Dawson College: Calculus II: 201-NYB-05-C2: Fall 2009

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Quiz 3

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. *(4 marks)* §5.2 #13 Find the indefinite integral.

$\int \frac{x^2-3x+2}{x+1}$ $\longrightarrow$ $= \int x-4 + \frac{6}{x+1}\,dx$

degree of num. > degree of denom.

$$\begin{array}{r} x-4 \\ x+1 \overline{)\,x^2-3x+2} \\ -(x^2+x) \\ \hline -4x+2 \\ -(-4x-4) \\ \hline 6 \end{array}$$

$= \frac{x^2}{2} - 4x + 6\ln|x+1| + C$

$\therefore \frac{x^2-3x+2}{x+1} = x-4+\frac{6}{x+1}$

Question 2. *(2 marks)* §5.4 #87 Find the indefinite integral.

$\int \frac{e^{\sqrt{x}}}{\sqrt{x}}\,dx \overset{①}{=} \int \frac{e^u}{\sqrt{x}} 2\sqrt{x}\,du = 2\int e^u\,du = 2e^u + C \overset{①}{=} 2e^{\sqrt{x}} + C$

① $u = \sqrt{x}$

$du = \frac{1}{2\sqrt{x}}\,dx$

② $2\sqrt{x}\,du = dx$

Question 3. *(4 marks)* §5.7 #17 Find the indefinite integral.

$\int \frac{x-3}{x^2+1}\,dx = \int \frac{x}{x^2+1} - \frac{3}{x^2+1}\,dx$

$= \int \frac{x}{x^2+1}\,dx - 3\int \frac{1}{x^2+1}\,dx$

① $u = x^2+1$

$du = 2x\,dx$

② $\frac{du}{2x} = dx$

$\overset{①}{=} \int \frac{x}{u}\,dx - 3\arctan x + C$

$\overset{②}{=} \int \frac{x}{u}\,\frac{du}{2x}$

$= \frac{1}{2}\ln|u| - 3\arctan x + C = \frac{1}{2}\ln|x^2+1| - 3\arctan x + C$