February 11, 2011

Last Name: SOLUTIONS

First Name: _____

Student ID: _____

Quiz 3 (A)

Question 1. Evaluate the following definite integrals:

(a) *(5 marks)*

$$\int_1^4 \frac{7+\sqrt{x}+xe^x}{x}dx = \int_1^4 \left(\frac{7}{x} + x^{-1/2} + e^x\right)dx$$

$$= \left(7\ln|x| + 2x^{1/2} + e^x\right)\Big|_1^4$$

$$= \left(7\ln 4 + 2(4)^{1/2} + e^4\right) - \left(7\ln 1 + 2(1)^{1/2} + e^1\right)$$

$$= 7\ln 4 + e^4 - e + 2$$

(b) *(5 marks)*

$$\int_{\pi/4}^{\pi/3} (\sec\theta\tan\theta - \cos\theta)\,d\theta = \left[\sec\theta - \sin\theta\right]_{\pi/4}^{\pi/3}$$

$$= \left(\sec\frac{\pi}{3} - \sin\frac{\pi}{3}\right) - \left(\sec\pi/4 - \sin\pi/4\right)$$

$$= \frac{1}{1/2} - \frac{\sqrt{3}}{2} - \frac{1}{\sqrt{2}/2} + \frac{\sqrt{2}}{2}$$

$$= 2 - \frac{\sqrt{3}}{2} - \frac{2}{\sqrt{2}} + \frac{\sqrt{2}}{2}$$

$$= 2 - \frac{\sqrt{3}}{2} - \frac{2\sqrt{2}}{2} + \frac{\sqrt{2}}{2} = \frac{4-\sqrt{3}-\sqrt{2}}{2}$$