

“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

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

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

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

$$\int_1^2 2y^2 dy = \left. \frac{2y^3}{3} \right|_1^2 = \frac{2(2)^3}{3} - \frac{2}{3} = \frac{16}{3} - \frac{2}{3} = \boxed{\frac{14}{3}}$$

2. Calculate the double integral

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

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

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

$$\int_0^1 \frac{x^2 y}{x^3 + 1} dx = \left. \frac{\ln(x^3 + 1)}{3} \cdot y \right|_0^1 = \frac{y \ln 2}{3} - \frac{y \ln 1}{3} = \frac{y \ln 2}{3}$$

$$\int_{-1}^1 \frac{y \ln 2}{3} dy = \frac{\ln 2}{3} \left[\frac{y^2}{2} \right]_{-1}^1 = \frac{\ln 2}{3} \left(\frac{1}{2} - \frac{1}{2} \right) = \boxed{0}$$