

"QUIZ" for Lecture 12

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E-MAIL SCANNED .pdf OF COMPLETED QUIZ to DrZcalc3@gmail.com (Attachment: q12FirstLast.pdf) ASAP BUT NO LATER THAN Oct. 19 8:00pm

1. Calculate the iterated integral

$$\int_1^2 \int_{-1}^1 (x + y^2) dx dy$$

$$\int_{-1}^1 x + y^2 dx = \left. \frac{x^2}{2} + xy^2 \right|_{-1}^1 = 0 - \left(\frac{1}{2} - y^2 \right) = y^2 - \frac{1}{2}$$

$$\int_1^2 y^2 - \frac{1}{2} dy = \left. \frac{y^3}{3} - \frac{1}{2}y \right|_1^2 = \left(\frac{8}{3} - 1 \right) - \left(\frac{1}{3} - \frac{1}{2} \right)$$

$$= \frac{10}{6} - \frac{-1}{6} = \boxed{\frac{11}{6}}$$

2. Calculate the double integral

$$\iint_R \frac{x^2 y}{x^3 + 1} dA$$

$$R = \{(x, y) \mid 0 \leq x \leq 1, -1 \leq y \leq 1\}$$

$$u = x^3 + 1$$

$$du = 3x^2 dx$$

$$\int_{-1}^1 \int_0^1 \frac{x^2 y}{x^3 + 1} dx dy$$

$$\int_{-1}^1 \frac{y}{3} \ln|2| dy$$

$$\int_0^1 \frac{x^2 y}{x^3 + 1} dx = \int_1^2 \frac{x^2 y}{u 3x^2} du = \frac{y^2}{6} \ln|2| \Big|_{-1}^1$$

$$= \int_0^2 \frac{y}{3u} du$$

$$6 \ln|2| \left[\frac{1}{6} - \frac{1}{6} \right]$$

$$= \frac{y}{3} \ln|u| \Big|_1^2 = \frac{y}{3} \ln|2|$$

$$= \boxed{0}$$