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Calc II

76 Suposse $\int_0^2 g(t)\,dt = 5$ Calculate the following

a) $\int_0^4 g(t/2)\,dt$

$\int_0^4 g(\frac{t}{2})\,dt$ $4, (\frac{4}{2}) = \boxed{2}$ $0, \frac{0}{2} = \boxed{0}$

$w = t/2$
$dw = \frac{1}{2} dt$
$dt = 2dw$

$2\int_0^2 g(t)dt = 2(5) = \boxed{10}$

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b) $\int_0^2 g(2-t)\,dt$ $2, (2-2) = \boxed{0}$ $0, (2-0) = \boxed{2}$

$\int_0^4 g(2-t)\,dt$

$\int_0^2 g(t)\,dw+1 = 1\int_0^2 g(t)dt = 5$

$1(5) = \boxed{5}$

$w = 2-t$
$dw = -1dt$
$dt = dw+1$

78 $\int_{-\pi}^{\pi} \cos^2\theta \sin\theta\, d\theta$

a) $\int_{-\pi}^{\pi} \cos^2\theta \sin\theta\, d\theta$

$\int_{-\pi}^{\pi} \cos\theta \cdot \cos\theta \cdot \sin\theta\, d\theta$

$u = \cos\theta$
$du = -\sin\theta\, d\theta$

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$-\int u^2\,du = -\left[\frac{u^3}{3}\right] = -\frac{\cos^3\theta}{3}\Big|_{-\pi}^{\pi}$

$= -\frac{\cos^3\theta}{3} + C$

$= \frac{-(\cos\pi)^3}{3} - \left[\frac{-(\cos(-\pi))^3}{3}\right]$

$= \frac{-(-1)^3}{3} - \left(\frac{-(-1)^3}{3}\right)$

a) $= \frac{1}{3} - \frac{1}{3} = \boxed{0}$

b) $= -\frac{\cos^3\theta}{3}\Big|_0^{\pi}$

$= \frac{-(\cos(\pi))^3}{3} - \left[\frac{-\cos(0))^3}{3}\right]$

$= -\frac{(-1)^3}{3} - \left(\frac{-(1)^3}{3}\right)$

$= \frac{1}{3} + \frac{1}{3} = \boxed{2/3}$

norma ©

(42)

$$\int uv'dx = uv - \int u'v\,dx$$

$$\int e^x \sin x\,dx$$

$u = e^x \quad u' = e^x$

$v' = \sin x \quad v = -\cos x$

$$I_1 = e^x - \cos x - \boxed{\int e^x - \cos x\,dx} = I_2$$

$u = e^x \quad u' = e^x$

$v' = -\cos \quad v = -\sin x$

$$I_2 = -e^x \sin x - \int -e^x \sin x$$

$$I_2 = -e^x \sin x + \int e^x \sin x$$

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$$I_1 = e^x - \cos x - \left[-e^x \sin x + \int e^x \sin x \right]$$

$$2I_1 = e^x - \cos x + e^x \sin x$$

$$I_1 = \frac{1}{2} e^x - \cos x + e^x \sin x + C$$

$$\boxed{A = I_1 = \frac{1}{2} e^x(-\cos x + \sin x) +}$$

(46) $\int x^n e^x\,dx = x^n e^x - n \int x^{n-1} e^x\,dx$

$$A = \boxed{\begin{array}{ll} u = x^n & u' = nx^{n-1} \\ v' = e^x & v = e^x \end{array}}$$

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