NAME: (print!) Prathik Colla   Section: _____

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

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

$$D = \{(x,y)\mid 1 \le y \le 4,\ 0 \le x \le \ln y\}$$

$$\downarrow$$

$$D = \{(x,y)\mid 0 \le x \le \ln 4,\ e^x \le y \le 4\}$$

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

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.

$$\int_0^1 \int_0^{2x} \frac{1}{(x^2+1)^2}\, dy\, dx \qquad\qquad \int_0^1 \frac{2x}{(x^2+1)^2}\, dx$$

$$\int_0^{2x} \frac{1}{(x^2+1)^2}\, dy = \frac{1}{(x^2+1)^2}\left(\int_0^{2x} dy\right) \qquad U = x^2+1,\ du\ 2x\, dx$$

$$\int_1^2 \frac{1}{v^2}\, dv = \left[-\frac{1}{v}\right]_1^2 = \boxed{\frac{1}{2}}$$

$$\frac{1}{(x^2+1)^2}\left[y\right]_0^{2x} = \frac{1}{(x^2+1)^2}(2x)$$