NAME: (print!) Irina Mukhametzhanova Section: 24

**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

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

First, we calculate the inside integral:

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

Then, using the result, we calculate the outside integral:

$$\int_1^2 2y^2\, dy = \frac{2}{3} y^3 \Big|_1^2 = \frac{2(8)}{3} - \frac{2}{3} = \frac{16-2}{3} = \boxed{\frac{14}{3}}$$

**2.** Calculate the double integral

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

$$R = \{(x,y) \,|\, 0 \le x \le 1,\ -1 \le y \le 1\} \quad .$$

We choose to calculate with respect to $x$ first; simpler

$$\int_0^1 \frac{x^2 y}{x^3+1}\, dx \Rightarrow \text{Substitute } \begin{array}{l} u = x^3+1 \\ du = 3x^2\, dx \end{array} \Rightarrow \int_1^2 \frac{y}{3u}\, du = \frac{y}{3} \int_1^2 \frac{1}{u}\, du =$$

$$= \frac{y}{3} \ln(u) \Big|_1^2 = \frac{y}{3} \ln(2) - \frac{y}{3} \ln(1) = \frac{y}{3} \ln(2)$$

Then, with respect to $y$:

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