

$$1) \int_1^4 \int_0^{\ln y} f(x, y) dx dy$$

$$1 \leq y \leq 4, \quad 0 \leq x \leq \ln y$$

$$0 \leq x \leq \ln 4, \quad e^x \leq y \leq 4$$

$$2) \int_0^2 \int_{y/2}^1 \frac{1}{(x^2+1)^2} dx dy$$

$$\int_0^1 \int_0^{2x} \frac{1}{(x^2+1)^2} dy dx$$

$$\int_0^{2x} \frac{1}{(x^2+1)^2} dy = \frac{1}{(x^2+1)^2} \cdot 2x$$

$$\int_0^1 \frac{2x}{(x^2+1)^2} dx = \left(\frac{1}{2} \right)$$

$$x^2+1 = u \quad \frac{2x}{u} \cdot \frac{du}{2}$$

$$2x dx = du$$