

$$(29) \iint_R \frac{xy^2}{x^2+1} dA \quad R = \{(x,y) \mid 0 \leq x \leq 1, -3 \leq y \leq 3\}$$

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

$$= \frac{2}{3} (27) \int_0^1 \frac{x}{x^2+1} dx \quad \begin{array}{l} u = x^2+1 \\ du = 2x dx \end{array}$$

$$= \frac{1}{3} (27) \int_1^2 \frac{1}{u} du \quad \frac{1}{2} du = x dx$$

$$= \frac{1}{3} 27 (\ln|2| - 0) = \boxed{9 \ln(2)}$$

$$(33) \iint_R ye^{-xy} dA \quad R = [0,2] \times [0,3]$$

$$\int_0^3 \int_0^2 ye^{-xy} dx dy = \int_0^3 y \left[-\frac{1}{y} e^{-xy} \right]_0^2 dy$$

$$= \int_0^3 -e^{-2y} + 1 dy = \left[\frac{1}{2} e^{-2y} + y \right]_0^3 = \frac{1}{2} e^{-6} + 3 - \frac{1}{2} + 0$$

$$= \boxed{\frac{1}{2e^6} + \frac{5}{2}}$$