Dawson College: Calculus II: 201-NYB-05-S2: Winter 2010

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Quiz 7

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. *(5 marks)* §6.2 #31 Evaluate the indefinite integral.

$\int \cot^3\alpha \csc^3\alpha \, d\alpha = \int \cot^2\alpha \csc^2\alpha \cot\alpha \csc\alpha \, d\alpha$ $\quad u = \csc\alpha$, $du = -\cot\alpha\csc\alpha \, d\alpha$

$= \int (\csc^2\alpha - 1)\csc^2\alpha \cot\alpha \csc\alpha \, d\alpha$

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

$= -\int u^4 - u^2 \, du$

$= -\frac{u^5}{5} + \frac{u^3}{3} + C$

$= -\frac{\csc^5\alpha}{5} + \frac{\csc^3\alpha}{3} + C$

Question 2. *(5 marks)* §6.5 #8 Use the Trapezoidal Rule to approximate the given integral with $n = 4$,

$\int_0^{1/2} \sin x^2 \, dx.$ $\quad \Delta x = \frac{b-a}{n} = \frac{1/2 - 0}{4} = \frac{1}{8}$ $\quad x_i = a + i\Delta x$, $x_i = \frac{i}{8}$ $\quad x_0 = 0, x_1 = \frac{1}{8}, x_2 = \frac{2}{8}, x_3 = \frac{3}{8}, x_4 = \frac{4}{8} = \frac{1}{2}$

$\approx \frac{\Delta x}{2}\left[f(x_0) + 2f(x_1) + 2f(x_2) + 2f(x_3) + f(x_4)\right]$

$= \frac{(1/8)}{2}\left[f(0) + 2f(1/8) + 2f(3/8) + 2f(3/8) + f(4/8)\right]$

$= \frac{1}{16}\left[\sin 0 + 2\sin\left(\frac{1}{64}\right) + 2\sin\left(\frac{1}{16}\right) + 2\sin\left(\frac{9}{64}\right) + \sin\left(\frac{1}{4}\right)\right]$

$\approx 0.042743454\,26$