5} \right]$$

$$= \frac{\sin 7t}{7} - \frac{\sin 5t}{5} + C$$

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

$u = \cos x$

$\frac{du}{dx} = -\sin x \Rightarrow dx = \frac{du}{-\sin x}$

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

$\int u^4$ ~~$\sin^2 x$~~ $- \frac{du}{\text{~~sin x~~}}$

$= \int u^4 \sin^2 x - du$

$- \int u^4 \sin^2 x \, du$

$\sin 2x + \cos^2 x = 1$

$\sin^2 x = 1 - \cos^2 x$

$- \int \sin^2 x u^4 \cdot du$

~~$- \int \sin^2 x u^4$~~

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

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

$- (u^4 + u^6] \, du$

$$- \left[\frac{u^{4+1}}{4+1} - \frac{u^{6+1}}{6+1} \right] + C$$

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

$$\frac{(\cos x)^7}{7} - \frac{(\cos x)^5}{5} + C$$

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