NAME: (print!) _Afsana Rahman_   Section: _23_

E-MAIL SCANNED .pdf OF COMPLETED QUIZ to DrZcalc3@gmail.com (Attachment: q13FirstLast.pdf) ASAP BUT NO LATER THAN Oct. 22, 8:00pm

1. Change the order of integration in

$$\int_1^4 \int_0^{\ln y} f(x,y)\, dx\, dy \quad .$$

$1 \le y \le 4$

$0 \le x \le \ln y \implies y = e^x$

$\ln(1) = 0$

$\ln(4) = \ln 4$

$0 \le x \le \ln 4$

$e^x \le y \le 4$

$$\int_0^{\ln 4} \int_{e^x}^4 f(x,y)\, dy\, dx$$

2. Evaluate

$$\int_0^2 \int_{y/2}^1 \frac{1}{(x^2+1)^2}\, dx\, dy \quad ,$$

by inverting the order of integration and evaluating the new iterated integral.

$\frac{y}{2} \le x \le 1 \implies y = 2x$

$0 \le y \le 2$

$\implies \int_0^1 \int_0^{2x} \frac{1}{(x^2+1)^2}\, dy\, dx = \int_0^1 \left[\frac{y}{(x^2+1)^2}\right]_0^{2x} dx = \int_0^1 \frac{2x}{(x^2+1)^2}\, dx$

$\int_0^1 \frac{2x}{(x^2+1)^2}\, dx \quad u = x^2+1 \quad du = 2x\, dx \quad = \int_0^1 \frac{du}{u^2} = \left[-\frac{1}{u}\right]_0^1 = -\frac{1}{x^2+1}\Big|_0^1 = -\frac{1}{2} - \left(-\frac{1}{1}\right) = 1 - \frac{1}{2}$

$$= \frac{1}{2}$$