

"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

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

$$\begin{aligned} \textcircled{1} \int_{-1}^1 (x + y^2) dx &= \left. \frac{x^2}{2} + \frac{y^3}{3} \right|_{-1}^1 \\ &= \frac{1}{2} + \frac{y^3}{3} - \frac{1}{2} + \frac{y^3}{3} = \frac{2y^3}{3} \end{aligned}$$

$$\begin{aligned} \textcircled{2} \int_1^2 \frac{2y^3}{3} dy &= \left. \frac{y^4}{6} \right|_1^2 \\ &= \frac{2^4}{6} - \frac{1}{6} = \frac{16}{6} - \frac{1}{6} = \boxed{\frac{15}{6}} \end{aligned}$$

2. Calculate the double integral

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

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

$$\begin{aligned} \textcircled{1} \int_0^1 \int_{-1}^1 \frac{x^2 y}{x^3 + 1} dA &= \frac{x^2}{x^3 + 1} \int_{-1}^1 (y) dy = \frac{x^2}{x^3 + 1} \left(\frac{y^2}{2} \right) \Big|_{-1}^1 \\ &= \frac{x^2}{x^3 + 1} \left(\frac{1}{2} + \frac{1}{2} \right) = 1 \end{aligned}$$

$$\begin{aligned} \textcircled{2} \int_0^1 \left[\frac{x^2}{x^3 + 1} \right] dx &= 3 \ln(x^3 + 1) \Big|_0^1 \\ &= 3 \ln(2) - 0 = \boxed{3 \ln 2} \end{aligned}$$