SOLUTIONS FOR HOMEWORK PROBLEMS 16.7

MATH 132 - WI00

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$\int_0^5 (-3x)\,dx = (-3)\frac{x^2}{2}|_0^5 = (-3)\frac{5^2}{2} - (-3)\frac{0^2}{2} = (-3) * 12.5 = -37.5$

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$\int_1^2 \frac{x^{-2}}{2}\,dx = \frac{1}{2}\int_1^2 x^{-2}\,dx = \frac{1}{2}\frac{x^{-1}}{-1}|_1^2 = \frac{1}{2}(\frac{2^{-1}}{-1} - \frac{1^{-1}}{-1}) = \frac{1}{2}(-\frac{1}{2}+1) = \frac{1}{2} * \frac{1}{2} = \frac{1}{4}$

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$\int_0^{e-1} \frac{1}{x+1}\,dx = \ln(x+1)|_0^{e-1} = \ln e - \ln 1 = 1 - 0 = 1$

In case you're not sure how to get ln there, the trick is to use u=x+1 as your substitution, and work on from here.

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$\int_{-1}^1 q\sqrt{q^2+3}\,dq$

Use substitution $u = q^2 + 3$, $du = 2q\,dq$ etc ... you'll get:

$\frac{1}{2}\frac{(q^2+3)^{\frac{3}{2}}}{\frac{3}{2}}|_{-1}^1 = ... = 0$

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$\int_3^4 \frac{e^{\ln x}}{x}\,dx = \int_3^4 \frac{x}{x}\,dx = \int_3^4 1\,dx = x|_3^4 = 1$

Quite a surprise, no? but ... you know that $e^{\ln x} = x$ and $\ln e^x = x$ (ln and e annihilate each other when composed together ... and they give you x!). You can of course use substitution here, namely say $u = \ln x$, $du = \frac{1}{x}\,dx$ ... but this takes longer a bit.

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Date: 02/29/2000.