

"QUIZ" for Lecture 14

NAME: (print!) Orion Kress-Santillano Section: 22

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

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

$$= \int_0^1 \int_x^{3x} x^2 y \left(\frac{y^2}{2} \right) dy \, dx = \int_0^1 x^2 \left(\frac{(3x)^4}{8} - \frac{x^4}{8} \right) dx$$

$$= \int_0^1 x^2 \cdot 10x^4 \, dx = \boxed{\frac{10}{7}}$$

Checked
Using
MAPLE

2. Evaluate the triple integral

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

where

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

$$= \int_0^1 \int_0^x y \ln(x^5) \left(\frac{(3x)^2}{2} - \frac{(2x)^2}{2} \right) dy \, dx = \int_0^1 \int_0^x \frac{\ln(x^5) \cdot 5x^2}{2} y \, dy \, dx$$

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

$a = x^5 \Big|_0^1 = 1$
 $da = 5x^4 dx$

$$= \frac{1}{4} \int_0^1 \ln(a) \, da$$

u = ln(a) dv = da
du = 1/a · da v = a

INT BY PARTS

$$= \frac{1}{4} (a \ln a - \int da) = \boxed{-\frac{1}{4}}$$

Checked
Using
MAPLE
How negative?