Dawson College: Calculus II (SCIENCE): 201-NYB-05-S2: Winter 2012

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Quiz 5

This quiz is graded out of 10 marks. No books, calculators, notes or cell phones are allowed. You must show all your work, the correct answer is worth 1 mark the remaining marks are given for the work. If you need more space for your answer use the back of the page.

Question 1. *(3 marks)* §6.1 #13 Evaluate the integral.

$\int \ln(2x+1)\,dx = uv - \int v\,du$ $\quad u = \ln(2x+1)$ $\quad du = \frac{1}{2x+1}\cdot 2\,dx$

$= x\ln(2x+1) - \int \frac{2x}{2x+1}\,dx$ $\quad v = x$ $\quad dv = dx$

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

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

$= x\ln(2x+1) - x + \frac{1}{2}\ln|2x+1| + C$

Question 2. *(4 marks)* §6.1 #24 Evaluate the integral.

$I = \int_0^t e^s \sin(t-s)\,ds = [uv]_0^t - \int_0^t v\,du$ $\quad u = e^s$ $\quad du = e^s ds$ $\quad v = \cos(t-s)$ $\quad dv = \sin(t-s)ds$

$I = [e^s\cos(t-s)]_0^t - \int_0^t e^s\cos(t-s)ds$

$I = e^t\cos(0) - e^0\cos(t) - \left[[uv]_0^t - \int_0^t v\,du\right]$ $\quad u = e^s$ $\quad du = e^s ds$ $\quad v = -\sin(t-s)$ $\quad dv = \cos(t-s)ds$

$I = e^t - \cos(t) - \left[[-e^s\sin(t-s)]_0^t - \int_0^t -e^s\sin(t-s)ds\right]$

$I = e^t - \cos(t) + e^t\sin(0) - e^0\sin t - I$

$2I = e^t - \cos t - \sin t + C$

$I = \frac{1}{2}\left[e^t - \cos t - \sin t\right]$

Question 3. *(3 marks)*§6.2 #8 Evaluate the integral.

$\int_0^{\pi/2} \sin^2(2\theta)\,d\theta = \int_0^{\pi/2} \frac{1-\cos 4\theta}{2}\,d\theta$

$= \frac{1}{2}\int_0^{\pi/2} 1-\cos 4\theta\,d\theta$

$= \frac{1}{2}\left[\theta - \frac{\sin 4\theta}{4}\right]_0^{\pi/2} = \frac{1}{2}\left[\left[\frac{\pi}{2} - \frac{\sin 4(\frac{\pi}{2})}{4}\right] - \left[0 - \frac{\sin 0}{4}\right]\right]$

$= \frac{1}{2}\left[\left[\frac{\pi}{2} - 0\right] - [0-0]\right] = \frac{\pi}{4}$