

"QUIZ" for Lecture 14

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E-MAIL SCANNED .pdf OF COMPLETED QUIZ to DrZcalc3@gmail.com (Attachment: q14FirstLast.pdf) ASAP BUT NO LATER THAN Oct. 26, 8:00pm

1. Evaluate the iterated integral

$$\int_0^1 \int_x^{3x} \int_0^y x^2 y z \, dz \, dy \, dx$$

10
7

$$\int_0^y x^2 y z \, dz$$

$$x^2 y \frac{z^2}{2} \Big|_0^y$$

$$\int_0^1 \int_x^{3x} \frac{x^2 y^3}{2} \, dy \, dx$$

$$\frac{x^2 y^4}{8} \Big|_x^{3x}$$

$$\frac{81x^6}{8} - \frac{x^6}{8} = \frac{80x^6}{8} = 10x^6$$

$$\int_0^1 10x^6 \, dx = \frac{10x^7}{7} \Big|_0^1 = \frac{10}{7}$$

2. Evaluate the triple integral

$$\iiint_E yz \ln(x^5) \, dV$$

where

$$E = \{(x, y, z) \mid 0 \leq x \leq 1, 0 \leq y \leq x, 2x \leq z \leq 3x\}$$

$$\begin{aligned} & \iiint_E yz \ln(x^5) \, dz \, dy \, dx \\ & \int_0^1 \int_0^x \int_{2x}^{3x} yz \ln(x^5) \, dz \, dy \, dx \\ & \int_0^1 \int_0^x \frac{y^2 z^2}{2} \ln(x^5) \Big|_{2x}^{3x} \, dy \, dx \\ & \frac{9x^2 y^2 \ln(x^5) - 4x^2 y^2 \ln(x^5)}{4} \Big|_0^x \\ & \int_0^1 \frac{9x^2 \ln(x^5) - 4x^2 \ln(x^5)}{4} \, dx \end{aligned}$$

$-\ln(5)$
2

$$\int_0^1 \frac{5x^2 \ln(x^5)}{4} \, dx = \frac{5}{4} \int_0^1 x^2 \ln(x^5) \, dx$$