Dawson College: Calculus II: 201-NYB-05 12

March 25, 2010

Last Name: SOLUTIONS

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Student ID: _____

Quiz 7

Question 1. Evaluate the following integrals:

(a) *(5 marks)*

$$I = \int \frac{4x^2-9x-4}{x^3-x^2-2x}\,dx$$

FACTOR DENOMINATOR: $x^3-x^2-2x = x(x^2-x-2) = x(x-2)(x+1)$

$$\frac{4x^2-9x-4}{x(x-2)(x+1)} = \frac{A}{x} + \frac{B}{x-2} + \frac{C}{x+1} \Rightarrow 4x^2-9x-4 = A(x-2)(x+1) + Bx(x+1) + Cx(x-2)$$

LET $x = 0$: $-4 = A(-2)(1)$, $\boxed{2 = A}$

LET $x = 2$: $-6 = B(6)$, $\boxed{-1 = B}$

LET $x = -1$: $9 = 3C$, $\boxed{3 = C}$

$$\therefore I = \int \frac{2}{x} - \frac{1}{x-2} + \frac{3}{x+1}\,dx = 2\ln|x| - \ln|x-2| + 3\ln|x+1| + C$$

(b) *(5 marks)*

$$\int \frac{3-2x}{(x+3)^2}\,dx$$

$$\frac{3-2x}{(x+3)^2} = \frac{A}{(x+3)} + \frac{B}{(x+3)^2}$$

$$\Rightarrow 3-2x = A(x+3) + B$$

LET $x = -3$: $\boxed{9 = B}$

LET $x = 0$: $3 = 3A + 9$, $-6 = 3A$, $-2 = A$

$$= \int \frac{-2}{x+3} + \frac{9}{(x+3)^2}\,dx$$

$$= -2\ln|x+3| - \frac{9}{x+3} + C$$