

"QUIZ" for Lecture 13

NAME: (print!) Krithika Patrachari Section: 22

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

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

Type 2: $R = \{ (x, y), 1 \leq y \leq 4, 0 \leq x \leq \ln y \}$

Floor $\rightarrow 1 \leq y \leq 4$

Left curve $\rightarrow x = 0$

Right curve $\rightarrow x = \ln y \rightarrow y = e^x$

Type 1: $R = \{ (x, y), 0 \leq x \leq \ln 4, e^x \leq y \leq 4 \}$

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

2. Evaluate

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

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

Type 2: $R = \{ (x, y), 0 \leq y \leq 2, y/2 \leq x \leq 1 \}$

floor: $0 \leq y \leq 2$

Left curve: $x = y/2 \rightarrow y = 2x$

Right curve: $x = 1$

Type 1: $R = \{ (x, y), 0 \leq x \leq 1, 0 \leq y \leq 2x \}$

$$\int_0^1 \int_0^{2x} f(x, y) dy dx$$

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

$$(x^2 + 1)^{-2} \int_0^{2x} dy$$

$$(x^2 + 1)^{-2} (2x - 0)$$

$$2x (x^2 + 1)^{-2}$$

$$\int_0^1 2x (x^2 + 1)^{-2} dx$$

$$u = x^2 + 1 \quad \int_1^2 u^{-2} du$$

$$du = 2x \quad -u^{-1} \Big|_1^2$$

$$u(1) = 2 \quad -\frac{1}{2} - (-1)$$

$$u(0) = 1 \quad = -\frac{1}{2} + 1 = \frac{1}{2}$$

$$\frac{-\frac{1}{x^2 + 1} \Big|_0^1}{-2} = \frac{1}{-4} - \frac{1}{-1} = -\frac{1}{4} + 1 = \frac{3}{4}$$

$-\frac{7}{10}$