

Qn 17/12 ^{iterated.}

1. calculate the integral

$$\int_1^2 \int_1^1 (x+y^2) dx dy$$

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

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

$$= \left(\frac{1}{2} + y^2 \right) - \left(\frac{1}{2} - y^2 \right)$$

$$= 2y^2$$

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

$$= \int_1^2 (2y^2) dy$$

$$= \left. \frac{2}{3}y^3 \right|_1^2$$

$$= \frac{14}{3}$$

Q2. cal. the double integral

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

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

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

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

$$= \frac{x^2}{x^3+1} \cdot \int_{-1}^1 y dy$$

$$= \frac{x^2}{x^3+1} \cdot \left. \frac{1}{2}y^2 \right|_{-1}^1$$

$$= \frac{x^2}{x^3+1} \cdot 0$$

$$= 0$$

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

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

$$= \int_0^1 0 dx$$

$$= 0$$

