

"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

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

$$\rightarrow \int_0^y x^2 y z \, dz = \frac{x^2 y z^2}{2} \Big|_0^y = \frac{x^2 y^3}{2}$$

$$\rightarrow \frac{1}{2} \int_x^{3x} x^2 y^3 \, dy = \frac{x^2 y^4}{8} \Big|_x^{3x} = \frac{81x^6}{8} - \frac{x^6}{8} = \frac{80x^6}{8} = 10x^6$$

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

2. Evaluate the triple integral

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

where

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

$$\rightarrow \int_0^1 \int_{2x}^{3x} \int_0^x yz \ln(x^5) \, dz \, dy \, dx$$

$$\rightarrow \int_{2x}^{3x} yz \ln(x^5) \, dz = \frac{25x^2 \ln(x) y}{2}$$

$$\rightarrow \int_0^x \left(\frac{25x^2 \ln(x) y}{2} \right) dy = \frac{25x^4 \ln(x)}{4}$$

$$\rightarrow \int_0^1 \left(\frac{25x^4 \ln(x)}{4} \right) dx = \boxed{-\frac{1}{4}}$$