November 14,2012

QUIZ♯3 Math102-sec14.

Net Time Allowed: 20 minutes

Name: **ID ♯:** **Serial ♯:**

Exercise1: (04pts)

Evaluate the integral: $I = \int_0^{\ln\sqrt{3}} \frac{e^x}{1+e^{2x}}\, dx.$

solution:

Let $u = e^x \Rightarrow du = e^x dx$ (01)

IF $X = 0 \Rightarrow u = 1$ (01) and IF $X = \ln(\sqrt{3}) \Rightarrow u = \sqrt{3}$

Therefore: $I = \int_0^{\ln(\sqrt{3})} \frac{e^x}{1+e^{2x}}\, dx = \int_1^{\sqrt{3}} \frac{du}{1+u^2}$ (01) $= \tan^{-1}u\Big]_1^{\sqrt{3}}$

Hence $I = \tan^{-1}\sqrt{3} - \tan^{-1}1 = \frac{\pi}{3} - \frac{\pi}{4} = \frac{\pi}{12}$ (01)

Exercise2: (06pts)

Evaluate the integral: $I = \int \frac{dx}{2+(x-1)^2}.$

solution:

$I = \frac{1}{2}\int \frac{dx}{1+\left(\frac{x-1}{\sqrt{2}}\right)^2}$ (01)

(01)

Let $u = \frac{x-1}{\sqrt{2}} \Rightarrow du = \frac{1}{\sqrt{2}}\, dx$, Therefore:

$I = \frac{\sqrt{2}}{2}\int \frac{du}{1+u^2} = \frac{\sqrt{2}}{2}\tan^{-1}u + C$ (02)

Hence: $I = \frac{\sqrt{2}}{2}\tan^{-1}\left(\frac{x-1}{\sqrt{2}}\right) + C$ (02)