

NAME: (print!) Veram Sarah Jung Section: 23

E-MAIL SCANNED .pdf OF COMPLETED QUIZ to Drzcal3@gmail.com (Attach-ment: q14FirstLast.pdf) ASAP BUT NO LATER THAN Oct. 26, 8:00pm

1. Evaluate the iterated integral

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

$$x^2 y^2 z^2 \Big|_u^x = x^2 y^2 \left( \frac{x^2}{2} - \frac{u^2}{2} \right)$$

$$\int_{3x}^x x^2 y^2 \left( \frac{x^2}{2} - \frac{u^2}{2} \right) dy = \frac{x^4}{2} \left( \frac{1}{2} - \frac{9}{2} \right) = -4x^4$$

$$\int_0^1 -4x^4 \, dx = -\frac{4}{5} x^5 \Big|_0^1 = -\frac{4}{5}$$

2. Evaluate the triple integral

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

where

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

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

$$= \int_0^1 \left[ \frac{y^2 z^2}{4} \ln(x^5) \right]_{2x}^{3x} dy = \int_0^1 \frac{y^2}{4} \ln(x^5) (9 - 4) dy = \frac{5}{4} \ln(x^5) \int_0^x y^2 dy$$

$$= \frac{5}{4} \ln(x^5) \left[ \frac{y^3}{3} \right]_0^x = \frac{5}{12} \ln(x^5) x^3$$