q12 Rahul Paleja

Section: 22

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

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

$= 2y^2$

$\int_1^2 2y^2\,dy = \frac{2y^3}{3} \Big]_1^2 = \frac{2(2)^3}{3} - \frac{2(1)^3}{3}$

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

② $\iint_R \frac{x^2 y}{x^3+1}\,dA \qquad R = \{(x,y) \mid 0 \le x \le 1, -1 \le y \le 1\}$

$\int_0^1 \int_{-1}^{1} \frac{x^2}{x^3+1}\, y\,dy = \frac{x^2}{x^3+1} \cdot \frac{y^2}{2} \Big]_{-1}^{1}$

$= \left(\frac{x^2}{x^3+1} \cdot \frac{1}{2}\right) - \left(\frac{x^2}{x^3+1} \cdot \frac{1}{2}\right)$

$= 0$

$\int_0^1 0\,dx = \boxed{0}$