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 #32 Evaluate the indefinite integral.

$\int \csc^4 x \cot^6 x \, dx$

$= \int \cot^6 x \csc^2 x \csc^2 x \, dx$

$= \int \cot^6 x (1 + \cot^2 x) \csc^2 x \, dx$

$= -\int u^6 (1 + u^2) \, du$

$= -\int u^6 + u^8 \, du$

$= -\left[\frac{u^7}{7} + \frac{u^9}{9}\right] + C$

$= -\frac{\cot^7 x}{7} - \frac{\cot^9 x}{9} + C$

$u = \cot x$

$du = -\csc^2 x \, dx$

$-du = \csc^2 x \, dx$

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

$\int_0^{1/2} \sin x^2 \, dx.$

$\Delta x = \frac{b-a}{n} = \frac{1/2 - 0}{4} = \frac{1}{8}$

$x_i = a + i\Delta x$

$x_i = \frac{i}{8}$

$x_0 = 0, \; x_1 = \frac{1}{8}, \; x_2 = \frac{2}{8}, \; x_3 = \frac{3}{8}$

$x_4 = \frac{4}{8} = 1/2$

$\approx \frac{\Delta x}{3}\left[f(x_0) + 4f(x_1) + 2f(x_2) + 4f(x_3) + f(x_4)\right]$

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

$= \frac{1}{24}\left[\sin 0 + 4\sin\left(\frac{1}{64}\right) + 2\sin\left(\frac{1}{16}\right) + 4\sin\left(\frac{9}{64}\right) + \sin\left(\frac{1}{4}\right)\right]$

$\approx 0.041477783088.$