

"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

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

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

$$= \int_{-1}^1 (2 + 2y^2) dy = \left. 2y + \frac{2y^3}{3} \right|_{-1}^1 = 2 + 2y^2$$

$$= 2(2-1) + \frac{2(2-1)^3}{3} = 2 + \frac{2}{3} = \frac{6}{3} + \frac{2}{3}$$

$$= \boxed{\frac{8}{3}}$$

2. Calculate the double integral

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

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

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

$$\int_0^1 \frac{x^2 y}{x^3 + 1} dx \quad u = x^3 + 1 \quad du = 3x^2 dx$$

$$\int \frac{y}{u} \cdot \frac{du}{3} = \frac{1}{3} \int \frac{y}{u}$$

$$= \frac{y}{3} \ln|u| = \frac{y}{3} \ln|x^3 + 1| \Big|_0^1$$

$$= \frac{y}{3} \ln(1+1) = \frac{\ln(2)y}{3}$$



$$\int_{-1}^1 \frac{\ln(2)y}{3} dy = \frac{\ln(2)}{3} \int_{-1}^1 y dy = \frac{\ln(2)}{3 \cdot 2} y^2 \Big|_{-1}^1$$
$$= \frac{(1+1) \cdot \ln(2)}{6} = \frac{2 \ln(2)}{6}$$

$$= \boxed{\frac{\ln(2)}{3}}$$