

"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

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

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

$$\left[\frac{x^2}{2} + xy^2 \right]_{-1}^1 = \left[\frac{1}{2} + y^2 \right] - \left[\frac{1}{2} - y^2 \right] = 2y^2$$

$$\int_1^2 2y^2 dy = \left[\frac{2y^3}{3} \right]_1^2 = \frac{16}{3} - \frac{2}{3} = \frac{14}{3}$$

$$\boxed{\int_1^2 \int_{-1}^1 (x + y^2) dx dy = \frac{14}{3}}$$

2. Calculate the double integral

$$\int_{-1}^1 \int_0^1 \frac{x^2 y}{x^3 + 1} dx dy \quad \int \int_R \frac{x^2 y}{x^3 + 1} dA ,$$

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

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

$$\left(\frac{\ln|x^3 + 1|}{3} \Big|_0^1 \right) \left(y \Big|_{-1}^1 \right)$$

$$\frac{\ln(2)}{3} \left(\frac{y^2}{2} - \frac{y^2}{2} \right)$$

$$\boxed{\int_{-1}^1 \int_0^1 \frac{x^2 y}{x^3 + 1} dx dy = 0}$$